THE
ELEMENTS
OF
MATERIA MEDICA
AND
THERAPEUTICS.

BY
JONATHAN PEREIRA, M.D. F.R.S. & L.S.

LICENTIATE OF THE ROYAL COLLEGE OF PHYSICIANS IN LONDON;
MEMBER OF THE ROYAL COLLEGE OF SURGONS;
FELLOW OF THE ROYAL MEDICAL AND CHIRURGICAL SOCIETY;
CORRESPONDING MEMBER OF THE SOCIETY OF PHARMACY OF PARIS;
HONORARY MEMBER OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN;
EXAMINER IN MATERIA MEDICA AND PHARMACY TO THE UNIVERSITY OF LONDON;
AND ASSISTANT PHYSICIAN TO, AND LECTURER ON MATERIA MEDICA AT, THE LONDON HOSPITAL.

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TO

JOHN LINDLEY, PH. D. F.R.S.

PROFESSOR OF BOTANY IN UNIVERSITY COLLEGE, LONDON,

VICE-SECRETARY OF THE HORTICULTURAL SOCIETY,

ETC. ETC. ETC.

The Second Volume of this Work is Dedicated,

AS A

TESTIMONY OF ADMIRATION OF HIS BRILLIANT TALENTS

AND EXTENSIVE BOTANICAL ACQUISITIONS,

BY HIS OBLIGED FRIEND,

THE AUTHOR.
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| Agathotes Chirayta | ... | ... |
| Infusum Chiretta | ... | ... |

| Erythrea Centaurium | ... | ... |
| Menyanthes trifoliata | ... | ... |
| * Fraxern Walteri | ... | ... |

**ORDER xlii.—Spigeliaceæ**

| Spigelia Marilandica | ... | ... |
| Infusum Spigeliae | ... | ... |
| * Spigelia Anthelmintica | ... | ... |

**ORDER xliii.—Asclepiadaceæ**

| Calatropis gigantea | ... | ... |
| Hemidesmus indicus | ... | ... |
| Cynanchum Argel | ... | ... |
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| Secamone Alpini | ... | ... |

**ORDER xlv.—Apocynaceæ**

| Strychnos Nux-vomica | ... | ... |
| 1. Tinctura Nucis-vomicae | ... | ... |
| 2. Extractum Nucis-vomicae | ... | ... |
| 3. Strychnia | ... | ... |
| * Other Medicinal or Poisonous Apocynaceæ | ... | ... |

**ORDER xlv.—Oleaceæ**

| Olea europaea | ... | ... |
| Ornus europaea | ... | ... |

**ORDER xlvii.—Styraceæ**

| Styrax officinale | ... | ... |
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| 2. Pilulæ Styracis compositae | ... | ... |

| Styrax Benzoin | ... | ... |
| 1. Tinctura Benzoini composita | ... | ... |
| 2. Fumigating pastiles | ... | ... |

2. Calycidóre.

**ORDER xlviii.—Pyrolaceæ**

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1. Tinctura Lactucarii
2. Trochisci Lactucarii

Lactuca virosa

* Cichorium Intybus

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Valeriana officinalis

1. Infusum Valerianae
2. Tinctura Valeriana
3. Tinctura Valeriana composita
   * Other Medicinal Valerianaceae

ORDER LII.—RUBIACEAE

Cinchona

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Botanical species
Description of the barks
1. Cinchona Corone
2. Cinchona Huanuco
3. Cinchona Jaen
4. Cinchona Huamalies
5. Cinchona Calisaya seu Regia
6. Cinchona rubra
7. Cinchona Loxa alba
8. Cinchona de Cartagena dura
9. Cinchona de Cartagena fibrosa
10. Cinchona de cusco
11. Cinchona aurantiacea de Santa Fé
12. Cinchona nova
13. Red Cinchona with a white micaceous epidermis

Composition
Chemical Characteristics
Ditto — of the goodness of Cinchona
Physiological Effects
Uses
Preparations
1. Infusum Cinchone
2. Decoctum Cinchone
3. Tinctura Cinchone
4. Tinctura Cinchone composita
5. Extractum Cinchone
6. Quinae Disulphas

Cephaelis Ipecacuanha

1. Vinum Ipecacuanhae
2. Syrupus Ipecacuanhae
3. Pulvis Ipecacuanhae compositus
4. Pilulae Ipecacuanhae et Opii
5. Trochisci Morphiae et Ipecacuanhae
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**Order LVIII.**

- Cucurbitaceae
  - Cucumis Colocynthis
  1. Extractum Colocynthis
  2. Extractum Colocynthis composite
  3. Pilulae Colocynthis et Hyoscyami
  4. Enema Colocynthis
- Momordica Elaterium
  5. Other Cucurbitaceae, Dietetical, Medicinal, or Poisonous

**Order LXXI.**

- Melaleuca minor
- Caryophyllus aromaticus
  1. Infusum Caryophylli
  2. Oleum Caryophylli
  3. Tinctura Caryophylli
- Eugenia Pimenta
  1. Oleum Pimentae
  2. Spiritus Pimentae
  3. Aqua Pimentae
  4. *Eucalyptus resinifera* (Botany Bay Kino)

**Order LXXII.**

- Lythraceae
- Lythrum Salicaria
- Punica Granatum
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3. Trochisci Acidæ tartarici
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Pilulæ Cambogiæ compositæ
Canella alba
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Citrus Bergamia
Citrus Limonum
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Citrus Aurantium
Citrus vulgaris
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Thea

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Decoctum Altheae

Hibiscus officinalis

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   2. Syrupsus Altheae

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   2. Oleum Lini
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   4. Cataplasma Lini

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Adonis Caryophyllus

ORDER LXXVII.—POLYGALACEAE

Polygala Senega

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Echinops pratensis

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Sclera officinalis

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Sclera officinalis

Sclera alba
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Syrupus Rhoados...
Papaver somniferum...
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2. Opium...
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   Description...
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   Composition...
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   Application to medico-legal purposes...
   Estimation of the purity and strength...
   Physiological effects...
   Opium-eating...
   Opium-smoking...
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   Uses...
   Administration...
   Antidotes...

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b. Preparations of Opium.
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   3. Pilula Calomelanos et Opii...
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   6. Pulvis Creta compositus cum Opio...
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   9. Extractum Opii purificatum...
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   10. Tinctura Opii...
   11. Enema Opii...
   12. Linimentum Opii...
   13. Vinum Opii...
   14. Tinctura Opii ammoniata...
   15. Aetum Opii...
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   17. Tinctura Camphora composita...
   18. Pilula Styracis composita...
   19. Pulvis Ipecacuanhae compositus...
   20. Pilula Ipecacuanhae composita...
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Uses

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2. Tinctura Cantharidis

3. Ceratum Cantharidis

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6. Emplastrum Cantharidis compositum

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*List of Woodcuts*
Tabular View

OF

THE HISTORY AND LITERATURE

OF THE

MATERIA MEDICA.

1. WORKS ON THE HISTORY OF MEDICINE GENERALLY.

AEGE (Dr. D.). Historie de la Médecine. Gen. 1696. 4to; Amst. 1725. 4to; à la Haye, 1729. 4to, s. 1744. to the time of Galen. An English translation, by D. R. Drake and Baden, 8vo. ed. 1799.

AEGE (Dr. J.). The History of Physick from the time of Galen to the beginning of the Sixteenth Century. 2 vols. 8vo. Lond. 3d ed. 1727.

AEGE (Dr. J. H.). Historia Medicina a rurum initio ad annum urbis Romae DXXXV. deducta. 8vo. 1728.

AEGE (Dr. J. C. G.). Institutiones Historic Medicinae. 8vo. Norimb. 1792.

AEGE (Dr. K.) Histor. Versuch einer pragmatischen Geschichte der Arzneikunde. 3 Aufl. 5 in 6 Th. w. Halle, 1821-26. (There is a French translation in 2 vols. by A. L. Jourdan, of the 2nd ed. de 1815-20.)

AEGE (Dr. L.). Tafeln zur Geschichte der Medizin nach der Ordnung ihrer Doctrinen. 4to. Halle, 1822. 10.


AEGE (William). The History of Medicine, Surgery, and Anatomy, from the Creation of the World to the commencement of the Nineteenth Century. 3 vols. small 8vo. Lond. 1831.


AEGE (C.). Atlas Historique et Bibliographique de la Médecine, ou Histoire de la Médecine. 1864. (A translation of Cleland’s Tables, with some additions.)

2. WORKS CONTAINING A SPECIAL HISTORY OF PHARMACOLOGY.


3. CATALOGUES OF PHARMACOLOGICAL WORKS.


Watt (Dr. Robt.). Bibliotheca Britannica, or a general introduction to British and Foreign literature. 2 vols. Svo. Edinburgh, 1824. (See vol. iv.; subject: Materia Medica: Medicines, Pharmacopoeia, and Pharmacy.)

Sprengel (C.). Literatura Medica externa recentior seu enumeratio librorum piorumque coeminentiorum singularium, ad doctrinas medicas insistentium, qui extra Germaniam ab anno 1750 impressi sunt. Lipsiae, 1829.


EGYPTIAN MEDICINE.

Thout or Thaot (also called Hermes or Mercury) regarded as the founder of Medical practice in Egypt. He was the god of the study of one disease. (Herod. Enterpe LXXXIV.)

The sick exposed in public places (Strabo), and put on a diet of purges, vomits, and clysers, used for three days successively in every month. (LXXVII.) Abstinence; dietetical regulations: the hog regarded as unclean. Bath and ungents.

Worshipped a bulbous plant (Kysóμοι; Squilla?) to which they erected a temple (Papyrus).

 Employed aicide, slime of the Nile, frictions with crocodile’s fat in rheumatic complaints; mohillage of aconitum pygialis; salt, stéon (carbonate of soda); alum, plaster, and ungents; white lead and verdigris occasionally cast into the latter.

Fumigations with cymk (Kύμα) a mixture of various drugs. (Dioscorides, l. c., 24.)

Spices, balm, and myrrh, carried to Egypt, and doubtless used by the Egyptians. (Gen. xxxvii. 25.)

1720
EGYPTIAN MEDICINE.—Continued.

Embalming practiced. Palm wine, aromatics, myrrh, cassia, and other odorous substances (not frankincense), as well as sicut (sulfuric acid) and gum used in this process. (Herod, Euterpe, LXXVII.)

Alexandria School [see Greek Medicine].

HEBREW MEDICINE.

The infliction and cure of diseases on various occasions ascribed by the Sacred Historian to the direct interposition of God. (Exod. ix. 15. Numb. xii. 10.)

Remedial agents consisted principally in strict hygienic means. (Circumcision, dietary rules, separation, ablation, combustion of infected garments. (See Gen. xvii. 10; Lev. xi. & xii; 2 Kings, v.)

Medicine practised by the Priests. (Lev. xix. 25, 31.) Gold, silver, lead, tin, iron, and brass (copper?) mentioned by Moses.

Oleiferous ointment and confection; the most ancient recipes on record. (Exod. xxx. 25–26, 34–35.)

"There are named in the Pentateuch about 29 minerals, 10 vegetables and animals" (Alston).

Music employed as a remedy. (2 Sam. xvi. 16.)

Sesquio-lignite of antimony used as a face paint. (2 Kings, ix. 30.)

Fig poultice. (2 Kings, xx, 7.)

Physicians (not priests) referred to. (Jerem. viii. 22.)

N.B. The so-called Egyptian physicians (Genes. i. 2.) were probably *epagantas*, undertakers, or embalmers.

The following substances are referred to in the Bible: the Olive, Saffron, Barley, Wheat, the Fig, the Vine, Myrrh, Balsamum, Gumnam, Cumin, Coriander, Flux, Garlic, Balm of Gilead, Olibanum (Frankincense), Cassia, Cinnamon, the Almond, the Pomegranate, Dill [in our translation incorrectly called Amise]—Colocynth? Rycius? Herbodes let down into a bath of oil. (Josephus, Bell. Jud. lib. i. cap. 33, § 3.)

Oil and wine applied to wounds. (Luke, x. 31.)

Various superstitious practices. (Adam Clarke Comm. Note to Mark, v. 26.)


CHINESE MEDICINE.

Of its ancient state but little is known. The Chinese pretend that its study was coeval with the foundation of their empire, and that their medical code was the production of Shou, B.C. 2000. (Grossier.) Before the Christian era there was a constant communication between China and India. (Asiat. Jour. July, 1836.)

Medical science commenced with Chang-ka; for all works before that (said to be dated B.C. 1105 and 1893) treat of medicine, without giving prescriptions. (Treaty of Med. Soc. of Calc. i. 146.) As the Chinese have retained their ancient manners and customs, we must judge of what their medicine was by what it is.

Pseudo-mon (or Herbal), the most considerable Chinese work on Materia Medica, includes minerals, vegetables, and animals. Davies, ii. 278. [A copy in the British Museum.]

Ching che cho chang (Approved work of Medical Practice), a celebrated work in 40 vol.; of which, eight are devoted to Lay-sung (Pharmacology). The articles of the Materia Medica are very numerous. Ginseng is their panacea. Aromatic plants and gums in infusoried cases. Opium as an anodyne and in dysentery. Mercury both raw and oxidized. Musk, rhubarb, tea, cumin of the Dryasian, saffron, spices,
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<td>1. Ancient Medical Authorities and their Works.</td>
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<td>Brahma the Hindu Deity; author of the Vedas, the most ancient books of does, and next in antiquity to those of Moses. (Sir W. Jones, Disc. ix.) Ayur Veda, the oldest medical writing of the Hindus, forms a part of the 4th c. of Veda (the least ancient Veda). It is distributed into eight subdivisions. S. Wilson, Calcutta Orient. Mag., Feb. and March 1823; and Royce, Essay, p. 126. Dachsh, the Prayapati, to whom Brahma communicated the Ayur Veda, insates two Aways or Sons of Surya (the Surgical attendants of the gods). According to some the Aways instructed Indra, the preceptor of Dhan (also styled Kasinaja, prince of Benares); but others make Athaya, Bhad and Charaka, prior to the latter. Charaka (Sarava, Saric, Sekro or Xaro) mentioned by Sarapiao, Avic. Rheevo. His work is extant, but not translated. Subrasa, son of Vishwamitra, was pupil of Dhanwantari and contemporary. He treats chiefly of Salysa and Saligaya or Surgery, and divides medicines into (animals) both viviparous and oviparous, and produced in moist non-locomotive (plants and minerals). Gold, Silver, Arsenic, Mercury, Earths, and Pearls, are enumerated; also Heat and Cold, Light and Dark, increase and decrease of the Moon’s age, as remedial means. Lithotomy. In the Futas, Venesection. 127 weapons and instruments. Actus Alkaline caustics. Hael metallic plates. Lecches. Scroda used as glasses. Astringent and emollient applications. Leaves, ploquets, threads, dages. Drastic and mild purgatives, enemas, diaphoretics, baths, and soap water, Stimulants, Sedatives, Narcotics, and Acid poisons all employed. Nux Vomica, Croton Tigillum, Myrobalans, &amp;c. were adopted by the Arabs.</td>
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| A.D. | Date uncertain; Carmed in the 4th Century, A.D. and probably much more ancient. |

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<th>B.C.</th>
<th>2. Early Translations from Hindu Works.</th>
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<td>a. Tamil, by Mahaj Rishi Agastia, who is named, in the Ramanava, Hindu profane work, and which is supposed to have been revised by the poet in the reign of Vikrama. The 2357. (For a class in the Tamil work called the Kaliapandana, see Royce’s Essay, p. 54.) Chingalec. (See a list in Anville’s Mat. Ind. vol. ii. p. 592; also Heyne’s India, p. 125—171.)</td>
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<td>7. Tibetian made in the eighth century. (See Cossa de Foros, in Journ. iv. 1.) 715 substances are mentioned, most of which are indigenous in Ind.</td>
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<tr>
<td></td>
<td>Cannot be determined by Hindu chronology or authors; hence must be a from other sources. The great antiquity of Hindu Medicine is proved by the circumstances:</td>
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<tr>
<td></td>
<td>a. Indian products are mentioned in the Bible. (Royce, p. 138.) In early commerce was established between India and Persia, Syria, and Babylon; all Persian and Arabian Gulph, with Egypt, &amp;c.</td>
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<td></td>
<td>b. At a very early period India was peopled and in a high state of civilization; see Royce, p. 130 to 179.) As many chemical arts (e.g., distillation, dyeing, calico printing, tanning, soap and glass making, manufacture of indigo) were practised by the Hindus, who were acquainted with, and the contains, all the chemical substances mentioned by Geber, it is not improbably, and not the Arabs, originated Chemistry. The Grecian ages travel East; hence the coincidences between the systems and discoveries of the 4 those recorded in Sanscrit works.</td>
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</table>
|      | 7 Indian products are mentioned by the Greeks and Romans (e.g., by H. Theophrastus, Dioscorides, Pliny, Oribasius, Elius, and Paulus). They were less employed in the countries where they were indigenous before the period.
HINDOO MEDICINE.—Continued.

3. Ancient Inscriptions show the Antiquity of Hindoo Medicine. A medical edict by King Priyadas, directing the establishment of depots of medicine, and the planting of medicinal roots and herbs throughout his dominions and in the countries where Antiochus and his generals commanded. This, therefore, must have been issued and cut in rocks and metal pillars as early as B. C. 229.

4. The Persians translated Hindoo Works A.D. 531 to 579. (Royle’s Essay, p. 68.)

5. Hindoo physicians were in high repute at the Court of Harum Al-Rashid and Al-Mamun, from A.D. 768 to 830.

6. The Arabian authors (Rhazes, Serapion, Mesue, and Avicenna) mention Charak, and quote from the Susruta.


4. English Writers on Indian Materia Medica.

FLEMING (Dr.). Catalogue of Indian Medicinal Plants and Drugs in the Asiatic Researches. Vol. 3.

AISALIE (Dr. W.). Materia Medica of Hindostan. 4to. 1813.—Materia Indica. 2 vols. 8vo. 1826.

ROYCE (J. F.). List of Articles of Materia Medica obtained in the Bazaars of the Western and Northern Provinces of India. In the Journal of the Asiatic Society of Bengal. 1 vol. 1832.

O’SULLIVAN (W. B.). The Bengal Dispensatory and Pharmacopeia. Chiefly compiled from the Works of Ray, Wallach, Aisalie, Wight and Ainslie, Royce, Potier, Richard and See, and including the results of numerous special experiments. Published by order of Government. Calcutta. [Three parts, including pp. 622, 534, have appeared.]

Much valuable information on Indian Materia Medica is contained in Royce’s “Illustrations of the Beeswax and other branches of the Natural History of the Himalaya Mountains,” 8vo. 1832–41. Several interesting papers on the same subjects have appeared in the Anglo-Indian Journals. See also the works of HENRY, BUCHANAN (HAMILTON), and CRAWFORD.

GREEK MEDICINE.

1. Before the time of Hippocrates.

MELAMPUS, a soothsayer and physician. Cured impotence by iron wine (Apollod. Bibli. Fr. transl. lib. i. cap. ix. p. 76); and madness by hellebore (Pliny, xxv. 21).

CERES, a CENTAUR, a physician and surgeon. Was cured of a wound by the Centaurus Centaurae (Ibid. xxv. 30). Had several pupils, as Hercules (to whom the invention of the warm bath is ascribed) and Asclepius.

ASCLEPIUS, or ASCLEPIUS, renowned for his medical and surgical skill. Employed amulets, incantations, charms, potions, incisions, and topical remedies (Le Clerc). His sons MACHAON and PUBLILIUS also famous surgeons; the latter practised venesection.

Destruction of Troy. The first temple to Asclepius founded.

EUCRATES, the author of the Priam. Kypas or Cynidian Sentences.

HERODOTUS mentions the Papyrus somnifereum, sulphur fumations, pyres (‘Cauinae indicae’; opium 77), Moly (7), &c.

ARISTOCREAS discovered Silphium (see p. 1435).

PYTHAGORAS employed Magic, Dietetics, Mustard, Anise, and Vinegar of Squills (Pliny xix. 30).

ASCLEPIADS. Descendants and followers of Asclepius and priests of his temples. Extended over 700 years, i. e. until Hippocrates. The temples became schools of medicine, the most celebrated of which were the Cean and the Gnidian. The priests of the former attempted to unite reasoning with experience; those of the latter attached themselves to observations and matters of fact. The remedies used were Gnidian berries, juice of euphorbium, hellebore, scammony, coloquynth, brosio, elaterium, mineral waters, &c. (Le Clerc, Sprengel, Bostock). Votive tablets were erected in the temples.
### HISTORICAL TABLE OF THE MATERIA MEDICA.

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| 460—360 | Hippocrates the "Father of Medicine." Born at Cos. The 16th by his father Esculapius. Ascribes diseases to alterations of the humours (blood, phlegm, and yellow and black bile). An antipathic. Employed diet, baths, blood-letting (venesection, cupping, and scarification), the actual cauterity, and a very extensive series of medicines. Alston found in the works which he named the name of Hippocrates "about 36 mineral, 200 vegetable, and 150 antiseptics," and he adds, "I cannot pretend to have overlooked none." The materia medica includes:

1st. Minerals—sulphur, lime, carbonate of soda, alum, common salt, oxide of lead, acetate (and sulphate?) of copper, oxide of iron, and yellow and phuret of arsenic.

2ndly. Vegetables—acacia, album, ammoniacum, and ammonium, anther, and optima, cardamom, cinnamon, colocynth, coriander, coriandrum, coccus, cuminum, cydonia, elaeophora, fermentum, galbanum, galle, glycyrrhiza, gindium, heliobota, cyamus, juniper, lactua, laurus, linnum, malva, marshmallow, mastic, morus, myrrha, oler, opium, opolabalanum, opsonum, origanum, piper, psyllium, punica, quercus, rus, rubia, ramum, rubus, sambucus, sapagum, sanguis, scilla, silphium, silphium, saponaria, sphyx, turpentine, and veratum.

3rdly. Animals—acridum (Mylabris Fissilinai?), castoreum, sepia, cor, scorba lactis, and cera.

380—322 | Ancient Dogmatic (or Hippocratic) School (Theory in Medicine) Founded by Thessalus and Diroco (Sons of Hippocrates), in conjunction with his brother in law. —334. Dioscorides Carystius (called the second crater) wrote on plants and diseases. Gave a lead bullet in 1251. —338. Gerasias of Cos (the last of the Asclepiadse); vegetable medicines. —326. Ceres of Callas, opposed bleeding and purging, and vegetable medicines.


384—322 | Natural Historians. 384—322. Aristotle; wrote on animals (also on pharmacy). 371—286. Theophrastus, the founder of botany.


100 | Galen (Claudius) first used by Gentius, king of Illyria.

547 | Methodic Sect. —100. Asclepiades of Bithynia rejected all previous opinions and termed the Hippocratic system "a meditatio on death." —83. Theophrastus, pupil of Asclepiades, founder of the sect. Explained all physiologic pathological doctrines by the strictures and laxae of the organic pores, and all medicines as astringents or relaxants. Employed locches.

131—200 | Dioscorides (Peduncus). The most renowned of all the old writers on Medicine. His work is the best of the ancient ones on the subject, and for 1600 years it was the first authority. "In him I counted about 30 minerals, 700 ph 168 animal substances, that is 958 in all, without reckoning the different six same substance often afforded." (Alston, Lect. 1. 15.) Dr. Sibthorp visited Greece with a purpose of studying the spot the Greek plants of Dioscorides. (Flora and Prod. F. Greek, by Sir J. R. Smith.)

300 | Galen (Claudius) a brilliant genius of vast erudition and rare talents. Explained his operations of medicines by reference to their elementary qualities (heat, cold, and moisture), of each of which he admitted four degrees. This doctrine was adopted by the schools until the time of Paracelsus. Galen gives the names and virtues of plants, 180 animal, and 100 mineral substances. (Alston.)

4. From Galen to the fall of the Greek School.

Osirias. Transcribes and abridges Dioscorides and Galen. Both he and were called Simas Galeni (Alston).

Aphie. Employed musk medicinally.

Alexander Traillius. First mentions rhubarb, which he states was of the liver and in dysentery. Notices hermolycol. Used mild.
**GREEK MEDICINES—Continued.**

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<td>PAULUS EMETETA. First notices the purgative properties of rhubarb. Distinguishes between Eka and Rheen. Describes the effects of hermodactyl. Seth (Simeon). Notices camphor.</td>
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<td>(Minor Greek Authors.)</td>
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<td>ACTUARIUS (John). Mentions capisicus (edaphus). The first Greek who mentions the mild purgatives (as cassia, manna, senna, myrrhalsas). Myrsippos (Nicholas).</td>
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**5. Modern Greek Medicine.**


**ROMANS OR ITALIANS.**

In the early periods of Roman history medicine was practised by slaves and freedmen. MAMERISTES. Employed escharotics. Invented Dacrylsa plaster.

CELLES (A. Cornelius). De Medicina. A methodist? An elegant writer. Lays down hygienic rules. Distinguishes foods according to the degree of their nutritive power and digestibility. His remarks on these subjects, as well as on the use of remedial agents generally, display great judgment. Speaks of the use of nourishing clysters, gustation, baths, frictions, &c. Employed in dropsy, frictions with oil.

SCROPHON/LABOUR. An empiric. His work (Compositiones Medicae) is the first pharmaepoeia known.

PLINIUS the Elder (Cainus). A natural historian. In his work (Historia Naturalis) he has collected all that was known in his time, of the arts, sciences, natural history, &c. He displays prodigious learning and a vast fund of erudition. In botany and materia medica he has copied almost verbatim the remarks of Theophrastus and Dioscorides.

CELLES AURELIANUS. A methodist. The only one of this sect whose works have descended to us.

**PERSIAN MEDICINE.**

Must be very ancient, but its history scarcely known. Products of Persia (ex. galbanum, asafetida, macepumpum, &c.) mentioned in the Bible or by Hippocrates: it is to be presumed that the Persians knew the medical qualities of their indigenous drugs, previous to selling them.


MOON恤 MOOMIN. Tooke of Moonim. The most esteemed of the Persian works. The author states that he is the third, in the order of time, who had written on medicines in the Persian languages. (Royle, p. 26.)

MOHIMMAH AT DORICH or Storehouse of Medicines. Hoglow, 1824. 2 vols. smal. fol. (Royle, p. 26.)

**Notes:**

1. See also GLEWELL’S “Compendious Vocabulary, English and Persian, including all the Simple in the Materia Medica employed in Modern Practice,” 1802, Maha 1306; Dr. K. SELIGMANN, “Uber drei wicht-

2. Dr. Royles has suggested to me the propriety of making a distinction between the Materia Medica of the Persians previous and subsequent to that of the Arabs. But convenience and limited space have prevented me from adopting his suggestion.
ARABIANS.

767
Bagdad built. The sciences magnificently patronised by the Caliph. A college and练s established.
Schools of Damascis and Cordova.
The doctrines of Hippocrates and Galen taught. Mases, rhubarb, and senna, substituted for ointments. Chemical medicines in use.
Various pharmaceutical preparations (syrops, juleps, conserves, lozenges, roes, boiled waters and oils) contrived. Dispensatories published.

622
Died 872
Born 702

Aaron of Ashron (The Pseudo).

Born-Samel (Sabor) Khabidas, the first Dispensatory.

Alkende (J.). Wrote on the proportions and dosages of medicines.

Gerber, The Patriarch of Chemistry. Mentions nitric acid, vinegar, aqua regis, carbonates of potash and soda, caustic soda, nitrate of potash, molucca, alum, sulphate of iron, borax, nitrate of silver, bichloride and bismuth, calomel, lihahge, and red lead. May have obtained his knowledge from the Hindus. (See Hidade Medicina.)

Mesue (John). De simplicibus et de electuaribus.

Serapion (John, Jude). De simplicibus medicinis.

652 to 932

Arn Guvith or Ahren Grevith. De simplic. medicam. virtut.

Rhazes. De simplicibus medicinis. One of the most celebrated Arabians. Emetta. Mercarial ointment.

Enisina or Avicenna, "The Prince of Physicians." His Canon medicinae is a treatise from Galen, Aetius, and Rhazes: for five centuries it was regarded as a reliable guide. Mentions croton tiglium, camphor, box gums, macon, natal.

Haly Abbas. (Ametek or the Royal book).

Avenzoar at Seville in Andalusia.

Averroes, a native of Cordova.

690
1179?
Died 1196
or 1186
12th or 13th century
1065

Albuscus of Alsaharavius. Mentions the preparation of rose water.

Arn Bitar or Ibn-Reifar. His works have not been printed, but they are quoted by Persian authors on Materia Medica. (Royse, Essay, p. 28.) Had the most extensive influence in the East.


** In the "Pharmazeutisches Central-Blatt f. 1829," p. 215, is a notice, by Dr. A. Bugshere, of the list of Arabian medicines made by Dr. Schultze, in Arabia.

EARLY CHRISTIAN WRITERS ON MEDICINE.

(Dark Ages.)

Medicine practised by Monks. Magic and Astrology employed in medicine. The Neapolitan Schools of Monte-Cassino and Salerno founded by Benedictine Monks.

Constantine the African. Wrote on diet, and simple and eye medicines.


Matthew Platerius. 1189. Egoiarius of Corbeil.

Hildebrand, Abbot of Bingen. Born 1098. Wrote on medicine. Mentions tinctures and tinctures (supposed to be Hellevorii niger).

John of St. Amand. Commented on the works of Nicollas.
EARLY CHRISTIAN WRITERS ON MEDICINE.—Continued.

ROGER BACON. The most philosophical of the Alchemists.

ARNOLD OF VILLA NOVA. Wrote a commentary on the Regimen Salernitanum. Prepared the oils of turpentine and rosemary.

RAYMOND LULLY. Prepared the oil of rosemary, acetic of lead, ammonio-chloride of mercury, nitric oxide of mercury, and spirit of wine.

SIMON DE CORSO. 1317. MATTHEW SYLVATICUS. 1320. (death) PETER DE APONO. 1328. FRANCIS OF PIERNOST. 1345. DONDIS, father and son.

PLATERRUS (John). Antidotarium Nicolai cum expositione.

ST. ARDOVIC. Red oxide of mercury.

BASIL VALENTINE. Prepared chemical medicines. Introduced antimonials (curru triumphi citronヌ). Was acquainted with the double chloride of iron and ammonia, and the acetate of lead.

VALENSCUS DE TARENTO.

Ortus sanitatis (first botanical figures).

CALDEMICUS discovers America. Tobacco and its use for smoking first known.

Mercury employed externally in syphilis.

Guaiacum introduced into Europe by the Spaniards.

PANACEUS. A vain, ignorant, arrogant, drunken quack, fanatical, and impostor. He burrt publicly the works of Galen and Avicenna, declaring that his shoe-strings possessed more knowledge than these two celebrated physicians, and asserted that he possessed the elixir of life! He was a calist, astrologer, and believer in the doctrine of signatures. He conferred several important benefits on medicine: he overturned Galenism, introduced chemical medicines (employed mercury in syphilis), and substituted tinctures, essences, and extracts, for various disgusting preparations. A more favourable opinion of the character of Panaceus is entertained by some writers.

Sarsaparilla first appeared in Europe.

Early botanists in whose works several medicinal plants are distinctly referred to, in some cases, for the first time. 1536. BUNYELIUS; Cardaminae praetensae; Serpulaharum nolicern. 1532. TRUGUS; Fouglore (Campanula sylvestris); Helodina (Solamum luteum nigrum); Dulcamara. 1542. FECHERUS; Stramonium; Digitalis.

GREAT BRITAIN.

Winter's Bark brought to Europe.

Serpeny root noticed by THOMAS JONSON.

WILLIS (Dr. Thos.). Pharmacoeleia Rationalis. 8vo.

Sulphate of Magnesia obtained from the Japanese Waters by DR. GREW.

FLOWER (Sir J. M. D.). Phosphoro-Bazutus: or the Touchstone of Medicines. 2 vols. 8vo.

BATE (Dr. G.). Pharmacoeleia Bateae, by Fuller. 12mo.

DALE (Dr. B.). Pharmacoeleia, seu Manuactia ad Mat. Med. 8vo. 1698.—Stis ed. 4to. 1737.

3697

Sulphuric acid made from sulphur.

MEAD (Dr. Richard). A Mechanical Account of Poisons. 5th ed. 1756. 8vo.

QUINCY (Dr. J.). Pharmacoeleia officinale et extemporanea; or, a Complete English Dispensatory. 14th ed. 1736.

DOUGLAS (James). Index Medicus, or a Catalogue of Singany Medicines. Lond. 1726. 4to.

1739

BRADLEY (R.). A Course of Lectures upon the Materia Medica, Antient and Modern. 8vo.

Spigga is an ethnomedicinal name known.

1743

Senga introduced by DR. TENNANT.

1747

JAMES (Dr. R.). Pharm. Unit. or a New Dispens. 8vo.

1747

HALL (Dr. J.). A History of the Materia Medica. 4to.

1753

BADDELEY (Dr. R.). The General Dispensatory. 8vo.

1754

LEWIS (Wm.). The New Dispensatory. 8vo. Several editions were published during the lifetime of the author.—The Edinburgh New Dispensatory, published after his death, was essentially a new edition of his work. It was successively edited by Dr. Webber, Dr. Duncan, Dr. Rotheram, and Dr. Duncan, jun.

1756

A red astrigent gum (Kino?) described by Dr.-addonsmall.

1766

LEWIS (Wm.). An Experim. Hist. of the Mat. Med. 4to.—4th ed. in 2 vols. 8vo. by DR. ALKIN. 1791.

1783

Bark of Salix alta used by REV. Mr. STONE.

1783

Receipts for preparing Ward's Medicines.

1788

ALEXANDER (Wm.). Experimental Essays. 8vo.

1770

ALFCON (Dr. Ch.). Lectures on the Materia Medica. 2 vols. 4to.

1770

MOORE (Dr. D.). Treatise on Mineral Waters. 8vo. 2 vols.

1772

PRESLEY (Dr. J.). discovered oxygen, protolise of nitrogen, and hydrochloric acid, ammoniacal and sulphurous acid gases.

1775


1775

WITHERING (Dr. Wm.). Account of the Foxglove. 8vo. Birm.

1790

BROWN (Dr. John). Elements of Materia Medica. Regarded all medicines as stimulants and narcotics from each other in little more than the degree in which they exert their stimulating power. (Bromional theory.)

1791

HOME (Dr. F.). Methodus Materia Medica. 12mo.
HISTORICAL TABLE OF THE MATERIA MEDICA.

GREAT BRITAIN—Continued.

A.D. 1782. SAIKES (Dr. W.). Observations on Red Peruian Bark.
1796. DUNCAN (Dr. A.). Heads of Lectures on the Materia Medica. Svo.
1790. CULLEN (Dr. W.). A Treatise of the Materia Medica. Regarded all med. acting by motions excited in, and propagated by, the nervous system.
1790—94. WOODVILLE (Dr. W.). Medical Botany. 4 vols. 4to. 2d ed. 1810.—3d ed. in 2 vols. 1812. Hooker and Spratt, 1812.
1793. ALDERSON (Dr. J.). Essay on Rhus Toxicodendron. Svo.
1794. BIRD (Dr. Thomas) and WATTS (Jas.). Consid. on the Use of Fuciottis Alba. Svo.
1794. RUPERT (J.). Inquiry into the Medical Efficacy of Yellow Bark. Svo.
1829. SAIKES (Dr. W.). Treatise on Mineral Waters. Svo.
1809. HAMILTON (Dr. J.). Observations on Putrid Medicines. Svo.
1809. The existence of Cinchona infused by Dr. Duncum, Jun.
1810. THOMSON (Dr. A. T.). Conspectus of the Pharmacopoeias. 3d ed. 1811.
1811. THOMSON (Dr. A. T.). The London Dispensatory. 2d ed. 1811.
1812. PARIS (Dr. J. A.). Pharmacologia. Svo. 6th ed. 1823.—7th ed. 1833.—Appendix.
1814. YOUNG (Dr. Chas.). Classis. and List of Mat. Med. in the Intro. to Med. Lit.
1815. ROSE (Dr. J.). General Dispensatory. 12mo. Bristol.
1821. Medico-Botanical Society of London established. Some "Address" and sections have been published by the society, but irregularly.
1825. GRAY (Dr. J.). The Elements of Pharmacy, and of the Chemical History of the Materia Medica. 2 vols.
1824. PHILLIPS (Dr.). Trans. of the Pharm. of the Prov. Coll. of Phys. Lond. 2d ed. 1841.
1829. CHRISTIANSON (Dr. J.). Treat. of Diseases. 3d ed. 1835.
1830. BARBER (Dr. F.) and MONTGOMERY (Dr. W. F.). Observ. Chem. and Pract. on Pharm. 2 vols.
1831. BILLING (Dr. J.). First Principles of Medicine. 4th ed. 1841.
1832. HARDIE (Dr. J. L.). Hospital Facts and Observations.
1832. STEPHENSON (Dr. J.). Med. Botany. 4 vols. Svo. Fig. by G. Burrell. 1834.—59.
1834. KANE (J.), Elements of Practical Pharmacy.
1836. SIGMUND (Dr. G. C.). Lect. on Med. and Therap. in the Lancet.
1838. LINDELL (Dr. John). Florula Medicinae. 2 vols. 1838.
1838. URE (Dr. J.). Practical Compendium of Med. and Therap. for Infancy and Childhood. 3d ed. 1841.
1840. LANE (Dr. J. J.). Compendium of Materia Medica and Therapy. 4th ed. 1841.
1840. BEESEY (H.). The Pocket Formulary and Synopsis of the Pharmacopoeias. 2d ed. 1841.
1840. PEREIRA (Dr. J.). The Elements of Materia Medica. 2 vols. 2d ed. 1840.
1841. BELLINGHAM (Dr. J.) Elements of Materia Medica and Pharmacy. 2 vols. 1841.
1842. CHRISTIANSON (Dr. J.). A Dispensatory, or Commentary on the Pharmacopoeias of Great Britain. Edinb.
### HISTORICAL TABLE OF THE MATERIA MEDICA.

#### A.D.

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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<tbody>
<tr>
<td>1542</td>
<td>SYLVIUS (James)</td>
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<tr>
<td>1555</td>
<td>Antimony proscribed.</td>
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<tr>
<td>1565</td>
<td>Antimony permitted.</td>
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<tr>
<td>1675</td>
<td>Tartarized soda discovered by Signette.</td>
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<tr>
<td>1757</td>
<td>LEMERY (N.). <em>Pharmacopée Universelle</em>.</td>
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<tr>
<td>1759</td>
<td>LEMERY (N.). <em>Traité Universel des Drogs simples</em>.</td>
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<tr>
<td>1763</td>
<td>Smurubba bark sent to Paris.</td>
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<tr>
<td>1768</td>
<td>TOURNEOY (J. P). <em>Materia Medica</em>.</td>
</tr>
<tr>
<td>1776</td>
<td>HELMISOCRORGEN sent to Paris.</td>
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<tr>
<td>1792</td>
<td>DESBOIS DE ROCHEPORT. <em>Cours Élément. de la Mat. Méd.</em> 3 vols. 1791.</td>
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<tr>
<td>1793</td>
<td>NARCOTICS discovered by DERRINE.</td>
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<td>1799</td>
<td>PICROTOXIN discovered by BOULLAY.</td>
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<tr>
<td>1802</td>
<td>IODINE discovered by COURTOIS.</td>
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<tr>
<td>1804</td>
<td>THE EXISTENCE OF MORPHINE confirmed by ROUSSET.</td>
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<tr>
<td>1807</td>
<td>PELLETIER and CAVENTOU discover emetine, strychnia, brucis, veratrum, and quina.</td>
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<tr>
<td>1822</td>
<td>CAVENTOU. <em>Traité de la Pharm. théorique</em>. 2 vols. 1822.</td>
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<tr>
<td>1825</td>
<td>HANIN. <em>Cours de la Mat. Méd.</em> 2 vols. 1825.</td>
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<tr>
<td>1828</td>
<td>LABARRIQUE recommends the chlorides of lime and soda.</td>
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<tr>
<td>1835</td>
<td>BROMINE discovered by BALARD.</td>
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<tr>
<td>1850</td>
<td>Derede discovered by ROUSSET.</td>
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*Also* *Journal de Pharmacie*. From 1809 to 1815. *Journal de Pharmacie*. From 1815 to the present day; *Journal de Pharmacie*. From 1823 to the present day.
<table>
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<th>A. D.</th>
<th>Author</th>
<th>Title</th>
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<tr>
<td>1588</td>
<td>Camerarius</td>
<td>Hort. Med. et Philosoph.</td>
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<td>1631</td>
<td>Retzius</td>
<td>Emicit tartar mentioned by Myntisch.</td>
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<td>1636</td>
<td>Sulphate of soda discovered by Glauber.</td>
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<td>1659</td>
<td>Phosphorus discovered by Brandt.</td>
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<td>1684</td>
<td>Schroeder</td>
<td>Pharmacopoeia Medica Chymica. 4to.</td>
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<td>1679</td>
<td>Wepper</td>
<td>Historia Cienta Aequatica. 4to.</td>
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<tr>
<td>1681</td>
<td>Nitrile ether noticed by Kunkel.</td>
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<td>1680</td>
<td>Cascarella mentioned by Steiner.</td>
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<td>1701</td>
<td>Rivinus</td>
<td>Cenoso Medicae. Officina. 4to.</td>
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<td>1712</td>
<td>Kemper (E.)</td>
<td>Anamnesea exotica. 4to.</td>
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<td>1714</td>
<td>Zorn (B.)</td>
<td>Botanologia Medica. 4to.</td>
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<td>1728</td>
<td>Stahl (G. E.)</td>
<td>Materia Medica. 8vo.</td>
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<td>1740</td>
<td>Neumann (Dr. C.)</td>
<td>Praetiosae Chemic. by J. C. Zimmermann; an authentic edition in 1756, under the title of Chymia medica, dogmatically-experimentalis, and his chemical works, by Dr. Lewis. 4to. 1759.</td>
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<tr>
<td>1740</td>
<td>Hoffmann (F.)</td>
<td>Opera amm. physico-medica. 6 vols. fol.</td>
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<td>1755</td>
<td>Lüders (I. L. L.)</td>
<td>Mat. Med. 8vo.</td>
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<td>1758</td>
<td>Vogel (Dr. R. A.)</td>
<td>Hist. Mat. Med. 8vo.</td>
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<tr>
<td>1760</td>
<td>Störck (A.)</td>
<td>On hemlock, stramonium, aconite, hyoscyamus, and colchicum.</td>
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<td>1762</td>
<td>Cantz (L. C.)</td>
<td>Mat. Med. Syst. 8vo. 3 vols. 2nd ed. 1772.</td>
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<td>1774</td>
<td>Spieelman (J. P.)</td>
<td>Institutiones Mat. Med. 8vo. ed. nov. 1784.</td>
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<td>1774</td>
<td>Murray (Dr. J. A.)</td>
<td>Apparatus Medicum. 8vo. ed. curt. Altorf. 1793.</td>
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<td>1791</td>
<td>Arndmann (Dr. J.)</td>
<td>Praktische Arzneimitteltheile. 8vo. 6th ed. by Kraus.</td>
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<td>1791</td>
<td>Arndmann (Dr. J.)</td>
<td>Chirurgische Arzneimitteltheile. 6th ed. by Kraus. 1818.</td>
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<td>1788</td>
<td>Biörner (E. G.)</td>
<td>Literatur der Neuesten Materia Medica, 8vo.</td>
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<td>1793</td>
<td>Schlegel (J. C. T.)</td>
<td>Thesaurus Materiae Medicae. 3 vols. 8vo.</td>
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<td>1795</td>
<td>Gmelin (J. F.)</td>
<td>Apparum Medicum, reumam mineralium compless. (See J. A. Murray). 8vo.</td>
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<tr>
<td>1797</td>
<td>Sion (F. L.)</td>
<td>Handbuch der praktische Arzneimitteltheile. 8vo.</td>
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<td>1797</td>
<td>Jahn (F.)</td>
<td>Auswahl der wirksamsten Arzneimittel. 8vo.</td>
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<td>1800</td>
<td>Swediaur (D. F.)</td>
<td>Materia Medica. 12mo.</td>
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<tr>
<td>1802</td>
<td>Frank (J. S.)</td>
<td>Vernich einer theoretisch praktischen Arzneimitteltheile nach den Principien der Erregungstheorie. Erläutert.</td>
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<td>1804</td>
<td>Morphina und Morphin acid discovered by Serturmier.</td>
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<td>1805</td>
<td>Bertele (G. A.)</td>
<td>Handbuch einer dynamischen Arzneimitteltheile. 8vo.</td>
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<td>1807</td>
<td>Burdach (Dr. D. F.)</td>
<td>System der Arzneimitteltheile. 8vo. 2nd ed. 1817-19.</td>
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<td>1818</td>
<td>Würzner (F.)</td>
<td>Grundriss der Arzneimitteltheile. 8vo.</td>
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<td>1838</td>
<td>Ebermaier (Dr. D. C.)</td>
<td>Tauschenbuch der Pharmacie. 8vo.</td>
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<td>1839</td>
<td>Müller (J. H.)</td>
<td>Handbuch der Lebens- und Arzneimitteltheile.</td>
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<td>1840</td>
<td>Harnemann</td>
<td>Organon der rationellen Heilkunde.</td>
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<td>1841</td>
<td>Schön (E.)</td>
<td>Praktische Arzneimitteltheile nach den Grundzügen der Erregungstheorie.</td>
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<tr>
<td>1842</td>
<td>Sprengel (Dr. F.)</td>
<td>Institutiones Pharmaceuticae. 8vo.</td>
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<td>1810</td>
<td>Vogel (Dr. F.)</td>
<td>Vollständiges System der Arzneimitteltheile. 2 vols. 8vo. Heraus von Kühn.</td>
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<tr>
<td>1819</td>
<td>Schwartzer (Dr. F. W.)</td>
<td>Pharmaceuticae Tabulatae. fol. 2nd ed. 1833.</td>
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<tr>
<td>1820</td>
<td>Tiedemann (F.) and Gmelin (L.)</td>
<td>Vernich über die Wapache on sahraln Sulfate aus dem Mangen und Darnonkali aus Rind gelangt. Heidelberg.</td>
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<td>1821</td>
<td>Vogt (Dr. F. W.)</td>
<td>Lehrbuch der Pharmakodynamik. 2nd ed. 1828.</td>
</tr>
<tr>
<td>1824</td>
<td>Martius (Dr. C. F. A.)</td>
<td>Specimen Materiae Medicae Brasiliensis. 4to.</td>
</tr>
<tr>
<td>1825</td>
<td>Jöhr (Dr. C. G.)</td>
<td>Material. zu einer künstlichen Arzneimittel.</td>
</tr>
<tr>
<td>1835</td>
<td>Sundelin (Dr. C.)</td>
<td>Handbuch der speziellen Heilmitteltheile. 3rd ed. 1833.</td>
</tr>
<tr>
<td>1826</td>
<td>Heteron (H. von)</td>
<td>Versuch einer Monographie der Chinea. 4to. plates.</td>
</tr>
<tr>
<td>1826</td>
<td>Richter (G. A.)</td>
<td>Ausführliche Arzneimitteltheile. 6 vols. 8vo.</td>
</tr>
<tr>
<td>1827</td>
<td>Duk (Dr. F. F.)</td>
<td>Die preussische Pharmaceutaer Übersetzung und erweitert. 2 pts. 2nd ed. 8vo. 1829.</td>
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<tr>
<td>1827</td>
<td>Berenreuther (Dr. D. J.)</td>
<td>System der allgemeinen Heilmitteltheile. 2 vols. 8vo.</td>
</tr>
<tr>
<td>1827</td>
<td>Duk (Dr. F. F.) and Kurze (Dr. G.)</td>
<td>Pharmaceutische Warenkunde. 2 vols. 8vo.</td>
</tr>
<tr>
<td>1828</td>
<td>Dierck (Dr. J. H.)</td>
<td>Der neuen Farbstoffen in der Materia Medica. 3rd ed. 1833.</td>
</tr>
<tr>
<td>1832</td>
<td>Hayne</td>
<td>Darstellung und Beschreibung der Arzneimittel. 3rd ed. 1833.</td>
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<tr>
<td>1832</td>
<td>Brandt (F. J.)</td>
<td>Pharmacologia dynamiaca. 2 vols. 8vo.</td>
</tr>
<tr>
<td>1832</td>
<td>Nees von Esenbeck (Dr. Th. F. L.)</td>
<td>Weyher (M. F.)</td>
</tr>
<tr>
<td>1832</td>
<td>Brandt (F. J.) and Ratzinger (J. F. C.)</td>
<td>Medische Zoologie. 2 vols. 8vo.</td>
</tr>
<tr>
<td>1829</td>
<td>Michaelis (Dr.)</td>
<td>Art. Arzneimittel. in the Encyclopaedisches Werterbuch der medizinischen Wissenschaften.</td>
</tr>
</tbody>
</table>
HISTORICAL TABLE OF THE MATERIA MEDICA.

GERMANY.—Continued.

WENDT (Dr. J.), Praktische Materia Medica. 8vo.

MARTIUS (T. W. C.), Das Neueste aus dem Gebiete der Pharmakognosie, als Nachtrag zu Gouanow's Materia Medica. 1st ed. 1840. 2nd ed. 1848. 8vo.

NEER (T. F. L.) and EBERMAIER (C. E.), Handbuch der medizini sch-pharmazeutischen Botanik. 2 vols. 8vo.

SACHS (L. W.) and DULKE (F. P.), Handbuch der Arzneimittelkunde, 19 L. 8vo.

ZENKER (Dr. J. C.) and SCHNEE (Dr. E.), Naturgeschichte der vorzüglichsten Han delspflanzen. 2 vols. 4to.

SCHROFF (Drs. E. S. & K. D.), Arzneimittelkunde und Receptkunde. 12mo.


BACHMANN (W. L.), Handbuch der Arzneimittelkunde. 12mo.

MITSCHERLICH (Dr. G. C.), Lehrbuch der Arzneimittelkunde. 1st ed. 1837. 2 vols.

HOLAND.

DODONAEUS (R.), De Medicina Brasiliensi. Mentisipaeae, copaiba, tapoeca, &c.

CLESUS (C.), Enothece. Libr. X. Lugd. 4to.


VOLLEBRAN (J.), Pharmacologia Universae. 3 parts. Lugd. 8vo.

YEPY (A.), Introductio in Medicum Medicum. Lugd. 8vo.

YEPY (H.), Handbuch der Materia Medica. Amt. 8vo.

VAN HOUTE (J. A.), Handleiding tot de Materia Medica, of Leer der Geneesmiddelen. Amt. 8vo.

VAN WATER (J. A.), Schmokoch noch zoo met mogelijk volledig Handbood voor de Leer der Geneesmiddelen. Amt. 8vo.

HISTORICAL TABLE OF THE MATERIA MEDICA.

BELGIUM.

A.D. 1824

SCANDINAVIA.

(Denmark, Norway, and Sweden.)

1. DENMARK.

1640
PAULI (Simon) *Quadripartitum botanicum de simplicium medicamentorum fusc.* Rostochi 4to. Argent. 1667, 1668, 1673-1728.

1658
BARTHOLINUS (C. Th.), *Dispensatorium Hafniense.* Hafn. 4to.

1727-1840
PHARMACOPEA Danica. Hafn. 1772-1768, 1805, 1840.

1768
BANG (Fr. L.), *Pharmacepea in urum Nascamii Praeventia.* Hafn. 12mo.

1799
MANGOR (C. E.), *Pharmacepea Pauperum.* Hafn. 4to.

1800
MANGOR (C. E.), *Armenapathet.* Hafn.

1804
TYCHEN (Nicolai), *Theoretic et practic Anweisung til Apothekerkunsten.* Kbh. 1 & 2 D 8vo.

1809-10
MYNSTER (O. H.), *Pharmaco Lithica.* Kbh. 2 D 8vo.

1810-12
WENDT (J. C. W.), *Anweisung til at samle, tørre og preserves medicinske Planteter.* Kbh. 8vo.

1811
WENDT (J. C. W.), *Anweisung til Recepteekunsten.* Kbh. 8vo.

1813
PHARMACOPOEIA MILITARIA. Kbh. 8vo.

1828
PHARMACOPOEIA MILITARIA. Kbh. 12mo.

1834-5
DUREF (M.), *Haandbog i Pharmakoepien.* Kbh. 8vo.

1835
OTO (Crist.), *Haandbog i Teozikologien.* Kbh. 8vo.

"* Many articles on pharmacology will be found in the following Danish medical journals —

* For further information respecting Danish and Norwegian works on pharmacology consult —
WINther (M.) "Bibliothek Danske Medicin Histor." 1822.

2. NORWAY.

The Danish and Norwegian literature was common to both countries till their separation in 1814, when Norway was united with Sweden. The language used in writing, and by all educated persons, in speaking, is identical with the Danish. Hence, every medical work published in Denmark till 1814 may be considered also belonging to Norwegian literature. Since that year no work on pharmacology has been published in Norway. The King has, however, appointed a committee to prepare a new pharmacopoeia for that country. The *Pharmacoepia Danica* has, hitherto, been the only one. Several articles on pharmacology have appeared in the following Norwegian periodicals — *Eyr. et medicinsk Tidsskrift.* 11 vols. Commenced in 1826, and continued by Dr. Holst till 1867.

3. SWEDEN.

1666
PHARMACOPOEIA Stockholnensis. Holmiae, 4to.

1677-1717

1749
BERGMANN (T.), A distinguished chemist.

1769

1794-1796
SCHREILE (C. W.), *Discoverer Tartaric Acid in 1770, Chlorine in 1774, solid Cof in 1781, and hydrous Prussic Acid.

1771
RETZIUS (A. J.), *Primitius Scientiarum, suelio eloquente edite, jam Latinae et Göttingae, 8vo.*

1776

1789
PHARMACOPOEIA MILIT. NAR. ET CIV. IN UTOVRIO, qui impresa public. curatur. Stockh. 1789, 8vo.

1792-25
RONANDER (C. W., H.), *Systema Pharmacologica.* Stockholm. 1 Deel; 1, 2, 3.

1794
PHARMACOPOEIA IN UTOVRIO Novo, milit. Holm. Holmiae. 1794, 12mo.

* Besides several pharmacological papers in the following Swedish journals —

HISTORICAL TABLE OF THE MATERIA MEDICA.
PORTUGAL.

1536

1675
Henriquez de Paiva (J. J.), Pharm. Lisbona. Lisb. Svo.

1794

1797
Brottero described the Ipecacuanha plant.

1810
Gomes obtained crystallized Cinchonias.

1830
Alvares (Dr.) O Codigo Farmaceutico ou Tratado de Farmacia. Coimbra.

A pharmaceutical journal is published at Lisbon, under the title of "Jornal da Sociadea Farmaceutica de Lisboa." Of this I have seen one number only, viz. "Tomo II. 6 Anno Numero X." Lisbon published monthly.

UNITED STATES OF AMERICA.

1755
Chair of Materia Medica and Botany in the University of Pennsylvania established. Wood's Address, 1836.

1756
Botany separated from Materia Medica in that University.

1801
Barton (Dr. R. S.). Collections for an Essay towards a Materia Medica of the States. 3rd ed. 1819.

1823
Chimplahia introduced by Dr. Mitchell.

1809
Coxe (Dr. J. R.). The American Dispensatory. Svo. 1826. 8th ed. 1830.

1807
Ergot of Rye introduced by Dr. Sturman.

1810
lobelia inflata introduced by the Rev. Dr. Cutler.

1810
Truckler (Dr. J.). American New Dispensatory. Svo. 2nd ed. 1813.

1817

1817–18
Barton (Dr. W. P. C.). Vegetable Materia Medica of the United States. 2 vols. 2nd ed. 1828.

1817–18

1822

1822
Bogues (Dr. W.). A Treatise on the Materia Medica, intended as a sequel to the cipenia of the United States. Boston.

1827
Eclectic and General Dispensatory. Philadelphia.

1825–30

1830
The Jabor plant (Thusmas purga) described by Mr. Nuttal.

1830–34

1831
The Pharmacopoeia of the United States of America. By authority of the Medical Convention, held at Washington A.D. 1830.

1831
Carpenter (G. W.). Essays on some of the most important Articles of the Materia Medica. 12mo. Philadelphia.

1833
Wood (Dr. G. B.), and Bache (Dr. F.). The Dispensatory of the United States. 1836.

1834
Dundie (Dr. D.). General Therapeutics, or Principles of Medical Practice of the chief remedial agents, and their preparations.

1835
Ewell. Materia Medica in connection with his Medical Companion.

1835
American Journal of Pharmacy. Published under the auspices of the Philadelphia College of Pharmacy. (A continuation of the Journal of the Philadelphia College of Pharmacy) From 1833 to the present time. Svo.

1836
Young. Manual of Materia Medica.

1840

1841
Thomson (Sam.). The Thomsonian Materia Medica, or Botanic Family Physiology. 12th ed. pp. 634. 1841. [Trash. Written by a quack (alleged to be p. 541), tried in America in 1803, for poisoning by the use of Lobelia].
THE

ELEMENTS

OF

MATERIA MEDICA.

II. ORGANISED KINGDOM.

I. The Vegetable Sub-Kingdom.

Division I. Cryptogamia, Linneus.—Flowerless Plants.

ACOTYLEDONES, Jussieu.—CELLULARES, De Candolle.—ACROGENS, Lindley.

Essential Character.—Substance of the plant usually composed of cellular tissue chiefly, either in a spheroidal or elongated state; spiral vessels or ducts only present in the highest orders. Stem either increasing by an extension of its point, or by a regular or irregular development in all directions from one common point; not increasing perceptibly in thickness or density when once formed. Cuticle generally destitute of stomata. Sexual organs, and consequently flowers, absent. Reproduction taking place either by spores or spores (spore sac spore sac), which are inclosed in cases called theca (sporangia) or imbedded in the substance of the plants; or else by a mere dissolution of the utricles of cellular tissue; germination occurring at no fixed point, but upon any part of the surface of the spores (Lindley).

Fig. 132.

Structure of Cryptogamic Plants.

1. Longitudinal section of a stem.
2. Transverse section of a stem.
3. Leaf of a moss with leaves and theca, or end-case.
4. Leaf of a moss magnified.
5. Leafy thallus of a lichen with apothecia.
6. Fungus of the highest tribe.
7. Fungi of the lowest rank.
8. Conifer magnified.
ORDER I.—ALGÆ, Juss.—THE SEA-WEED TRIBE.

ALGÆAE, Lindley.

Essential Character.—Leafless, flowerless plants, with no distinct axis, vegetation, growing [with very few exceptions] in water, frequently having animal motion, and consisting of simple vesicles lying in mucus, or of articulated filaments, or of lobed fronds, formed of uniform cellular tissue. Reproductive matter either altogether wanting, or contained in joints of the fronds, or deposited in theca of various forms, size, and position, caused by dilatations of the substance of the frond. Sporules with no proper integument, in germination elongating in two opposite directions (Lindley).

Properties.—None of the plants of this order are poisonous. A mucilaginous or gelatiniform matter (carrageenin, pectin) and sugar (mannite) render several species nutritious, emollient, and demulcent. Some Algae have been found beneficial in scrofulous affections and glandular enlargements. The general effects are referrible to iodine, and in part, perhaps, to alkaline salts. A purgative property has been ascribed to some species.

Laennec tried the influence of an artificial “marine atmosphere” (air preginiated with the vapour of fresh sea-weed) on consumptive patients, as he was impressed with an idea of its efficacy; but experience shows that inhabitants of sea-coasts are as liable to phthisis as those of inland districts.

1. FU’CUS VESICULO’SUS, Linn. D.—SEA WRACK.

Sex. Syst. Cryptogamia, Algae.

(Herba cum fructu. Ph. D. xiv.)

History.—Theophrastus mentions several species of Algae (spinosus), but he includes under this name Rocella tinctoria. Fucus vesiculosus is sometimes termed Quercus marina, Bladder Fucus, and Common Sea-ware.

Botany. Gen. Char. — Frond plane, compressed or cylindrical, linear, dichotomous, coriaceous. Air-vessels when present innate in the frond, simple, large. Receptacles terminal (except in nodosus), turgid, containing tubercles, imbedded in mucus, and discharging their seeds [sporangia] by conspicuous pores (Greville).


Hab.—Sea-shores. Very common every where.

Physical Properties.—Its substance is thickish, flexible, but very tough. Its colour is dark, olivaceous, glossy green, paler in the extremities, becomes black by drying. Its odour is strong; taste nauseous.

Composition and Characteristics.—It has been analyzed by Stackhouse, by Gaultier de Claubry, by John, and by Fagerström.
is composed of **Cellular Tissue, Mucilaginous Matter (pectin?)**  
Odorous Oil, Colouring and Bitter Matters, and **Salts of Calcium and Sodium** (iodide, sulphates, and chloride).

By treating the distilled water of Fucus vesiculosus with ether, a **semi-solid white Oil** is extracted, which is the odorous principle. The aqueous decoction of this plant is neutral, and contains chloride of sodium, sulphates of soda and lime, and a mucilaginous substance somewhat analogous to *pectin*. It yields, with chlorine and starch, faint traces only of iodine. But if alcohol be added, by which the mucilage and a part of the sulphates are thrown down, the alcoholic liquor evaporated, and the residue mixed with potash, then calcined, and afterwards treated with hydrochloric acid to disengage hydrosulphuric acid, we may detect iodine in the filtered liquor by the deep blue colour formed on the addition of and chlorine¹. By combustion in the open air, this plant yields a *Kelp* (vide p. 551); and by incineration in a crucible it gives a charcoal, termed *Vegetable Ethiops*.

**Biological Effects.** — During the winter, in some of the high islands, horses, cattle, and sheep, are fed on it¹. Its local is detergent, and perhaps disinfectant. Its remote effects are by analogous to those caused by small doses of iodine, modifying the influence of salts of sodium and calcium.

Frictions of the plant, with its contained mucus, were employed with supposed advantage, by Dr. Russell², in glandular enlargements and other scrofulous tumors: the parts were afterwards exposed to sea-water. He also gave internally the expressed juice vesicles in glandular affections¹.

**OPS VEGETABILIS; Vegetable Ethiops.** — This is prepared by heating Fucus vesiculosus in a covered crucible. It is composed of charcoal, Chloride of Sodium, Carbonate of Soda, Sulphuretted Hydrogen and Calcium, and traces of an Alkaline Iodide. It has exhibited in bronchocele and scrofulous maladies. Dr. Russell³

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³ *Dissertation on the Use of Sea-Water*, 5th ed. 1769, pp. 41 and 44.
says, it far exceeds burnt sponge in virtue. It has been employed also as a dentifrice. The dose of it is from ten grains to two drachms.

2. CHONDREUS CRISPUS, Grev.—CARRAGEEN OR IRISH MOSS.

Sex. Syst. Cryptogamia, Algæ.

(Plants, Office.)

History.—It was introduced into medicine by Mr. Todhunter, of Dublin. It is sometimes sold as Pearl Moss.

Botany. Gen. Char.—Frond cartilaginous, dilating upwards into a flat, nerveless, dichotomously divided frond, of a purplish or bluish red colour. Fructification: subspherical capsules [sporangia?] in the substance of the frond (rarely supported on little stalks), and containing a mass of free seeds [sporules?] (Greville).

Sp. Char.—Frond plane, dichotomous, the segments linear, wedge-shaped. Capsules subhemispherical, imbedded in the disk of the frond (Greville).

Hab.—On rocks and stones on the sea-coast: very common. For dietetical and medicinal uses it is collected on the coasts of Ireland (especially in Clare), washed, bleached (by exposure to the sun), and dried.

Physical Properties.—In the recent state it is purple-brown or purple-red, becoming greenish and ultimately whitish in decay. A met with in commerce, it is dry, crisp, mostly yellowish or dirty white, but intermixed with purplish red portions, inodorous or nearly so, with a mucilaginous taste. It swells up in water. A calcareous meshy crust (consisting of various species of Flustra) is frequently found on the frond.

Composition.—It has been analyzed by Herberger and by Feuchtwanger.

<table>
<thead>
<tr>
<th>Herberger</th>
<th>Feuchtwanger</th>
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<tbody>
<tr>
<td>Vegetable jelly</td>
<td>Jelly (a large portion)</td>
</tr>
<tr>
<td>Mucus</td>
<td>Pectin</td>
</tr>
<tr>
<td>Gum</td>
<td>Starch</td>
</tr>
<tr>
<td>Two resins</td>
<td>Oxalate of lime</td>
</tr>
<tr>
<td>Pasty matter and free acids</td>
<td>Compounds of sulphur, chlorine, and bromine</td>
</tr>
<tr>
<td>Chlorides of sodium and calcium, potash, lime, &amp;c.</td>
<td>No fungic, botanic, or lichenic acids</td>
</tr>
<tr>
<td>No traces of iodine or bromine could be recognized</td>
<td></td>
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Carrageenin.—The mucilaginous matter (called by some writers Vegetable Jelly, by others Pectin,) appears to me to be a peculiar substance, which I should term Carrageenin. It is soluble in boiling water, and its solution forms a precipitate with diacetate of lead and silicate of potash, and, if sufficiently concentrated, gelatinizes on cooling. Carrageenin is distinguished from ordinary gum by its aqueous solution not producing a precipitate on the addition of alcohol; from starch, by its not assuming a blue colour with tincture of iodine; from animal jelly, by tincture of nutgalls causing no precipitate; from pectin, by acetate.

* An anonymous reviewer (Edin. Med. and Surg. Journ. vol. iv. p. 220) states that Chondrus may be a millimion in tolerably large quantity is occasionally found in the carrageen of commerce.
* Dierbach, Die neuesten Entdeckungen in der Material Med. 1837.
* American Journal of Science and Art, xxvi.
* More recently both bromine and iodine have been detected in this plant (Pharmaceutisches Central-Blatt, fur 1839, S. 150).
ad not throwing down any thing; as well as by no mucic acid being formed by
action of nitric acid. Dr. Lucas* regards carrageenin as more closely
resembling animal jelly than any other substance.

**Chemical Characteristics.**—The presence of carrageenin in the
coction is demonstrated by the tests just enumerated. No iodine
recognizable by nitric acid and starch. Oxalate of ammonia de-
sects lime (or calcium) in solution, while nitrate of silver points out
the presence of chlorine. Guibourt† could recognize neither sugar
nor magnesia.

**Physiological Effects.**—Chondrus crispus is nutritive, very
gustible, emollient, and demulcent.

**Uses.**—It is a popular remedy for pulmonary complaints (espe-
cially of a phthisical character), chronic diarrhoea and dysentery,
raufla, rickets, enlarged mesenteric glands, irritation of bladder and
aneys, &c. As a culinary article it is employed as a substitute for
jelly, in the preparation of blanc-mange, jellies, white soup,

**Administration.**—It is usually exhibited in the form of decoction
jelly.

1. **Decoctum Chondri.**—Macerate half an ounce of carrageen in cold
warm water, during ten minutes; then boil in three pints of water,
a quarter of an hour. Strain through linen. Milk may be substi-
tuted for water when the decoction is required to be very nutritious.
Doubling the quantity of carrageen a mucilage is procured.
agar, lemon juice, tincture of orange-peel, or aromatics, as cinna-
mon or nutmeg, may be employed as flavouring ingredients.

2. **Gelatina Chondri.**—Prepared by concentrating the decoction,
by employing a larger quantity of carrageen.

3. **Gigartina Helminthocor' ton, Grev.**—**Corsican Moss.**

**Sec. Syst.** Cryptogamia, Alge.

**(Plants, Offic.)**

**History.**—This plant has been in use for several centuries among
natives of Corsica, as a remedy for intestinal worms. In 1756,
Vacher sent it to Paris."

**Botany.** *Gen. Char.—Frond* horny or cartilaginous, filiform, cy-
indrical, irregularly branched. *Fructification* uniform; spherical,
while capsules containing a globose mass of seeds [sporules?]

**Sp. Char.—Frond* cartilaginous, terete, tufted, entangled. *Stem*
form, creeping; branches setaceous, somewhat dichotomous,
marked indistinctly with transverse striae.

**Hab.**—The Mediterranean Sea, on the shores of Corsica.

**Physical Properties.**—Under the name of Corsican moss is sold

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* Berriq, Jabes. xxxiv. Abth. i.
in the shops a mixture of various marine vegetables and animal. The essential, though usually smaller, part of the mixture is the Gigartina Helminthocorton; the remainder consists of Coralline Sertularias, and Ceramiums, to the number of twenty species. Lamouroux states he found the remains of eighty species of marine plants. See also T. C. Martius*

The structure of the frond of Gigartina Helminthocorton is very peculiar, being exceedingly lax and cellular, with a consistence similar to that of the stems and leaf-stalks of some aquatic hexagonal plants, and having the appearance of articulations which do not actually exist†. The fructification is scarcely ever seen. The plant has a reddish grey colour externally, but is whitish internally. Its odour is strong, marine, and disagreeable; its taste is saline.

Composition.—Bouvier‡ obtained from 100 parts of Corsican moss, Vegetable Jelly, 60-2; Vegetable Fibre, 11-0; Chloride of Sodium, 9-2; Sulphate of Lime, 11-2; Carbonate of Lime, 7-5; Iron Manganese, Silica, and Phosphates of Lime, 1-7. Straub§ and Gau tier de Claibry¶ have subsequently detected iodine, but the quantity is small.

Chemical Characteristics.—Corsican moss effervesces with acids, owing to the carbonate of lime which it contains. The brown watery infusion is deepened in colour by sesquichloride of iron, and aslets fall some brown flocculi. Tincture of galls does not alter nitric acid and starch give no indication of iodine.

Physiological Effects.—Its effects are not very obvious. The vegetable jelly must render it nutritive; the iodine and saline matter alterative. Mr. Farr⁵ says, that after using the decoction for seven days, it acts as a diuretic and diaphoretic, and occasional produces nausea and giddiness: after some time the stools become darker, present greenish specks, and are sometimes slimy.

Uses.—It has been principally celebrated as an anthelmint against the large round worm (Ascaris lumbricoides). Bremson ascribes its efficacy to chloride of sodium.

In 1822, Mr. Farr brought it forward as a remedy for cancer. It was led to try it from the circumstance of Napoleon Bonaparte having stated to Barry O'Meara that it was used in Corsica for dispersive tumors. Experience does not warrant us in ascribing any benefit of its employment in this disease.

Administration.—In powder it is given in doses of a scruple two drachms, mixed with honey or sugar; but the more usual mode of exhibiting it is in the form of decoction, prepared by boiling four

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* De Candolle, Essai sur les Propriétés Méd. p. 348, 2d éd.
† Fée, Cours d'Hist. Nat. l. 157.
‡ Grundtvig, d. Pharmakog. 12.
§ Greville, Aime Brkt. p. 146.
¶ Ann. de Chim. ix. 33. 1794.

A Treatise explanatory of a Method whereby occult Cancers may be cured, 2d ed. 1822.

Sur les Vers Intestins. 414.
four to six drachms of Corsican moss in a pint of water; of this the dose is a wine-glassful, three times daily.

OTHER MEDICINAL OR ESCULENT SEA WEEDS.

FIG. 134.

Esculent Sea Weeds.

a, Rhodomenia palmata (or Dulce).
b, Rhodomenia ciliata.
c, Alaria esculenta.
d, Iridaea edulis.
e, Laminaria saccharina.
f, Ulva latissima.

Several species of the inarticulated Algae are occasionally employed, in some parts of the British islands, as articles of food, or as condimentary substances. Taken in this way, they might perhaps prove serviceable in scrofulous affections and glandular enlargements. Besides the species above depicted, the following have also been used: Laminaria digitata (or Tangle, p. 233, fig. 47, d), Porphyra umbilicata and vulgaris (commonly called Laver), Laurencia pinnatifida (Pepper-dale), &c. *

Fucus amyloides or the Ceylon Moss† has been, within the last few years, introduced into India and England by M. Previté. As found in commerce it is white, filiform, and fibrous. It has the usual odour of sea weeds. It consists, according to Dr. O'Shaughnessy, of Vegetable Jelly 54-5, True Starch 15, Ligneous Matter 18, Gum 4, Sulphate and Muriate of Soda 8-5, Sulphate and Phosphate of Lime 1, Wax, Iron, and Loss 1. By boiling in water it yields a liquid which gels on cooling. The decoction or jelly forms an agreeable, light, nourishing, and useful food for invalids and children. It may be used as a substitute for nutritious substances. *

ORDER II.—LICHENES, Juss.—THE LICHEN TRIBE.

Lichenaceae, Lind.

ESSENTIAL CHARACTER.—Perennial plants, often spreading over the surface of the earth, or rocks, or trees, in dry places, in the form of a lobed and foliaceous,

* For further details, consult Dr. Greville’s Algae Britannica, xxx.; London’s Encyclopaedia of Gardening, 3d ed. p. 806; and Plenck’s Bromatologia, pp. 171-3.
† Mr. Crawford (History of the Indian Archipelago, vol. iii. p. 46) calls it Agar-agar.
‡ Transactions of the Royal Medical-Botanical Society for 1837, p. 181.
§ For further particulars respecting it, see Dr. Sigmond and Farre’s work On the Ceylon Moss, 1840.
or hard and crustaceous or leprous substance, called a thallus, crust, or (receptaculum commune). This thallus is formed of a cortical and medullary layer, of which the former is simply cellular, the latter both cellular and ameboïd. In the crustaceous species the cortical and medullary layers are chiefly in texture, and in the former being coloured, in the latter colourless. But in the fruticose or foliaceous species, the medulla is distinctly distinct from the latter occupying the lower half of the thallus, in the former enclosed by the cortical layer. Reproductive matter of two kinds: 1, sporosacs lying in membranaceous tubes (thecae) immersed in nuclei of the medulla, which burst through the cortical layer, and colour and harden exposure to the air in the form of little disks (apothecia), which have different names according to their forms; 2, the separated cells of the medullary layer of the tissue (Lindley, with some additions).

Properties.—The lichens, at least the foliaceous ones, contain a substance (called fuculoid or lichenin), which renders them nutritive, emollient and demulcent. They also possess a bitter principle (cetrarin), from which they derive tonic properties. Several lichens, by maceration in ammoniation, develop brilliant colours, which render them valuable as dyes.

1. Cetraria Islandica, Ach. L. E. D.—ICELAND MOSS

Sex. Syst. Cryptogamia, Alge.

(Cetraria, L. E. D.—Planta, D.)

History.—The medicinal properties of this plant, (usually called Lichen islandicus) were probably first known to the native islanders. According to Borrichius, the Danish apothecaries were acquainted with them in 1678. In 1688, Härne spoke favourably of its effects in haemoptysis and phthisis.1

Botany. Gen. Char.—Thallus foliaceous, cartilaginous, smooth and naked. Apothecia obliquely adnate with the margin of the thallus, the lower portion being flat and united with the thallus; the disk coarse or plano-concave, with a border for the thallus and inflexed (Hooker).

Sp. Char.—Thallus erect, tufted, brown, paler on one side, laciniate, channelled, and dentato-ciliate, the lacinia very broad. Apothecia broadly pressed, flat, with an elevated disk (Hooker).

The apothecia are generally wanting on the plant of the shops.

Hab.—Dry mountainous districts, new and old continents. Although found with considerable abundance in Iceland, it is never gathered there as an article of commerce.

Physical Characters.—As met with in commerce, Icelandic is brownish or greyish white, with white farinaceous spots or

1 For further details respecting the useful qualities of Lichens, see the Mémoires de l'Académie des Sciences, Belles-Lettres et Arts de Lyon, sur l'Utilité de la Lichénologie dans la Médecine et dans les Arts, par MM. G. F. Hoffmann, Amouroux fils, et Wilmet.—L. M'ttay, App. Medicum. v. 508.
ICELAND MOSS. 879

urely having apothecia. It has little or no odour, and a slightly bitter taste. Its powder (or farina) is whitish grey.

COMMERCE.—It is imported in barrels and bags from Hamburg and Gothenburg, and is said to be the produce of Norway and Iceland. In 1836, 20,599 lbs. paid duty; in 1837, 12,845 lbs.; in 1838, 179 lbs.; in 1839, 15,983 lbs.; and in 1840, 6462 lbs.

COMPOSITION.—It has been analyzed by Berzelius, who obtained the following products from 100 parts:—Starchy Matter (lichenin), 16; Bitter Principle (cetrarin), 8; Uncrystallizable Sugar, 3-6; Morophyllac, 1-6; Extractive Matter, 7-0; Gum, 3-7; Bilichenes of ash and Lime mixed with Phosphate of Lime, 1-9; and Amylaceous lbra, 36-2 (=101-6).

1. LICHENIN.—The starchy matter or seculoid substance of lichens is somewhat different from ordinary starch. I have been unable to detect any particles analogous in their physical properties to those of other seculas. Payen, however, says he has seen the starch of Iceland Moss united in little balls. Water extracts a starchy substance. But no boiling, however long continued, deprives the insoluble extract of Iceland moss of the property of being tinged blue by iodine, so that lichenin seems to enter into the constitution of the tissues of Iceland Moss. Lichenin is composed, according to Guerin-Vary, of C\textsubscript{16} H\textsubscript{22} O\textsubscript{10}.

2. CETRARIN.—The bitter principle of this lichen is white, intensely bitter, soluble in alcohol (especially at a boiling temperature), ether, less so in water, volatile oil, and creosote. It is coloured blue by hydrochloric acid when aided by heat; it combines with alkalis; and forms a red precipitate with the salts of iron, and a greenish one with those of copper.

3. LICHENIC ACID.—This is composed of C\textsubscript{4} H\textsubscript{3} O\textsubscript{4}. It forms a reddish precipitate with the salts of iron.

CHEMICAL CHARACTERISTICS.—Iceland moss swells up in cold water, to which it communicates a brownish tint. Boiled in water it yields a liquid which, when sufficiently concentrated, gelatinizes on cooling. The decoction, when cold, forms with iodine a blue compound (iodide of starch); with the sesquichloride of iron, a dingy purplish red (cetrarate and lichenate of iron); with diacetate of lead, a copious whitish precipitate (amidate of lead); with sulphate of copper and caustic potash, a green precipitate (cetrarate of copper).

PHYSIOLOGICAL EFFECTS. a. On Animals.—In Carniola, pigs, horses, and oxen, are fattened by it.

b. On Man.—It is a mucilaginous or demulcent tonic, without any trace of astringency. If the bitter matter (cetrarin) and extractive be removed, it is nutritive, emollient, and demulcent, like ordinary starch, over which it has no advantage. Captain Sir John Franklin and his companions tried it as an article of food, when suffering great privations in America, but its bitterness rendered it hardly eatable.

USES.—Iceland moss is well adapted to those cases requiring a nutritious and easily-digested aliment and a mild tonic, not liable to order the stomach. It has been principally recommended in chronic affections of the pulmonary and digestive organs, particularly phthisis, tetrica catarrh, dyspepsia, chronic diarrhœa, and dysentery; but its utility has been much exaggerated.

1 Ann. de Chim. xc. 277.
2 L'Institut de 1837, p. 143.
3 Herberger, Journ. de Pharm. xxii.
5 Narrative of a Journey to the shores of the Polar Sea, p. 414. 1823.
Administration.—It is best exhibited in the form of decoction. When employed as an alimentary substance merely, the bitter matter should be extracted before ebullition. This is effected by digesting the lichen in a cold weak alkaline solution (composed of water 20 parts, and carbonate of potash 1 part), and afterwards washing it with cold water. It is then to be boiled in water or milk. When the decoction is sufficiently concentrated, it gelatinizes on cooling. It may be flavoured with sugar, lemon peel, white wine, or aromatic, and then forms a very agreeable kind of diet.

Decoction Cetraria, L.; Decoction Lichenis Islandici, D.; Decoction of Iceland Moss. (Iceland Moss, 3v.; Water, Ojss.; boil down a pint, and strain. The Dublin College orders half an ounce of moss to be digested for two hours in a close vessel with a wine pint of boiling water, then to be boiled for fifteen minutes, and the liquor strained while hot.)—Dose, f3j. to f5iv. every four hours.

2. Rocella Tinctoria, De Cand. L. E. D.—Dyer’s Orchil or Orchella.

Sex. Syst. Cryptogamia, Algæ.

(Lacunus: Thallus preparatus, L.—Lacmus, E.—Litmus, D.)

History.—It is the ποντικος φυκος (Mucus marinus) of Theophrastus. By the moderns it was first employed as a dye at the commencement of the fourteenth century.

Botany. Gen. Char.—Thallus coriacea-cartilaginous, rounded plane, branched or laciniated. Apothecia orbicular, adnate with thallus; the disk coloured, plano-convex, with a border at least thickened and elevated, formed of the thallus, and covering a subent form, black, compact, pulverulent powder concealed within the substance (Hooker).

Sp. Char.—Thallus suffruticose, rounded, branched, somewhat crev greyish brown, bearing powders. Apothecia flat, almost black and pruinose, with a scarcely prominent border (Hooker).

Hab. —Maritime rocks of the Canaries, Azores, southern coast England, &c.

Commerce.—It is imported from the Canaries (Canar Weed), the Azores (Western Island Weed, St. Michael’s Weed), Cape Verde Islands and Mogadore (Af can or Mogadore Weed). That from the Canaries is the most valuable. In 1838, 567 cwts., in 1839, 64

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Dr. Davidson, in a paper On the Removal of the bitter taste and lichenous odour of Iceland Moss (Jameson’s Edinburgh New Phil. Journ. vol. xxvii. p. 269, 1840), recommends a solution of caustic pot for extracting the bitter taste of this lichen. A pound of carbonate of potash (rendered caustic by pound of lime) is sufficient for 2 lbs. of the plant.

* Hist. Plant. lib. iv. cap. 7.

* Beckmann, Hist. of Invent. and Discov. vol. 1.
DYER'S ORCHIL.

and in 1840, 4175 cwt. of *Rocella tinctoria* and *fuciformis*

dy.

**Chemical Properties.**—Both *Rocella tinctoria* and *fuciformis* are
d as orchil. I have met with the latter species in commerce
he name of Madeira Weed. It is distinguished from *R. tinc-
its larger size, its paler colour, and its broader flat fronds.

Position.—*Rocella tinctoria* was analyzed by Fr. Nees v.
ck, who found in it a brown resin (soluble in alcohol and ether,
combing brownish red with ammonia), wax, glutinous matter,
te starch, yellow extractive, yellowish brown gummy matter,
tartaric and oxalate of lime, and chloride of sodium from the
salt sea water.

Recently Dr. Kane has submitted this plant to a very elabo-
mination. The following substances, he states, either pre-
the lichen or are “produced immediately by the processes
ed in its analysis.”—Erythryline, Erythrine, Amarythrine,
rine, and Rocelline.

**Erythryline.** A pale yellowish, often whitish substance, insoluble in
it easily soluble in alcohol, ether, and alkaline solutions. From its
in alkaline liquors it is precipitated by an acid. It is altered by boiling
the liquid is then found to contain amarythrine. It is fusible at 212°.
tests of C₁₁₂ H₁₆ O₁₆.

**Erythrine; Pseudo-erythrin** of Heeren. A crystalline substance, sparingly
in cold, abundantly soluble in boiling, water. It is very soluble in al-
ether. Its formula is C₁₁₂ H₁₆ O₁₆. It is formed by the action of air on

**Amarythrine; Erythrine-bitter.** Formed by dissolving erythrine in hot
exposing for some days to the air. A bitter sweet liquid is obtained
brown colour. Amarythrine consists of C₁₁₂ H₁₆ O₁₆.

**Erythrine.** A crystalline neutral white substance obtained by exposing
d amarythrine for several months to the air. Its formula is C₁₂ H₄ O₁₈.

**Rocelline; Acid of Heeren; Rocelline** of Kane. A fatty crystallizable acid.
ays its acid properties are not marked. Its formula, according to Liebig,
₁₈ O₁₈. Kane regards it as C₉₀ H₂₆ O₉₄.

**Chemical Characteristics.**—The aqueous decoction of *Rocella*
forms a copious precipitate with diacetate of lead, and has
our deepened by alkalis. Digested in a weak solution of am-
in a corked phial, at a heat not exceeding 130° F., the plant
a rich violet-red colour. This is *Heliot's test* for the discovery
lorific property in lichens.

**Preparation of Orchil.**—*Rocella tinctoria* has been introduced
he London Pharmacopoeia as the source of litmus; but this
ce, though formerly procured from *Rocella*, according to
't, is now probably prepared from Lecanora tartarea.

Il or Archil is the only colouring matter prepared from
la tinctoria in this country. *Blue Orchil* is procured by steep-

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ing the lichens in an ammoniacal liquor in a covered wooden vessel. The Red Orchil is made with the same liquor in common earthen jars placed in a room heated by steam, and called a stove. In one manufacturing process, I inspected, the ammoniacal liquor was prepared by distillation from a mixture of lime, impure muriate or sulphate of ammonia obtained from gas-works, and water; but I am informed that some makers still employ stale urine and lime.

The theory of the process is as follows: the erythrine which exists in the lichen absorbs oxygen and ammonia, and forms Orcein; the racemine absorbs oxygen and forms Erythrolic Acid; these being kept in solution by the excess of ammonia, the whole liquid is of an intensely rich purple tint, and constitutes ordinary orchil (Kane).

Properties.—The liquor sold in the shops as orchil has a deep reddish purple colour and an ammoniacal smell. It is reddened by acids which neutralize the ammonia which it contains.

Composition of Orchil.—According to Kane orchil consists of Orcein, Erythrolic Acid, and Azo-erythrine. To these must be added Ammonia.

1. Azo-erythrine.—This is insoluble in water, in alcohol, and in ether; but it dissolves in alkaline liquors, giving the characteristic port-wine colour. Its formula is C\textsubscript{22}H\textsubscript{16}N\textsubscript{19} + 3 Aq. Its formation may be explained by supposing that one equivalent of Amarythine C\textsubscript{22}H\textsubscript{13}O\textsubscript{18}, one equivalent of ammonia H\textsubscript{3}N, five equivalents of atmospheric oxygen O\textsubscript{8}, and three equivalents of water 3 Aq, form one equivalent of Azoerythrine.

2. Orcein.—A crimson red powder, sparingly soluble in water and in ethanolic solution. It dissolves in alkaline liquors, forming a magenta purple. Ordinary Orchil contains an ammoniacal solution of this kind. Kane has described two forms of orcein:—

a. Alphaorcein consists of C\textsubscript{18}H\textsubscript{10}N O\textsubscript{8}.

b. Betaorcein; Orcein of Robiquet, Dumas, and Liebig. It consists of C\textsubscript{18}H \textsubscript{10}N O\textsubscript{8}.

In contact with deoxidizing agents it combines with hydrogen and forms Lenta orcein, composed of C\textsubscript{18}H\textsubscript{10}N O\textsubscript{8} + H. Bleached by chlorine it yields Chlor orcein, whose formula is C\textsubscript{18}H\textsubscript{10}N O\textsubscript{8} + Cl.

Alpha-orcein is probably formed by the conversion of one equivalent of an erythrine C\textsubscript{22}H\textsubscript{16}N O\textsubscript{19} + 3 Aq, into four equivalents of carbonic acid C\textsubscript{4}O\textsubscript{8}, nine equivalents of water H\textsubscript{3}O\textsubscript{8}, and one equivalent of alpha-orcein C\textsubscript{18}H\textsubscript{16}N O\textsubscript{8}.

The latter absorbing three equivalents of oxygen O\textsubscript{3} becomes Beta-orcein C\textsubscript{18}H\textsubscript{10}N O\textsubscript{8}.

3. Erythrolic Acid.—This is a crimson substance distinguished by its semisolid consistence at ordinary temperatures, and its solubility in ether. Dissolved in alkaline solutions it forms a fine purple-coloured liquor. Its formula is C\textsubscript{26}H\textsubscript{26}O\textsubscript{9}. It is probably formed according to Kane by the abstraction of two equivalents of hydrogen from, and the addition of two equivalents of oxygen to, one equivalent of Roccellic acid C\textsubscript{26}H\textsubscript{26}O\textsubscript{9}.

Uses.—Orchil is employed merely as a colouring agent. It is used for dyeing, colouring, and staining.

3. Lecano'ra Tarta'rea, Ach.—Tartareous Moss.

_Sex. Syst. Cryptogamia, Algæ._

(Litmus, Offic.)

History.—The manufacture of a colouring matter from this plant was first started at Leith by Dr. Cuthbert Gordon, from whose name the word Cudbear originated.
TY. Gen. Char.—*Thallus* crustaceous, spreading, plane, adnate, *Apothecia* (*pallescens*) orbicular, thick, sessile, and adnate; plano-convex; its border thickish, formed of the crust and same colour (*Hooker*).

**Fr.**—Crust thick, granulated, and tartareous greyish white. *Apothecia* scattered; the disk convex, at length plane or tumid yellow-brown, inclining to flesh colour; the border thick, inflexed, at length wavy (*Hooker*).

**Hab.**—On rocks in Alpine countries, Norway, Scotland, &c.

**Commer.**—It is imported from Norway and Sweden under the name of White Swedish or Tartareous Moss.

**Preparation of Cudbear and Litmus.**—In this country, Red and Blue (in the form both of powder and paste) are prepared from it. In Holland, *Litmus* is made from it, according to *Nees undmaier*¹, and *Thomson*².

*tr* (*Persio*) is procured in the manner of orchil, by the action of nitric acid. When colour is developed, the decomposed lichen is er as paste, or dried and ground into powder.

*¹* (*Lactus, L. E. ; Litmus, D. ; Lacca caerulea, Lacca musca*) by the Dutch, and is imported from Holland. *Guibourt*³ at it owes its colour to the *Crozophora tinctoria*. But on a pic examination of the litmus cakes of commerce, portions of epidermis and mesothallus of some lichen are found. My ⁴, Mr. Quekett, who has carefully examined them, cannot whether they be the tissues of Rocella or of Lecanora. The mode of obtaining litmus is not known; but there is little the process is somewhat analogous to that for making orchil. en is said to be fermented in putrid (distilled?) urine.

**Properties of Litmus.**—Litmus occurs in small, cubical, light, flake cakes of a dirty blue colour. Examined by the microscope find sporules, and portions of the epidermis and mesothal-lus species of lichen, moss leaves, silica, &c. When the e thrown into dilute hydrochloric acid, effervescence takes and a solution of chloride of calcium is obtained, shewing that tain carbonate of lime. The blue colouring matter of litmus e in both water and alcohol. It is reddened by acids, but by alkalies. Chlorine and the hypochlorites destroy it.

**Besion.**—The nature and properties of the colouring matters have been examined by Dr. Kane. From his investigation appears to contain three colouring principles, namely, *†*††*ein, Erythrolitmine, and Azolitmine*. The characteristic

³ *Huit. des Drog. 3*° éd. ii. 143.
blue colour of litmus depends on the combination of the two latter colouring matters with Lime, Potash, and Ammonia. Litmus also contains Lignin, Chalk, and Silica.

1. **ERYTHROLEIN.** This is semifluid at ordinary temperatures. It is soluble in alcohol and ether, yielding fine red solutions. With ammonia it forms a magnificent purple. Its formula is C\(^{26}\) A\(^{22}\) O\(^{4}\). It is perhaps derived from Roscece.

2. **ERYTHROLITMINE.** This is a light red crystalline substance, sparingly soluble in water and in ether, but abundantly soluble in alcohol. It dissolves in a solution of potash or ammonia, forming a blue liquid. Its formula is C\(^{26}\) H\(^{12}\) O\(^{12}\). It is probably formed by the oxidation of erythrolein.

3. **AZOLITMINE.** It is a brownish red powder. It is sparingly soluble in water and insoluble in alcohol and ether. Dissolved in a solution of potash and ammonia, it yields blue solutions. Its formula is C\(^{18}\) H\(^{10}\) N\(^{10}\). It differs from betaoreolin in containing additional equivalents of oxygen. It is decolorized by deoxidizing agents yielding Leucolitmine.

4. **SPANOLITMINE.** This is not a constant constituent of litmus. It is a bright red colour, insoluble in alcohol and ether, and very sparingly soluble in water. Alkalis render it blue. Its formula is either C\(^{18}\) H\(^{7}\) O\(^{16}\), or C\(^{26}\) H\(^{10}\) O\(^{8}\). It is probably formed from erythrolitmine.

**USES.**—Litmus is employed as a test for acids and alkalis. The former communicate a red colour to blue litmus; the latter restores the blue colour of reddened litmus.

1. **TINCTURA LACMI; Tincture of Litmus** (Litmus, one part; Water, twenty-five parts. M.). This is chiefly a solution of azolitmine, with sometimes spanolitmine. When kept in a closely-stoppered bottle its blue colour sometimes disappears, but is shortly restored on the admission of atmospheric air.

2. **CHARTA LACMI; Litmus Paper.** This is more delicate when made with bibulous or unsized paper, which is to be brushed over with a strong clear infusion of litmus. Faraday* recommends the infusion to be prepared from half an ounce of litmus and half a pint of water. The Prussian Pharmacopeia orders one part of litmus and four parts of water. When carefully dried, litmus paper should be preserved by wrapping it in stiff paper, and keeping it in well-stopped vessels in a dark cupboard.

    Blue Litmus Paper (Charta exploratoria caerulea) is prepared as above directed. *Reddened Litmus Paper* (Charta exploratoria reducta) is made with an infusion of litmus which has been feebly acidulated with acetic acid.

  * Chemical Manipulation.
THE MUSHROOM TRIBE.

OTHER ESculENT AND MEDICINAL LICHENS.

Fig. 138. Tripe de Roche (Gyrophora.)

Fig. 139. Cladonia rangiferina.

It has been already stated (p. 88) that several species of Gyrophora (G. pro-
flavidae and G. cylindrica) are employed by the hunters of the Arctic regions of
America as articles of food, under the name of Tripe de Roche (fig. 138). Cladon-
ria rangiferina or Reindeer Moss (fig. 139) is a well-known example of a nu-
tritive lichen, supporting the animals after whom it is named when no other sus-
tenance can be obtained.

Several lichens are employed as popular remedies for hooping-cough and pul-
monary affections. Those usually kept by the herbalist are, Sticta pulmonaria
(called Oak Lungs), Scyphophorus pyxidatus (Cup Moss), and Peltidea canina
(sold as Ground Liverwort). The first has been used in pulmonary affections.
The second has long been celebrated as a remedy for convulsive cough b. The
third and last one was formerly thought to be a specific for hydrophobia.

ORDER III.—FUNGI, Juss.—THE MUSHROOM TRIBE.

Fungi, Linn.

ESSENTIAL CHARACTERS.—Plants consisting of cells and fibres, always springing
from organized, and generally decayed or decaying substances, not perfected
when immersed in water, bearing reproductive sporidia, either externally or
internally, naked or inclosed in variously-formed cells, many of which fre-
cently concur in the reproduction of a single individual, varying extremely
in substance and duration, generally soft and juicy, sometimes exceedingly
hard, with or without a central gelatinous nucleus, or dry and powdery
(Berkely).

PROPERTIES.—Extremely variable: some fungi being highly nutritious, others
very deleterious. No anatomical characters are known by which the poisonous
can be distinguished from the esculent ones. A few species only have been
used in medicine, and these are not uniform in their properties. The prox-
imate principles peculiar to this order, which have been examined, are:
1, Fungi, a nitrogeneous, highly-nutritious, woody matter; 2, Amanitin, the
active ingredient of some of the poisonous Agarici; 3, Boleticacid; 4, Fungic
acid. Mushroom sugar has been found identical with mannite.

Lipsae, 1799.
ERGOTÆ'TIA ABORTIFAC'IENS, Quekett.—THE ABORTIFACIENT
ERGOTÆ'TIA.

See Syst. Cryptogamina, Fungi.
(Ergota, Offic.)

History.—This fungus was first described and named by
friend and colleague, Mr. Quekett, in a paper read before the Linn
Society, Dec. 4, 1838. An abstract of the paper was published
the London Medical Gazette by Mr. Quekett named the plant Er
tæ'tia abortans (Ergotæ'tia, from Ergot, Fr., Ergota, Ph. Lond.,
aeria, origin; abortans, in allusion to its destroying the germin
t power of the grain of grasses, and also to the medicinal power
ergot). Subsequently, at my suggestion, he substituted the word
abortifaciens for abortans. The sporidia of the plant are depicted
by Phæbus. They were also noticed by Phillipar.

Botany. Gen. Char.—Sporidia elliptical, moniliform, finally set
ing off from the mycelium, transparent, and containing seldom more than one, two,
three well-defined (greenish) granules.

Sp. Char.—Only one species known.

Hab.—Floral envelopes, and ovaria of grasses: Europe, America.

Sometimes the sporidia are slightly contracted about their mid
They contain usually one, two, or three, but occasionally as many
as ten or twelve, well-defined green granules. The sporidia are, on
average, about 1-4000th of an inch long, and 1-6000th of an
inch broad. When placed on glass and moistened with water,

Fig. 140.

Ergotæ'tia abortifaciens.
A. Sporidia.
B, C, E, F, G, H, different modes of reprodu-
tion in water.
D, Membrane of sporidium laid open.
I, The fungus assuming a radiated form,
and beginning to develop sporidia upon its branches in water.
THE MUSHROOM TRIBE.

adily germinate or produce other plants, though in various ways, as
metimes by emitting tubes (n); by the development of buds (c);
and by the formation of septa across their interior (e, f, g, h)
[whet]. This plant belongs to the Coniomycte of Fries, tribe
scedinae; and to the tribe Sporidesmiae of Berkeley.

By the growth of these fungi upon or within the ovarium of grasses,
these condition of the ovarium, involving the whole of the em-
bro, and sometimes partially or wholly the albumen, is produced,
led the ergot or spur, which will be described hereafter [vide
lamine]. Mr. Quekett has shewn that the sporidia of this
fungus are capable of infecting healthy grains of corn, and of ergo-
ing them.

Properties.—The chemical properties and physiological effects
this fungus are at present quite unknown. We have yet to learn,
ether the peculiar properties of ergotized grass depend on the
ngi, or on the morbid products of the ovarium.

OTHER ESCULENT, MEDICINAL, OR POISONOUS FUNGI.

1. Fungi esculenti.—Esculent Fungi.

Fig. 141.

Amanita caesarea.

Fig. 142.

Morchella esculenta.

Fig. 143.

Tuber cibarium.

I have already offered some remarks on the dietetical qualities of
g (see p. 68).

2. Fungi occasionally used in Medicine.

The internal portion of Polyporus ignarius (Boletus ignarius), commonly called
lice of the Oak, Touchwood, or Spunk, cut in thin slices, and beaten with a
ner until soft, has been applied, as a styptic, to restrain hæmorrhages; but
ction is mechanical, like lint: that is, it absorbs the blood, and promotes
ulation. Polyporus fomentarius (real Amadou) has also been used for similar
ses. The substance sold in the shops as Amadou, or German tinder, is pre-
ed from both species, by cutting the fungus in slices, beating, and soaking

it in a solution of nitre. Mr. Wetherfield recommends it as an elastic medium for applying support and pressure, and as a defence to tender and inflamed parts. It does not lose its elasticity like lint. *Polyergus Laricis* (P. officinalis, *Boletus purpureus*, or *Larch Agaric*) was formerly used as a drastic purgative, doses of from a scruple to two drachms, and it is still kept by the herbalist. M. Butler, of Covent Garden Market, informs me that it is imported from Germany but that there is very little sale of it. The dust (*sporidio*) of *Lyceoperdon* (P. *Bull*) was formerly used as a styptic; the smoke is used for stupefying bees.

3. *Fungi venenati.—Poisonous Fungi.*

**Fig. 144.**

*Poisonous Indigenous Agarici of the section Amanita.*

*Agaricus vermis, Gill.*  
*Agaricus nivalis, Crey.*  
*Agaricus muscaria, Linn.*  
*Agaricus pantherinus, Decc.*

All poisonous fungi are called by the public *Toadstools.* Those of the genus *Agaricus*, section *Amanita*, are the most important, because the most likely to be confounded with edible species (as with *Agaricus campestris*). The Russians who eat no less than sixteen species of *Agaricus*, never employ any belonging to the section *Amanita*.

The symptoms produced by poisonous fungi are those indicating gastro-intestinal irritation (nausea, vomiting, purging, and abdominal pain), and a disordered condition of the nervous system (delirium, stupor, blindness, convulsions, muscular debility, paralysis, and drowsiness). In some cases, the power of the vascular system is remarkably depressed, the pulse being small and feeble, the extremities cold, and the body covered with a cold sweat. At one time, less irritation only; at another, narcotism alone is produced.

In some cases the active principle of poisonous fungi seems to be a *Volatile acrid principle*; in other instances it is a brown, uncrystallizable solid, called *Letellier amantin*.

No specific antidote is known. The first object, therefore, is to expel the poison from the stomach and bowels. The subsequent treatment will depend on the nature of the symptoms which manifest themselves, and must be conducted on general principles.

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2 For some remarks on the Fungi used as food by the Russians, see Lyall’s *Character of the Russians and a detached History of Moscow*, p. 356. Lond. 1832.
3 For further information respecting poisonous fungi, consult *Christian’s Treatise on Poisons.*
DER IV.—LYCOPODIACEÆ, De Cand.—THE CLUBMOSS TRIBE.

The powder sold in the shops as Lycopodium, Witch-meal, or Vegetable Sulphur, is procured from Lycopodium clavatum (Common Club-moss). It consists of extremely small pale yellow particles, fig. 145, b (sporules ? pollen ? ?) which, in the plant, are contained in two-valved, one-celled capsules, (thece, sporangia ? anthers ? ?) lodged in the (fig. 145 a) axillae of the bracteal leaves. It is sometimes employed in medicine as a dusting powder for children; and, in pharmacy, for enveloping pills to prevent their adhesion.

ORDER V.—FILICES, Juss.—THE FERN TRIBE.

( Filicales, Lind.)

HABIT CHARACTER. — Herbaceous plants with a perennial rhizome, more or less having an erect arborescent trunk [when they are called tree ferns, filices arboreae ; fig. 146] ; trunk coated, of a procenchymatous structure, with the entire cylinder of woody fasciculi divided into two concentric parts, the one narrow, placed between the bark and the wood, the other larger, central, medullary, sending fasciculi of vessels towards the petioles, and communicating with the exterior by means of chinks in the woody cylinder. Leaves [frondes] scattered upon the rhizome or rosaceo-fasciculate on the apex of the caudex, with circinnate vernation, annual or perennial, the base of the petioles persistent, growing to the caudex; simple or pinnate, entire or pinnatifid [equal]-veined, (the veins composed of elongated cells), frequently having cuticular stomata. Sporangia [thece], placed on the veins of the back or margin of the leaves, collected in little naked heaps [sori], or covered with a membranous scale [indusium], or transmuted margin of the leaf, pedicellate [with the stalk (seta), passing round them in the form of an elastic column], or sessile, unilocular, indefinitely dehiscent. Spores [sporules] fus, free, globose, or angular, in germination at first elongated in every direction, throwing out radicles downward, and the caliculus upward ".

* Endlicher, Genera Plantarum.
Properties.—The leaves are mucilaginous, and frequently slightly astringent and aromatic. The rhizomes contain starch, usually tannic acid with more or less bitter matter, and sometimes both fixed and volatile oil, with some resin. They are mild astringent tonics. The rhizome of *Nephroidium Filix mas* is celebrated as a vermicide; that of *Polypodium Calignula* as a diaphoretic and diuretic in rheumatic and venereal diseases.

**Nephroidium Filix mas, Richard, E.—Male Shield Fern.**

*Aspidium Filicis mas, L. D.*

*Sex. Syst. Cryptogamia, Filices.*

*(Aspidium: radix, L—Rhizoma, E.—Radix, D.)*

**History.**—This plant was known to Theophrastus, Dioscorides, and Pliny. The two first call it πρεπε, the latter *Felix mas*.

**Botany. Gen. Char.—**Sori roundish, scattered. *Indusium* orbicular-reniform, fixed by the sinus.

**Sp. Char—**Fronds bipinnate, pinnules oblong, obtuse serrated, their stalk and midrib chaffy. *Sori* near the central nerve (*Hooker*).

![Diagram of Nephroidium Filix mas](image)

The rhizome is large, tufted, and scaly. The leaves grow in circle to a height of 3 or 4 feet.

**Hab.—**It is an indigenous plant, frequent in woods and in shady banks. It is a native of other parts of Europe, of Asia, of the North of Africa, and of the United States of America.

**Description.**—The subterranean stem (*rhizoma; caudex; fer root, radix filicis, officin.*) lies obliquely in the ground. It varies in length and breadth according to its age. For medical purposes should be from three to six or more inches long, and from half an inch to an inch or more broad. It is almost completely enveloped by the thickened bases of the footstalks of the fallen leaves. These bases (sometimes called tubercles) are arranged closely around the rhizome in an oblique direction, overlapping each other. They are one or two inches long, from three to five lines thick, curved, angi

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*Lambert's Illustrations of the genus Cinnabara, p. 125. 1821.*
MALE SHIELD FERN.

surrounded near their origin from the rhizome by two or
hining, reddish yellow, thin, silky scales (ramenta). The ra-
bres (root, properly so called) arise from the rhizome between
footstalks. The fern root of the shops consists of fragments of
ed thickened bases of the footstalks, to which small portions
rhizome are found adhering, and of the root fibres.
ally, the rhizome and footstalks are, in the present state,
of a light yellowish-green colour; but in the dried state, yel-
or reddish white. Iodine colours the fresh rhizome bluish
indicating the presence of starch; particles of which may be
ized by the microscope. In a transverse section of the rhizome
serve five or six, or more, bundles of woody fibres and scalari-
nts. These bundles are arranged in a circle, are of a reddish
colour in the recent rhizome, but yellow in the dried one.

dried root has a feeble, earthy, somewhat disagreeable odour.
ete is at first sweetish, then bitter astringent, and subsequently
us, like rancid fat.

lection.—The rhizome should be collected in the month of
August, or September. The black portions, fibres, and scales,
be removed, and the sound parts carefully dried and reduced
nder: this is of a yellowish colour, and is to be preserved in
oppered bottles. Both the whole rhizome and powder dete-
by keeping.

buds (gemma flicis maris) which are sometimes employed in
me, are to be collected in the spring.

osition.—Fern rhizome was analysed in 1805 by Vauquelin 6,
by Gebhard 7, in 1824 by Morin 8, in 1826 by Wackenroder 9,
Geiger 8. Subjoined are the results of the analyses of Geiger
Morin:

<table>
<thead>
<tr>
<th>Geiger</th>
<th>Morin</th>
</tr>
</thead>
<tbody>
<tr>
<td>in fat oil</td>
<td>6.9</td>
</tr>
<tr>
<td>resin</td>
<td>4.1</td>
</tr>
<tr>
<td>crystallizable sugar</td>
<td>4.2</td>
</tr>
<tr>
<td>ny oxidizable tannin</td>
<td>2.9</td>
</tr>
<tr>
<td>and salts, with sugar and tannin</td>
<td>2.9</td>
</tr>
<tr>
<td>foros Fibre and starch</td>
<td>56.3</td>
</tr>
<tr>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

: anthelmintic property of the rhizome resides in the oil (oleum
maris). Batso 1 found a peculiar acid (acidum flicheum) and an
(flicina) in the rhizome.

buds contain, according to Peschier 2, a volatile oil, brown resin,
olid fatty matter, green colouring principle, a reddish brown
le, and extractive.

* Dia. tmg. in Pfaff's Syst. d. Mat. Med. 7th Bd. 219.
* Journ. de Pharm. x. 723.
* De Anthelm. regni Vegetab.
* Haáb. d. Pharm. 1859.
* Isang. Dia. 1856, quoted in Goebel and Knorre's Pharm. Waarenk.
* Quoted by Soubeiran, Nouv. Traite de Pharm. t. ii. p. 199, 2nd Ed.
CHARACTERISTICS.—The presence of tannic acid in the aqueous decoction of fern rhizome is shown by the sesquisalts of iron producing a dark green colour (tannate of iron), and by a solution of gelatin causing a yellowish precipitate (tannate of gelatin). No indication of the presence of a vegetable alkali in the decoction, can be obtained by tincture of nutgalls. If the rhizome be digested in alcohol, and afterwards boiled in water, the decoction forms, with a solution of iodine, a dingy blue precipitate (iodide of starch).

PHYSIOLOGICAL EFFECTS.—These are not very obvious; but they are, probably, similar to those caused by other astringents. Large doses excite nausea and vomiting.

USES.—It is only employed as an anthelmintic. Theophrastus, Dioscorides, Pliny, and Galen, used it as such. The attention of modern practitioners has been directed to it principally from the circumstance of its being one of the remedies employed by Madame Nouffer, the widow of a Swiss surgeon, who sold her secret method of expelling tape-worm to Louis XVI. for 18,000 francs*. At the present time fern rhizome is but seldom employed in this country, partly because the efficacy of Madame Nouffer's treatment is referred to the drastics used, and partly because other agents (especially of turpentine) have been found more effectual. "It is an excellent remedy," says Bremsen**, "against Bothriocephalus latus [the tape-worm of the Swiss], but not against Tenia Solium [the tape-worm of this country]; for though it evacuates some pieces of the latter, it does not destroy it."

ADMINISTRATION.—It may be administered in the form of powder of oil or ethereal extract, or of aqueous decoction. The dose of the recently-prepared powder is from one to three drachms. Madame Nouffer's specific was two or three drachms of the powder taken in from four to six ounces of water in the morning fasting, and two hours afterwards a purgative bolus, composed of calomel ten grains, scammony ten grains, and gamboge six or seven grains. The bolus was exhibited to expel the worm which the fern rhizome was supposed to have destroyed.

The Etherial Tincture of Male Fern Buds (prepared by digesting 1 part of the buds in 8 parts of ether) has been used with success by Dr. Peschier (brother of the chemist of that name), and by Dr. Foubole as a vermifuge.

OLEUM FICICIS MARIS; OIL OF MALE FERN.—The impure oil of fern (called oleum ficiis Peschier, extractum ficiis aetherum, seu balsamum ficiis), recommended by Peschier*, is an ethereal extract, and

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* Trait. contre le Ténia, &c. 1778, quoted by Bremsen, Sur les Vers Intest.
* Journ. génér. de Med. 1828, p. 373.
RAFFLESIAEÆ.

Toed, according to its proposer, of a fatty matter, resin, volatile-colouring matter, extractive, chloride of potassium, and acetic. A pound of the rhizome yielded Soubieran an ounce and a thick black oil, having the aromatic odour of fern. It may prepared from the buds as above stated. The dose is from rachm to a drachm, in the form of electuary, emulsion, or pills: r afterwards, an ounce or an ounce and a half of castor oil be exhibited. Numerous testimonies of its efficacy have been ed. By substituting alcohol for ether, twelve or thirteen s of oil can be obtained from 2½ lbs. of the rhizome.

On II. Phanerogamia, Auct.—Flowering Plants.

COTYLEDONEÆ. Juss.—EMBRYONATAE, Rich.—VASCULARIS, De Cand.

1. CHARACTER.—Substance of the plant composed of cellular tissue, fibre, ducts, and spiral vessels. Leaves usually present: cuticle with a. Flowers with perceptible stamens and pistils. Seeds generally with embryo enclosed within a spermoderm, furnished with one or more ions.

1. RHIZANTHEÆ, Blume.—RHIZANTHS.

1. CHARACTER.—Parasitical leafless plants. Stem homogeneous. Vascular system scarcely present. Flowers propagated by the agency of sexes, having no embryo, but consisting of a homogeneous sporuliferous mass.

ORDER VI.—RAFFLESIAEÆ, Endl.

In this Order is contained the Rafflesia Arnoldi (fig. 148), one of the wonders of the vegetable world. The diameter of its flower is 3½ feet, the weight 15 lbs. The hollow in its centre is capable of holding twelve pints! It grows in Java, on the stems and roots of Cissus angustifolia.

A decoction of this plant is used in Java as an astringent application in relaxed conditions of the vagina.

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1. Nouv. Traité de Pharm. ii. 161, 2nd ed.
2. ENDOGENÆ, De Cand.—ENDOGENS.

MONOCOTYLEDONES, Juss.

Fig. 149.

Endogens, or Monocotyledons.

q. Transverse section of an endogenous stem, showing the absence of medullary rays and of annual layers.

r. Stem and leaves of an endogen, showing the alternated sheathing leaves, with parallel veins.

s. Germinating seed of Tradescantia cristata, showing the plumule rupturing the colupodium, with the radicle and radicles.

t. Sections of a germinating seed, showing the cotyledon remaining in the tests.

Essential Character.—Trunk usually cylindrical, when a terminal bud only is developed, becoming conical and branched when several develop; consisting of cellular tissue, among which the vascular tissue is mixed in bundles, without any distinction of bark, wood, and pith, and destitute of medullary rays; increasing in diameter by the addition of new matter to the centre. Leaves frequently sheathing at the base, and not readily separating from the stem by an articulation, mostly alternate, with parallel simple veins, connected by smaller transverse ones. Flowers usually having a ternary division; the calyx and corolla either distinct or indistinguishable in colour and size, or absent. Embryo with but one cotyledon; if with two, then the accessory one is imperfect, and alternate with the other; radicle usually enclosed within the substance of this embryo, through which it bursts when germinating (Lindley).

ORDER VII.—GRAMINEÆ, R. Brown.—THE GRASS TRIBE.

(Gramina, Juss. Gramineæ, Lind.)

Essential Character.—Flowers usually hermaphrodite, sometimes monocious or polygamous; consisting of imbricated bracts, of which the most exterior are called glumes, the interior immediately enclosing the stamens palea, an innermost at the base of the ovary scales. Glumes usually two, alternate; sometimes single; most commonly unequal. Palea two, alternate; the lower or exterior, simple; the upper or interior composed of two, unite by their contiguous margins, and usually with two keels—together forming a kind of dislocated calyx. Scales two or three, sometimes wanting; if two collateral, alternate with the palea, and next the lower of them, either distinct or united. Stamens hypogynous, one, two, three, four, six, or more one of which alternates with the two hypogynous scales, and is, therefore, next the lower palea; anthers versatile. Ovary simple; styles two very rarely one or three; stigmas feathery and hairy. Pericarp usual
THE SUGAR CANE.

shable from the seed, membranous. *Albumen* farinaceous; *embryo* lying on one side of the albumen at the base, lenticular, with a broad cotyledon and a developed plumule; and occasionally, but very rarely, with a second cotyledon on the outside of the plumule, and alternate with the usual cotyledon.—*Rhizoma* fibrous or bulbous. *Culm* cylindrical, usually fistular, closed at the joints, covered with a coat of silex. *Leaves* alternate, with a split sheath. *Flowers* in little spikes, called *locusta*, arranged in a spiked, racemed, or paniced manner (*Lindley*).

**Properties.**—Almost every species is esculent and salubrious. The nutritive property is especially remarkable in the seeds of grasses, which contain *starch*, *gluten*, gum, and *sugar*. The stems and leaves also contain sugar, mucilage, and starch. Cane-sugar is procured from the stem of a grass. Both stems and leaves are used as food for cattle. Even the subterraneous stems and roots of some species (as *Triticum repens* and *Cynodon Dactylon*) abound in these principles. Considered in a medicinal point of view, the products of the grasses are emollient and demulcent.

statesments there are a few exceptions, some of which have been d (p. 95.)

Rum *officina*rum, Linn. E. D.—THE SUGAR CANE.

Saccharum officinale, L.

Sex. Syst. Triandra, Digynia.

Sacccharum : Succus preparatus, L.—Saccharum commune ; Sacchari Fæx ; Sac- c., E.—Succus concretion, a. non purificatus, b. purificatus ; Syrupus empyreuma- classis, D.)

—The manufacture of sugar is said by Humboldt to be est antiquity in China. Cane sugar was known to the eks and Romans, and was considered by them to be a cy. Possibly, Herodotus † refers to it when he says that s make honey in addition to that which they get from aphrystus ‡ calls it *mei in arundinibus* ; Dioscorides § terms Pliny § *saccarum*. Humboldt † adopts too hastily, I opinion of Salmasius, that the latter writers meant the duct of the Bamboo, viz., *Tabasheer* ; for, in the first a arrange it with honey, it was probably sweet, which not ; secondly, the Sanscrit name for sugar is *Sarkura* ;

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* Boyle's Essay on the Antig. of Hindoo Med. p. 34.
† Heliopomene, cxxiv.
‡ De Melle.
§ Lib. ii. cap. civ.
‖ Hist. Nat. lib. xii. cap. xvii.
¶ Journ. of Science and Arts, vol. v. p. 15.
* Boyle's Essay, p. 33.
thirdly, a passage in Lucan ¹ seems distinctly to refer to the
cane—"Quoque bibunt tenera dulces ab arundine succos." no one will pretend that the bamboo is a "tenera arundo?" ²

Botany. Gen. Char.—Spikelets all fertile, in pairs, the one the other stalked, articulated at the base, two-flowered, the floret neuter, with one palea, the upper hermaphrodite, with paleae. Glumes two, membraneous. Paleae transparent, awnless of the hermaphrodite flower minute, unequal. Stamens three. Styles two, long; stigmas feathered, with simple too hairs. Scales two, obscurely two or three-lobed at the point. Caryopsis smooth (?), loose (?). (Kunth).

Sp. Char.—Panicle effuse. Flowers triandrous. Glumes one-nerved, with very long on the back. (Kunth).

The stem is solid, from twelve feet high. Leaves Panicle terminal, from three feet long, of grey from the long soft hair that surrounds the flower. Palea coloured. Four varieties sugar cane are admitted

a commune, with a yellow
b purpureum (fig. 152), white stem, yielding a richer juice;
γ giganteum, with a very light-coloured stem.
δ tahitense, from Otaheite make the finest sugar. ³

Hab.—It is cultivated Indies. Its native country uncertain.

Manufacture of Sugar.
The canes, when ripe, close to the ground, struck leaves, and carried in to the mill-house, where are twice subjected to pressure between iron rollers, either vertically or horizontally. The cane-juice thus procured is an opaque liquid, of an olive green colour, saccharine taste, and bad odour. Its specific gravity is 1.033 to 1.106. It consists of sugar, gum, green fucula, extractive, gluten, acetic and malic acetates of lime and potash, super-malate and sulphate of lime, lignin in the form of fragments of the cellular and fibrous tissue of the canes.

¹ Lib. ii. v. 337.
² References to passages in other ancient authors will be found in the notes to Valpy's Hist. Nat. vol. iv. 2193. See also Moseley's Treatise on Sugar. Lond. 1799.
³ Porter's Nat. and Prop. of the Sugar Cane, p. 26, 1830.
THE SUGAR CANE.

rom the mill the juice is conveyed to a copper cauldron, called clarifier, where it is mixed with lime, and heated. The clear brine is then drawn off and put into a copper boiler, where it is heated and skimmed. It is then conveyed through a series of furnaces, the last of which is called the teache. When it has acquired a tenacity and granular aspect, it is passed into a wooden press, where it is allowed to crystallize or grain. The concrete press is then placed in casks (usually sugar hogsheads) with holes in the bottom, each of which is partially closed by the stalk of a sugar cane leaf. Here the sugar is allowed to drain for three or four days. It is then packed in hogsheads and sent to this country under the name of Muscovado or Raw Sugar. The uncrystallized portion, called molasses; it is brought to England in casks. In Jamaica, where water and molasses, with the skimmings of the clarifier and evaporating coppers, is fermented, and a vinous liquid thereby produced, which, by distillation and rectification, yields rum.

Sugar Refining.—Raw sugar contains several impurities, from which it is freed by refining. The eye recognizes the colouring matter in an aqueous solution, lime is detected by oxalic acid, which throws down the white oxalate of lime; tannic acid by the yellow produced on the addition of sesquichloride of iron, and precipitate formed by gelatin; glutinous and gummy matter by the estate of lead; and free acid by litmus. By keeping, strong sugar becomes weak, that is, soft, clammy, and gummy. This Mr. Daniell ascribes to the action of the lime.

following is an outline of the refining method which I saw

![View of Two Vacuum Pans and their subsidiary Apparatus.](image)

* Vide pp. 347 and 363.

* Quarterly Journal of Science, vi. 38.
practised at a large sugar-house in town:—Raw sugar is dissolved in water by the aid of steam (this process is called a blow-up). The liquid is then heated with bullock’s blood (technically called spirem) and sometimes with hydrate of alumina (termed finings), and filtered through canvas. The clear liquor is allowed to percolate slowly through a bed of coarse-grained animal charcoal nearly three feet deep, placed on a woollen cloth, supported on a false bottom of basket-work, and contained in a large wooden vessel. The filter liquor, which is nearly colourless, is conveyed to a copper vessel (Howard’s vacuum-pan), where it is boiled by the aid of steam, under diminished atmospheric pressure. The consistence of the liquid examined from time to time by taking out a sample by the probe stick, which is so constructed as not to admit air.

When the requisite degree of concentration has been attained, a valve is opened in the bottom of the vacuum pan, and the syrup allowed to escape into a copper vessel (heater), enveloped by a jacket, so as to enable it to be heated by steam. The syrup is then transferred to conical moulds (made of earthenware or iron), whose orifices are closed by a paper plug, and the next morning, when solidified, these moulds are carried to the curing-floor, when the stoppers are withdrawn and the moulds placed in pots, in order to allow the green syrups to drain off: these are made into an inferior sort of refined sugar (brown lumps). The loaves are then either clayed or sugared. Claying consists in pouring clay and water on the base of the sugar-loaf: the water slowly percolating through the sugar, a portion of which it dissolves, carries with it the colouring matter and other impurities. Sugaring is effected by substituting a saturated solution of pure sugar (called liquor) for the clay and water: it dissolves the colouring matter but not the pure sugar. The loaves are afterwards dried in a stove, and put in blue paper for sale.

The following may be regarded as an approximation to the produce of 112 lbs. of raw sugar by the above process:

<table>
<thead>
<tr>
<th>Component</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refined Sugar</td>
<td>79lbs.</td>
</tr>
<tr>
<td>Bastard</td>
<td>17</td>
</tr>
<tr>
<td>Treacle</td>
<td>16 (12lbs. solid matter.)</td>
</tr>
<tr>
<td>Water</td>
<td>4</td>
</tr>
<tr>
<td>Raw Sugar</td>
<td>112</td>
</tr>
</tbody>
</table>

Properties.—Common sugar, when pure, is white and odourless; it is the sweetest of all kinds of sugar. By the slow evaporation of its aqueous solution, it crystallizes: in this state it is called W. Sugar Candy (Saccharum candum album). The crystals are colourless; have, for their form, the oblique rhombic prism; and in consequence have two axes of no double refraction. Their sp. gr. is 1.6065. Common sugar is permanent in the air, and phosphorous is not volatile.

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1. “Claying Sugar, as they report here, was first found out in Brazil: a Hen having her feet going over a pot of Sugar by accident, it was found under her tread to be whiter than elsewhere.”—Steele’s Jamaica, vol. 1. p. 61.
2. For further details, consult a paper by Messrs. Guyne and Young, Brit. Ann. of Med. June and July 14, 1837; also Dr. Ure’s Dict. of Arts, art. Sugar.
of sugar, a saturated solution of it is called syrup. It is
saturated, and, by drying on paper, forms a kind of varnish.
When heated, it decomposes some of the metallic salts (as those of copper, mercury, gold, and silver); but when treated with the diacetate of copper and nitrate of silver it gives a boiling temperature to change them. Sugar probability of lime in water, and forms both a soluble and an insoluble compound with oxide of lead. It is soluble in water but insoluble in ether. A dilute watery solution of common table sugar, undergoes the vinous fermentation.

### Or Refined Sugar

Refined sugar (Saccharum, L.; Saccharum purum, E.; "purificatum," D.; Saccharum purificatum) is met with in the shops under the name of Loaf Sugar or truncated cones called lumps (Lump Sugar) of various degrees of purity. Small lumps are called Tittelers. The finest sugar is described as Saccharum albissimum, perfectly white, and termed double superior (Saccharum album) has a slightly yellowish tint, and is refined. Both varieties are compact, porous, friable, and made up of small white crystals.

Sugar (Saccharum commune, E.; Saccharum fuscum; Saccharum communis, D.) occurs in commerce in the form of a coarse powder containing crystalline grains. It is more or less damp and sticky, and has a very sweet taste. Its colour is brownish yellow, but it is more or less brownish yellow, but may be more or less yellow in the interior. Muscovado or raw sugar has the deepest brownish or burnt yellow brown, uncристallizable syrup which drains from the sugar. It is thicker than West Indian molasses, and has a different proportion of sugar in it. It contains, according to Dr. Ure, on the average, about 1/4 of solid matter.
Cane sugar is crystallizable, susceptible of vinous fermentation and has a strongly sweet taste. Its relation to other sugars has already been pointed out. (See p. 48.)

**Composition.**—The following is the ultimate composition of sugar:

<table>
<thead>
<tr>
<th>Atoms</th>
<th>Eq. Wt.</th>
<th>Per Cent.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon</td>
<td>12</td>
<td>73</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Oxygen</td>
<td>9</td>
<td>72</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Atoms</th>
<th>Eq. Wt.</th>
<th>Per Cent.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anhydrous Sugar</td>
<td>1</td>
<td>153</td>
</tr>
<tr>
<td>Water</td>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>Crystallized Sugar</td>
<td>1</td>
<td>171</td>
</tr>
</tbody>
</table>

Dr. Prout\(^a\) regards sugar as a secondary compound of carbon and water. Dobereiner\(^b\), on the other hand, views crystallized sugar as a carbonate of a dicrocarbon. Dr. Prout found that while, in the different varieties of sugar, the ratios of carbon to the elements of water varied, yet, that the relative quantity of hydrogen to oxygen was always in the proportion to form water. His statement with regard to the composition of different kinds of sugar has been already noticed (see p. 47).

**Physiological Effects.**—The dietetical qualities of sugar have been already stated (see pp. 48 and 49). It is a generally-received opinion that sugar has a tendency to cause flatulence and pretural acidity of the periphery. Occasionally, perhaps, it may do so, but I have never observed it. Though a dyspeptic myself, as obliged to be careful as to diet, I have never experienced any injurious effects from the use of sugar, of which I am remarkably fond. In a medicinal point of view, sugar is to be regarded as a demulcent and emollient.

**Uses.**—The dietetical uses of sugar have been before noticed (see p. 49).

Medicinally, sugar is but little employed. In the form of lozenge sugar candy, &c., it is slowly dissolved in the mouth to allay tickle cough. As a chemical antidote, it has been recommended in poisoning by the salts of copper, mercury, silver, gold, and lead\(^c\). But an advantage procured by its use, in these cases, is referable to its demulcent and emollient properties, and not to its chemical influence. The same remark may be made with respect to the benefit said to have been obtained by the use of the juice of the sugar-cane in poisoning by arsenious acid\(^d\). Powdered white sugar is sometimes sprinkled over ulcers, to remove spongy granulations, denomi- nated proud flesh. The same remedy has also been employed for removal of specks on the cornea.

In pharmacy the uses of sugar are much more extensive. It serves to preserve, to give flavour, bulk, form, colour, cohesiveness, and consistence; to sub-divide and to suspend oily substances in aqueous liquids. To fulfill one or more of these objects, it is a constituent of syrups, elacoacchara, conserves, electuaryes, confecions, lozen-
COMMON OR LONG-EARED BARLEY.

one pills and powders, &c. Its remarkable power of checking the sidation of some ferruginous compounds has been already noticed (see pp. 848 and 861).

1. SYRUPUS, L.; Syrupus simplex, E. D.; Syrup; Simple Syrup. Sugar, lb. x. [xxv. D.]; Water, Oij. [Oj. D.] Dissolve the sugar in the water by a gentle heat.—It is used to give flavour, cohesiveness, and consistence.

2. LIQUOR SACCHARI TOSTI; Caramel; Burnt Sugar.—This is an useful innocuous colouring agent. It is prepared by melting half a pound of brown sugar in an iron pot, and applying heat until the liquid acquires a deep brown colour; then adding a gallon of boiling water.

2. HORÆUM DISTICHON, Linn., L. E. D.—COMMON OR LONG-EARED BARLEY.

Sex. Syst. Triandria, Digynia.
(Semina integmentis undata, L.—Decorticated Seeds, E.—Semina decorticata, D.)

History.—Pliny*, on the authority of Menander, says, barley is a most ancient aliment of mankind. It was cultivated in Egypt nearly 1500 years before Christ b. Hippocrates mentions three kinds of barley: they were, probably, H. vulgare, H. distichum, H. hexastichum.

Botany. Gen. Char.—Spikelets three together, the lateral ones more or less withered, two flowered, with an upper flower reduced to a ciliate rudiment. Glumes two, lanceolate-linear, with subulate tips, flattish, unequal sided, at right angles [contraria] with the spike almost unilateral, turned inwards [anticæ], herbaceous, rigid. The two, herbaceous; the inferior one (turned inwards), concave, shining in an awn; the superior one (turned outward) contiguous to the rachis, bicarinate. Stamina three. Ovarium hairy at the apex. Styles two, sessile, somewhat terminal, feathery. Scales two, more or less augmented by a lateral lobe, usually hairy or ciliated, pyriform hairy at the point, oblong, with a longitudinal furrow, adherent to the paleæ, rarely free (Kunth).

Sp. Char.—The lateral florets male, awnless: the hermaphrodite distichous, close-pressed to the stem, awned (Kunth).

Hab.—A native of Tartary, cultivated in this country along with other species; viz. H. vulgare (Spring Barley), H. hexastichon (Water Barley), and H. Zeocitron (Sprat or Battledore).

---
* Exodus, ix. 31.
DESCRIPTION.—The grains (semina hordei cruda) are too known to need description. Deprived of their husk by a manner Scotch, hulled, or pot barley (hordeum mundatum). When the integuments of the grains are removed, and the seeds are and polished, they constitute pearl barley (hordeum perlatum) farina obtained by grinding pearl barley to powder is called barley.

COMPOSITION.—According to Einhof's 100 parts of ripe corns consist of husk 18:75, meal 70:03, water 11:20. The chemist obtained from 100 parts of barley meal, fibrous matter composed of gluten, starch, and woody fibre) 7:29, starch 67:18, gum uncrystallizable sugar 5:21, gluten 3:52, albumen 1:15, superin of lime with albumen 0:24, water 9:37, loss 1:42. Fourcroy Vauquelin detected an odorous acrid oil, to which the odour from raw grain has been ascribed; it resides in the integuments grains. The hordein of Proust is said, by Raspail to be but bran more minutely divided than that which remains in the The grains of barley starch have the same form and appear those of wheaten starch: they do not exceed 0.00998 of an inch.

CHEMICAL CHARACTERISTICS.—Iodine forms the blue in starch when added to the cold decoction of barley. Decoction whole barley has an acrid bitter taste, which it derives from the

PHYSIOLOGICAL EFFECTS.—The husk of barley is slightly laxative. Deprived of this (as in Scotch and pearl barley) they are highly nutritious (see p. 64). The aqueous decoction or pearl barley is emollient, demulcent, and easy of digestion.

USES.—Barley water is employed as a demulcent and a drink in febrile disorders, pulmonic inflammation, and irrit
the alimentary canal, whether produced by acrid poisons or other causes.

Administration.—Scotch and pearl barley are used in medicine. Count Rumford says, the entire grains of barley may be employed in broth with equal advantage.

1. DECOCTUM HORDEI, L. D.; Aqua hordeata; Barley Water.—Barley (pearl barley), 3iss.; Water, Ovss. First wash away, with water, the foreign matters adhering to the barley seeds; then, half a pint of the water being poured on them, boil the seeds a little while. This water being thrown away, pour the remainder of the water, first made hot, on them, and boil down to two pints, and strain, L.—The process of the Dublin Pharmacopoeia is not essentially different)—This is a valuable drink for the invalid in febrile cases and inflammatory disorders, especially of the chest, bowels, and urinary organs. It is usually flavoured with sugar, and frequently with some slices of lemon. It is a constituent of the Enema Albus, L., Enema Terrethine, L., and Decoctum Hordei compositum, L.

2. DECOCTUM HORDEI COMPOSITUM, L. & D.; Mistura Hordei, E.; Decoctum Pectorale; Compound Decoction of Barley; Pectoral De- coton.—(Decoction of Barley, Oij. [Oiv. wine measure, D.]; Figs., red, 3iss. [3ij. D.]; Liquorice [root] sliced and bruised, 3v. [3ss.]; Raisins [stoned], 3iss. [3ij. D. and Water, Oj. L.] Boil down two pints, and strain.—The process of the Edinburgh Pharmacopoeia is essentially the same)—This decoction is emollient, delicient, and slightly aperient. It is employed in the same cases the simple decoction.

1. BINA; BLOG; MALITUM; BRASIIUM; MALT.—This is barley made to germinate moisture and warmth, and afterwards dried, by which the vitality of the seed destroyed. When scorched it is called high-dried malt. During the process quantity of sugar in the seed is increased. Wort (Decoctum seu Infusum Brasii vel Malti) is nutritious, and has been used as an antiscorbutic and as a tonic it has been used in scrofulous affections, purulent discharges, from the kidneys, lungs, &c. and in pulmonary consumption. The decoction prepared by boiling three ounces of malt in a quart of water. This quantity be taken daily.

CERESII. MALT LIQUOR; BEER AND ALE.—A fermented decoction of malt. It is a refreshing and nutritive beverage. Its diétical and intoxicating properties have been already stated, (see pages 70, 71, and 358). For medical purposes Bottled Porter or Stout (Cerevisia Lageraria) is in general to be preferred. It is used as a restorative in the latter stage of fever, and to support powers of the system after surgical operations, severe accidents, &c.

Cerevisia fermentum, L. D.—Yeast; Barm; Zamin. The sub-
stance termed yeast from _Must_ and _Wort_ during fermentation, par
scum, partly as a sediment. Exam-
a microscope it is found to consis-
tual, ovoid, or somewhat pyriform-
rent vesicles (fig. 155, a b). Some-
have appeared to me to contain a
granule (as in the mass of vesicles
a), while at other times a number
small granules are observed in ex-
cle as at b). These different app-
are probably presented by the ve
different stages of their deve-
Turpin¹, who spent a night in a
that he might examine the chang-
these vesicles suffer during the fern-
of beer, states that on each vesici-
two buds develope, each of which
vesicle which remains attached
parent one, and in this way rows of
three adherent vesicles were produce-
vesicles thus described, Turpin ref-
constituting a new plant, which I
_Torula Cerevisiae_ (Nat. Ord. Fung
_Mucicellae_).

In the deposit from the Porter ref-
of Hanbury's brewery I have obse-
forms depicted in fig. 155 c, d, e, and,
constitute the plant called by Desm-
the _Mycoidea Cerevisiae_. Turpin
these as being produced by the
of the yeast vesicle placed under fa
circumstances².

As then, it is evident that the vesicles found in yeast are organized b
has been suggested that the process of vinous fermentation is the imme-
sequence of their vegetation. When placed in a saccharine fluid they
posed to grow at the expense of the sugar, which is partly converted into
while the plant gives out carbonic acid. According to this view, the fer-
mentation is the consequence of a vital act. By heat and the action of
poisons, the yeast plant loses its vitality, and with it its power of exci-
tation.

Considered in a chemical point of view, yeast possesses many of the pro-
of gluten. Independently of the acids and salts which precipitate will
composed of _Oxygen_, _Hydrogen_, _Carbon_, _Nitrogen_, and _Sulphur_.

Yeast has been administered internally as a tonic and antiseptic in
fevers. Dr. Stoker ³ states, that it usually acts as a mild laxative, im-
condition of the alvine evacuations, and is more effectual in removing
and black tongue than any other remedy. It is admissible where cino-
wine cannot be employed, on account of the inflammatory symptoms.
of it is two table-spoonfuls every third hour, with an equal quantity of
mixture. Enemata of yeast and asafoetida are said, by the same writ
fficacious against typhoid tympany. Externally yeast is employed in
of poultice.

¹ _Cataplasma Fermenti_, L.; _Cataplasma Fermenti Cerevisiae_, D

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² Annales des Sciences naturales, t. x. p. 43, 1827.
³ For further details respecting these vesicles I must refer the reader to the works alre-
as well as to the memoirs of M. Cagniard Latour and Turville, of Schwann, Keitina-
vene, referred to on a former occasion (see pp. 246-47, foot note).
⁴ Queneau, Journ. de Pharm. t. xxiv. p. 261.
THE COMMON OAT.

(Flores, lbj.; Yeast of Beer, Oas. Mix, and apply a gentle heat until
in to swell).—It is applied, when cold, to fetid and sloughing sores as an
e and stimulant: it destroys the fetor, often checks the sloughing, and
separation of the dead part. It should be renewed twice or thrice a
have frequently heard patients complain of the great pain it causes. The
acid is supposed to be the active ingredient.

PATULIUM FACULAE CEREBRIS; Poultice of the Grounds of Beer.—
s of Stale Beer; Oatmeal; as much of each as may be required to make
>).—It is applied cold twice or thrice a day, in the same cases as the
g preparation, to which its effects are analogous. Sometimes Maltmeal
uted for Oatmeal (Catepsama Hygnes).

AVEIJA SATIVA, Lima. L. E. D.—THE COMMON OAT.

Sex. Syst. Triandria, Digynia.

(Semina integumentis nudata, L.—Seeds, S.—Farina ex seminibus, D.)

ory.—The oat is not mentioned in the Old Testament. Theo-
s, Dioscorides, and Pliny, speak of it.

ANY. Gen. Char. — Spikelets three, many flowered; flowers
remote; the upper one withered. Glumes two, thin, membranous, awn-
less. Paleae two, herbaceous; the lower one awned on the back, above
the base, at the point almost bicuspi-
date; the upper one bicornate, awn-
less; awn twisted. Stamina three. Ovary
somewhat pyriform, hairy at the
point. Stigmata two, sessile, dis-
tant, villoso-plumose; with simple
scales two, smooth, usually
two-cleft, large. Caryopsis long,
slightly terete, internally marked by a
longitudinal furrow, hairy at the
point, covered by the paleae, adherent to the
upper one (?) (Kunth).

Sp. Char. — Panicle equal. Spikelets
two-flowered. Florets smaller than
the calyx, naked at the base, alter-
awned. Root fibrous, annual (Kunth).

—Cultivated in Europe.

eral varieties are cultivated in this country; viz. the White Oat,
ack Oat, the Red Oat, the Poland Oat, the Friesland or Dutch
the Potatoe Oat, the Georgian Oat, and the Siberian or Tartarian

scription.—Oats (semina avenae cruda) are too well known to
description. When deprived of their integuments they are
groats (semina integumentis nudata, L.; avena exsclerata seu
sm): these, when crushed, are denominated Embden groats.

Oatmeal (farina ex seminibus, D.) is prepared by grinding the grain. It is not so white as wheaten flour, and has a somewhat bitter taste.

Composition.—The grains consist, according to Vogel, of meal and bran 34. The dried meal is composed of fixed oil 2·0, bituminous matter and sugar 8·25, gum 2·5, grey albuminous matter, 4·3, starch 59, husk and loss 23·95.

Chemical Characteristics.—Iodine forms the blue iodide, starch with the cold decoction of oats.

Physiological Effects.—Oatmeal is nutritive, though less than wheaten flour. Considered medicinally, groats and oatmeal are nutritious, easily digestible, and yield an excellent diet for invalids.

Uses.—In medicine we employ gruel prepared from groats, oatmeal, as a mild, nutritious, and easily-digested article of food in fevers and inflammatory affections. In poisoning by acrid substances it is employed as an emollient and demulcent. It is given after use of purgatives, to render them more efficient and less injurious. Poultices are sometimes made with oatmeal.

1. Decoctum Avenae; Water Gruel.—This is prepared by boiling an ounce of oatmeal with three quarts of water to a quart, constante stirring; strain, and when cold decant the clear liquid from the sediment. Sugar, acids, or aromatics, may be employed for flavouring.

2. Pulvis pro Cataplasmate, D.; Powder for a Poultice (Linseed, which remains after the expression of the oil, one part; Oatmeal, two parts. Mix.)—This is an unnecessary formula. Moreover, it is a bad one; for linseed-meal should be prepared from unpilled flax seed.

3. Cataplasm Simplicissimum, D.; Simple Poultice. (Made with above powder and boiling water. The poultice should be smeared over with olive oil).—Used as an emollient application to allay and promote suppuration.


Triticum hybernum, L. D.—Triticum vulgare, E.

Sex. Syst. Triandria, Digynia.

(Farina; farina seminum: Amyllum; seminum; fucula, L.: Amyllum; fucula of the seeds, 1
Farina seminum, D.)

History.—In the earlier ages it was an esteemed article of food and is frequently spoken of by Hippocrates. Pliny describes several kinds of it.

— See p. 64 for its dietetical properties.
— Cullen, op. cit.
— Levis, li.
— De Dieta.
— Hist. Nat. xlvii. 12.
COMMON WHEAT.

BOTANY. Gen. Char. — Spikelets three or many flowered: the fru-
crous rachis generally articulated, flowers distichous. Glumes two,
early opposite, almost equal, awnless or awned: the upper one
carinaté; the keels more or less aculeato-ciliate. Stamina three.
Perianth pyriform, hairy at the apex. Stig mata two, terminal, sub-
acute, feathery; with long, simple, finely-toothed hairs. Scales
smooth, generally entire and ciliated. Caryopsis externally convex,
immanu concave, and marked by a deep furrow, distinct, or adhering
to the palea (Kamth).

Sp. Char. — Spike four-cornered, imbricated; with a tough rachis.
Spikelets generally four-flowered. Glumes ventricose, ovate, truncate,
acronate, compressed below the apex, round, and convex at the
head, with a prominent nervice. Flowers awned or awnless. Grains
one (Kamth).

1. aestivum: annual; glumes awned.
2. hibernum: biennial; glumes almost awnless.

Not. — It is a native of the country of the Baschkirs, and is culti-
vated in Europe.
Besides the above two varieties, no less than five other kinds of
wheat have been cultivated for their grain.

Fig. 157.

Triticum.— Wheat.

a. T. vulgare, a. aestivum.
b. T. vulgare, b. hibernum.
c. T. turgidum, (compositum).
d. T. turgidum.
e. T. polonicum.

DESCRIPTION. — Wheat (semina tritici) is reduced by grinding and
milling in mills into flour (farina; seminum farina, L. D.; farina
tritici) and bran (furfur tritici). The same wheat yields several
kinds of flour, distinguished as firsts, or fine flour; seconds; and
thirds, or middlings.

COMPOSITION. — The following are the constituents of several kinds
of wheat:

* Vauquelin, Journ. de Pharm. viii. 353.
The substance commonly termed _gluten_ is a compound of _vegetable albumen_, which is insoluble in alcohol, of _mucin_, soluble in hot alcohol, and of _glutin_ or _gliadine_, soluble both in hot and cold alcohol.

**CHEMICAL CHARACTERISTICS.**—The cold decoction of wheat forms, with tincture of iodine, the blue iodide of starch. If water be made into a paste, with water, and then kneaded in a stream of water until the liquid runs off colourless, the residue in hand is _gluten_. The water, on standing, deposits starch; but in solution _gum_, _sugar_, and some phosphatic _salts_. Nitric acid gives wheat-flour a fine orange-yellow colour. Recently-prepared tincture of guaiacum forms a blue colour with good wheat-flour.

**MANUFACTURE OF STARCH.**—Starch is procured by steeping wheat flour in water for one or two weeks, during which time fermentation takes place. The acid liquor (_sours_) is drawn off, and impure starch washed on a sieve, to separate the bran. What passes through is received in large vessels, termed _frames_. Here the starch is deposited. The sour liquor is again drawn off, and the starch removed from the surface of the starch, which is to be again washed, strained, and allowed to deposit. When, by these processes, starch has become sufficiently pure, it is _boxed_, that is, it is put in wooden boxes perforated with holes and lined with canvas, till it drains. It is then cut in square lumps, placed on bricks, to dry, and then the moisture, and dried in a stove. While drying it splits into lamina pieces, similar to grain tin, or columns of basalt. The greater part of the starch used for stiffening linen (called _Poland starch_) is coloured blue by finely-powdered smalt, or by inorganic substances. This is not adapted for medicinal purposes. _White_ (sometimes called _French_ starch) should be employed. A fine variety of this is the _patent white starch_.

Starch may also be procured by the action of a solution of caustic alkali (soda or potash) on wheat-flour or rice meal, by which the gluten is dissolved.

**PROPERTIES OF STARCH.**—Pure wheat starch (_amyllum_) is almost odourless and tasteless. Examined by the microscope, it is found to consist of particles varying considerably in size.

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* See the specification of Jones's patent in the *Repository of Patent Inventions*, April, 1849.
THE COMMON WHEAT.

The largest predominating, the intermediate ones being nest. Their shape is for the most part rounded. Their surface is uneven. The hilum is surrounded by concentric rings, but is very indistinct, until a gentle heat is applied to the water in which the particles are placed. Sometimes it is indicated by a round spot or a line: the rings may be traced to the edge of the particle. The particles crack, when heated, at the edges. If the particles be made to roll over in water, they are observed to be oblate spheroids, one of the flattened faces being somewhat more convex than the other. Viewed edways (fig. 158 a.) a black line is observed: this perhaps arises a the edge being out of focus.

Boiled in water, wheat starch yields a mucilage, which, when efficiently concentrated, forms a jelly (hydrate of starch) in cookie. With iodine the decoction when cold forms the blue iodide of ch, the colour of which is destroyed by alkalis and by heat.

**Composition of Starch.**—Wheat starch has the following condition:

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<tr>
<td></td>
<td>Carbon</td>
<td>7</td>
<td>42</td>
<td>43.75</td>
<td>43.7</td>
<td>42.89</td>
</tr>
<tr>
<td></td>
<td>Hydrogen</td>
<td>6</td>
<td>6</td>
<td>6.25</td>
<td>6.7</td>
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<td></td>
<td>Oxygen</td>
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<td>48</td>
<td>50.00</td>
<td>49.7</td>
<td>50.35</td>
</tr>
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Wheat Starch | 1 | 96 | 100.00 | 100.1 | 100.00 |

Table of the composition of starchy substances has been already given (see p. 47).

**Physiological Effects.**—Wheat surpasses all other cereal grains in nutritive qualities, in consequence of containing more gluten. Yields the finest, whitest, and most digestible kind of bread. Flour employed in medicine to form emollient and demulcent preparations.

Wheat-starch, though highly nutritious, is not employed alone as article of food. Its taste is somewhat disagreeable, and it is more cult of digestion than other starchy substances.

**Uses.**—Wheat-flour is rarely used in medicine. It is occasionally skilful over burnt or scalded parts, and is a constituent of some lice, as the yeast poultice (p. 904). Mixed with water, so as to form a thin mucilage, it may be employed as a chemical antidote in cases of poisoning, as by the bichloride of mercury, sulphate of copper, iodine, &c. It is used in pharmacy for enveloping pills.

Starch powder is used as a dusting powder to absorb acrid secretions and prevent excoriations. It is used as an emollient and ulcerative in inflammatory conditions of the large intestines, as a vehicle for the formation of other more active emenata. It is an antidote for poisoning by iodine, and is sometimes given in conjunction with this substance to prevent its local action (vide p. 247).
It enters into the composition of the *Pulvis Tragacanthei* compound Ph. L.

**Decoctum Amyli, L.; Mucilago Amyli; Decoction or Mucilage of Starch.** (Starch, 3iv., 3v. D.; Water, Oj.) Rub the starch (the water gradually added, then boil for a short time)—It is sometimes used alone, as an enema in dysentery, irritation of the tum, &c. It is a constituent of the *Enema Opii*, L.

1. **Panis Triticeus. Wheaten Bread.**—Crumb of Bread (Mica Panis) is sometimes used in the formation of pills; but is objectionable for this purpose account of the pills thus made becoming excessively hard by keeping. Furthermore, in some cases, the constituents of bread decompose the active ingredient of the pills. Thus the chloride of sodium of bread decomposes nitrate of silver. The Crumb of bread is most valuable for the preparation of poultices. The *Milk and Water Poultice* is prepared by covering some crumb of bread in a basin of hot water; after it has stood for ten minutes, pour off the excess of water and spread the bread about three-quarters of an inch thick on soft linen, and apply to the affected part. Sometimes lint dipped in oil is applied beneath the poultice. A Decoction of poppy, or Goulard's water, may be substituted for common water.

This is a valuable application to phlegmonous inflammation. A *Bread Milk Poultice*, to which lard is sometimes added, is also used to promote secretion; but it should be frequently renewed, on account of its tendency to decompose. Both poultices are used in the treatment of irritable ulcers. To *Toast Bread* (Panis tostus) is used in the preparation of *Toast-water* (Infusum tostis), a mild, agreeable drink in febrile disorders, and in some dyspeptic states. *Brown or Bran Bread* (Panis furfuraceus) is used by persons troubled with an actual costiveness; it acts as a slight laxative. It sometimes causes flatulence and acidity. *Biscuit* (Panis biscoctus) is used by some dyspeptics as a substitute for fermented bread. *Sea biscuit* (Panis nauticus) is preferred by sailors. (The dietetical properties of bread have been before noticed, see pp. 64-65.)

2. **Furfur Tritici. Bran.**—Decoction or infusion of bran is sometimes employed as an emollient foot-bath. It is also taken internally as a demulcent in catarrhal affections. Its continued use causes a relaxed condition of bowel.

5. **Secale Cereale, Linn.**—Common Rye.

**Sex.** Syst. Triandria, Digynia.  
(Semina, Office.)

**History.**—Rye is mentioned in the Old Testament.

**Botany.** Gen. Char.—Spikelets two-flowered. *Florets* sessile, with the linear rudiment of a third terminal one. *Glumes* two, herbaceous, keeled, nearly opposite, awnless or awned. *Scales* two, herbaceous; the lower one awned at the point, keeled, un sided, broadest and thickest on the outer side; the upper short, bicarinate. *Slamina* three. *Ovarium* pyriform, hairy. *Stigma* two, nearly sessile, terminal, feathery, with long, simple, finely toothed hairs. *Scales* two, entire, ciliate. *Caryopsis* hairy at a point, loose (Kunth).

**Sp. Char.**—*Glumes* and *awn* scabrous (Kunth).
COMMON RYE.

FIG. 159.

Secale cereale.

The Caucasian-Caspian desert. Cultivated in Europe.

Composition.—The grains consist, according to Einhof, of meal, 66; husk, 24·2; and moisture, 10·2. The meal is composed of crystallizable sugar, 3·28; gum, 11·09; starch, 61·07; husky matter (woody fibre), 6·38; gluten, soluble in alcohol, 9·48; albumen, 88; undetermined acid and loss, 5·627.

Chemical Characteristics.—A cold decoction of rye forms with iodine the blue iodide of starch.

Physiological Effects.—Rye-flour is nutritive, but less so than wheat-flour. (See p. 64.)

Use.—Rye-bread is in common use among the inhabitants of the eastern parts of Europe, but in this country is rarely employed. Re-pottage (Pulmentum vel Iusculum secalinum) is said to be a use-article of diet in consumptive cases.

6. SECA'LE CORNU'TUM.—SPURRED RYE OR ERGOT.

(Ergot, L. B.)

History.—No undoubted reference to ergot is found in the writings of the ancients. The disease produced by it is supposed to be referred to in the following passage:—"1089. A pestilent year, especially in the western parts of Lorraine, where many persons became putrid, in consequence of their inward parts being consumed by St. Anthony's fire. Their limbs were rotten, and became black as coal. They either perished miserably; or, deprived of their

putrid hands and feet, were reserved for a more miserable life. Moreover many cripples were afflicted with contraction of the sinews [acervorum contractio]."

The first botanical writer who notices ergot is Lonicerus. It seems to have been employed by women to promote labour pains before its powers were known to the profession. Camerarius, in 1683, mentions that it was a popular remedy in Germany for accelerating parturition. In Italy and France it appears to have been long in use.

Botany. — The nature and formation of ergot are subjects on which botanists have been much divided in opinion.

1. Some regard ergot as a fungus growing between the glumes of grass in the place of the ovary. Otto von Münchhausen; Schrank; De Candolle; Fries; Wiggers, and Berkeley, have adopted this opinion, and have described ergot as a fungus under the name of Spermoedia Clavus, Fries (Clavus; Clavus, Münch.; Sclerotium Clavus, De Cand.). Fries and Berkeley, however, evidently entertain some doubts respecting its nature; for the first adds to the generic character of Spermoedia "Semina graminum morbosa," and the second says "it appears to be only a diseased state of the grain, and has scarcely a sufficient claim to be admitted among fungi as a distinct genus."

Against this opinion may be urged the circumstance noticed by Tessier, that a part only of the grain may be ergotized. Moreover, the scales of the base of the ergot, the frequent remains of the stigma on its top, and the articulation it to the receptacle, prove that it is not an independent fungus, but an alter grain.

2. Some regard ergot as a diseased condition of the ovary or seed. The arguments adduced against the last opinion are in favour of the present one. Though a considerable number of writers have taken this view of the nature of ergot, there has been great discordance among them as to the causes which produced the disease.

a. Some have supposed that ordinary morbid causes, as moisture combined with warmth, were sufficient to give rise to this diseased condition of the grain. Tessier and Willdenow appear to have been of this opinion.

b. Some have ascribed the disease to the attack of insects or other animals. Tille, Fontana, Rédé, and Field, supported this view, which, I may add, has subsequently been satisfactorily disproved.

* Extract from the works of Sieber, in the Recueil des Histoire, des Gaules et de la France, xiii. p. 599. A passage somewhat similar to the above, with the addition of the following, "A bread which was eaten at this period was remarkable for its deep violet colour," is quoted by Lach in the first and best edition of Mesery's Abrégé Chronologique. But I cannot find the passage in the first and best edition of Mesery's Abrégé Chronologique. I am unable to decide, not having seen this work.

* The etymology of the word ergot is very doubtful. Whitere (Etymologiae Universae, ii. 50) thinks that it is derived from argus, and is attached to such terms as urgo. It was anciently written argot.

* Krnerbuch, p. 883, Franchefort, 1582.

* Actes des Curieux de la Nature, art. 6, obs. 82, quoted by Velleau.


* Hauwstel, i. 535, 1764-1773.

* Bayerische Flora, ii. 571, 1789.


* Syst. Myc. iii. 358, 1822.


* Errorously quoted in the Phars. Lond. 1836, as Acisula Clara.

* Quoted by De Candolle.


* In Christison's Treatise, p. 829.

* Refered to by Christison, op. cit. p. 830.
SPURRED RYE OR ERGOT.

Some, dissatisfied with the previously assigned causes of the disease, have been scent with declaring ergot to be a disease, but without specifying the circumstances and effects. Mr. Bauer, who closely watched the development of ergot during eight years (1805-13), and has made some beautiful drawings of it in different stages, arrived at this conclusion; as also Phoebus.

Others have referred the disease to a parasitic fungus. This opinion, which was not yet confused with that entertained by De Candolle and others (vide infra), has been adopted and supported by Léveillé, in 1826, by Dutrochet, and by Quekett.

The statements of Léveillé, Phillipar, Smith, and Quekett, leave, think, but little doubt that ergot is a disease of the grain caused by presence of a parasitical fungus. This view is supported by the observations of Wiggers—that the white dust (sporidia, Quek.) found on the surface of ergot will produce the disease in any plant (grass?) sprinkled in the soil at its roots. Mr. Quekett has infected grains of corn by immersing them in water in which the sporidia of the Ergotetia abortifaciens were contained. The plants which were induced by the germination of the grains were all ergotized. Phoebus, who has most accurately depicted these sporidia, denies that they are spores, on the ground that they are of variable size, and enclose other smaller bodies. But these objections deserve no mention, for, in the first place, by calling these bodies sporidia, we avoid deciding whether they are sporangia or spori; and, secondly, the sporidia of other plants, of the fungic nature of which botanists entertain no doubt, also enclose smaller bodies (sporidiola, Berk.)

Mr. Quekett, who has most carefully examined the development of ergot, says that the first appearance of the ergot is observed in the young grain and its appendages becoming covered with a white coating, composed of multitudes of sporidia (fig. 140 a, p. 886) mixed with minute cobweb-like filaments. (Ergotetia abortifaciens, see p. 886, fig. 140 H. I.) This coating extends over all the other parts of the grain, cements the anthers and stigmas together, and gives the whole a mildewed appearance. When the grain is immersed in water, the sporidia fall to the bottom of the fluid. A sweet fluid, at first limpid, afterwards viscid, is found in the affected flower at this stage, and, when examined by the microscope, is found to contain the sporidia just referred to. Phillipar says this fluid oozes from the floral centre; and Mr. Quekett, who first thought that it had an external origin, is now convinced that escapes from the ergot or the parts around it.

If we examine the ergot when about half-grown (fig. 160), we
find it just beginning to shew itself above the paleæ, and presents a purplish black colour. By this time it has lost in part its white coating, and the production of sporidia and filaments has ceased. At the upper portion of the grain, the coating now presents a vermiciform appearance, which Léveillé describes as constituting cerebriform undulations. These are beautifully depicted in Bauer’s drawings (fig. 160, a.d.e.). Léveillé regards this term as a parasitical fungus, which he calls *Sphacelia Segetum.* But these undulations are merely masses of sporidia: for if a little be scraped off with a knife, then moistened and examined by the microscope, we find nothing but myriads of sporidia. The ergot now increases in a very rapid manner.

**Fig. 160.**

**Ergot of Rye.**

A. A side view of a longitudinal section of an infected grain, soon after fertilization, when the end makes its first external appearance: magnified eight times in diameter.

B. Front view of a section of the above infected grain, cut at letter a: magnified sixteen times in diameter.

C. Ditto, cut at letter b: magnified sixteen times in diameter.

D. Side view of an unripe but advanced ergotized grain, at the upper part of which is the calcinated portion having a vermiciform appearance, and constituting the fungus (*Sphacelia Segetum*) of Léveillé.

E. Longitudinal section of the grain.

F. A full-grown ergot, within its floret, magnified twice its diameter.

The mature ergot (fig. 160, a.) projects considerably beyond the paleæ. It has a violet-black colour, and presents scarcely any filaments at all.

The number of grains in each spike which become ergotized vary considerably: there may be one only, or the spike may be covered with them. Usually, the number is from three to ten.

Besides rye, many other grasses (Phœbus has enumerated
ERGOT OF RYE.

are subject to this alteration, called the spur or ergot. In the
of 1838 nearly all the grasses growing in Greenwich marshes
and ergotized. Professor Henslow found it in wheat which
sent to the miller. But the disease is not confined to the
the Cyperaceae are also subject to it, and perhaps also

Agriculturist, an important subject of inquiry is the pre-
causes of ergot.

Fig. 161.

the Cornutum.

Very little of a satisfactory nature has
however, been ascertained on this point.
One fact, indeed, seems to have been
fully established, viz. that moisture,
which was formerly thought to be the
fertile source of the spur, has little, if
any thing, to do with it.1

COMMERCE.—Ergot is imported from
Germany, France, and America. Mr.
Butler, of Covent Garden Market, tells
me that about 1\frac{1}{2} tons were imported in
the year 1839. The duty is five shil-
lings per cwt.

DESCRIPTION OF THE ERGOT.—Spur-
red rye, or ergot (ergota), consists of
grains which vary in length from a few
lines to an inch, or even an inch and a
half, and whose breadth is from half a
line to four lines. Their form is cylin-
drical or obscurely triangular, with ob-
tuse angles, tapering at the extremities
(fusiform), curved like the spur of a
cock, unequally furrowed on two sides,
often irregularly cracked and fissured.
The odour of a single grain is not de-
tectable, but of a large quantity is fishy,
peculiar, and nauseous. The taste is
not very marked, but is disagreeable,
and very slightly acrid. The grains
are externally purplish brown or black,
somewhat glaucous, moderately brittle,
the fractured surface being tolerably
smooth, and whitish or purplish white.
Their sp. gr. is somewhat greater than
that of water, though when thrown into
this liquid they usually float at first,
owing to the adherent air. The lower
part of the grain is sometimes heavier
than the upper.

When examined by the microscope,

1 the Diseases of Wheat, p. 20, from the Journ. of the Royal Agricultural Society


op. cit. 126; also, Bauer, 1835.
the glaucous condition of the grains is found to depend on the presence of numerous sporidia of the Ergotææ abortifaciens. The violet color is made up of longitudinally-elongated cells. The tissue of the external portion of the ergot is composed of the rounded cellular tissue, the cells having the form and regularity of the cells of the normal healthy albumen, though they are smaller. In each of these cells are from one to three rounded bodies, which, Mr. Quëckett states, are globules of oil, for they are lighter than water, are not made blue with iodine, but are soluble in ether. If the structure of ergot be examined after the grains have been dried and remoistened, the tissue presents a most irregular appearance.

Phœbus regards the inner substance of the ergot as the altered albumen, for the embryo does not appear to be formed. The outer coat he considers to be the external (or external and internal) generated seed-coat. The little heart-shaped body (Mützchen) at the top of the ergot (fig.160, p.) he regards as the remains of the degenerate and elevated pericarp, together with some other more external parts of fructification, cemented together by the violet-whitish mass (sporidia, Quëk.) This mass, he observes, is obviously a new formation, originating from the already-described saccharine fluid. If Mr. Quëckett has shown the body, at the top of the ergot, to be the remains of the hairy crown of the grain, of the stigmata, and with the elevated pericarp.

DETERIORATION.—The ergot of rye is fed on by a little acarus, which is about one-fourth the size of the cheese-mite. This animal destroys the interior of the ergot, and leaves the grain as a mere shell. It produces much powdery excrementitious matter (Quëckett). In four months, 7½ ounces of this faecal matter of the acarus were formed in seven pounds of ergot. I have some ergot which has been kept for four years in a stoppered glass vessel without being attacked by the acarus, and it has all the characteristics of good ergot. It is advisable, however, not to use ergot which has been kept for more than two years.

COMPOSITION.—Ergot was analyzed, in 1816, by Vauquelìn; 1817, by Pettenkofer; in 1826, by Winkler; in 1829, by Maass; in 1831, by Wiggers; and more recently by Chevallier. The results obtained by Chevallier were analogous to those of Wiggers.

<table>
<thead>
<tr>
<th>Vauquelin's Analysis</th>
<th>Wiggers's Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pale yellow matter, soluble in alcohol, and tainting like fish-oil.</td>
<td>Ergotin</td>
</tr>
<tr>
<td>White bland oil, very abundant.</td>
<td>Peculiar fixed oil</td>
</tr>
<tr>
<td>Violet colouring matter, insoluble in alcohol, soluble in water.</td>
<td>White crystallizable fat</td>
</tr>
<tr>
<td>A fixed acid (phosphoric?)</td>
<td>Cerin</td>
</tr>
<tr>
<td>Vegeto-animal or nitrogenous matter, prone to putrefaction, and yielding ammonia and oil by distillation.</td>
<td>Pungin</td>
</tr>
<tr>
<td>Free ammonia, disengaged at 212° F.</td>
<td>Vegetable osmagne</td>
</tr>
</tbody>
</table>

Ann. Chim. iii. 337.
Buchner's Repert. iii. 65.
Christison, On Poisons, 3d ed. 831.
Schwartz, Pharam. Tabell. 2° Aug. 460.
Phœbus, Giftgewächse, 102.
ERGOT OF RYE.

Ergotin was procured by digesting ergot with ether, to remove the fatty matter, and then in boiling alcohol. The alcoholic solution was evaporated, and the extract treated by water. The ergotin remained undissolved. It was yellowish red, with an acrid, bitter taste, and, when warmed, had a peculiar but pleasant odour. It was soluble in alcohol, but insoluble in water or ether. It was fatal to a hen. Nine grains of it were equal to an ounce and a half of opium. It appears, then, that though a poisonous principle, it is probably not the same as the mother, for the latter is soluble in water, whereas ergotin is not. It is possible, however, that it may be rendered soluble in water by combination with some other body.

1. Oil of Ergot.—As this is now used in medicine, its properties will be described hereafter (see p. 227.).

There are no good grounds for suspecting the existence of either hydrocyanic acid or phosphate of morphia in ergot, as supposed by Pettenkofer.

Chemical Characteristics.—Ergot is inflammable, burning with a clear yellowish white flame. The aqueous infusion or decoction of ergot is red, and possesses acid properties. Both allantoic and diacetate of lead cause precipitates in a decoction of ergot. Iodine gives no indication of the presence of starch. Acetate of silver causes a copious precipitate soluble in ammonia, but insoluble in nitric acid. Tincture of nutgalls also produces a precipitate (tannate of ergotin?). Alkalis heighten the red colour of the decoction.

Physiological Effects.—Great discrepancy is to be found in the results published respecting the influence of spurred rye on man and animals. While the majority of experimenters or practical observers concur in assigning to it energetic powers, others have declared it harmless.

On Vegetables.—Schübler and Zeller have tried its effects on man, and I infer from their statements that they found it poisonous.

On Animals.—Accidental observation and direct experience concur in showing that in most instances spurred rye acts as a poison to the animal economy. But, as Phæbus correctly says, we cannot call it a violent poison, since drachms and ounces are required to destroy small animals (e. g. rabbits and cows).

It has proved poisonous to flies, leeches, birds (geese, ducks, sons, common fowls, &c.), and mammals (dogs, cats, pigs, sheep, rats, &c.) Birds and mammals refuse to take it even mixed with other kinds of food. Diez* gives the following as the symptoms produced by it in dogs who are compelled to swallow it:—“Great aversion to the ergot, discharge of saliva and vomit from the mouth, vomiting, dilatation of the pupil, quick respiration and circulation, frequent moanings, trembling of the body, continual running round, staggering gait, semi-

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* Quoted by Phæbus, op. cit. p. 108.
paralysis of the extremities, especially the hinder ones, sometimes diarrhoea; sometimes hot aunts, increased formation of gas in the alimentary canal; faintness and sleepiness, with great thirst, but diminished appetite, remained. Death followed under gradually increasing feebleness, without being preceded by convulsions. To the less constant symptoms belong inflammation of the conjunctiva, and the peculiar appearance of turning round a circle from right to left." Similar observations as to its injurious operation have been made by Robert 4. In some cases, abscess at gangrene of various parts of the body, with dropping off of the toes and convulsions, have been noticed. A strong decoction injected into the vein of a dog caused general feebleness, paralysis of the posterior extremities, vomiting, and death 5.

But there are not wanting cases apparently shewing that spurge rye has no injurious action on animals. The most remarkable and striking are those related by Block 6. In 1811, twenty sheep together nine pounds of it daily for four weeks without any ill effect. In another instance, twenty sheep consumed thirteen pounds and a half daily, for two months, without injury. Thirty cows together twenty-seven pounds daily, for three months, with impunity; and two fat cows took, in addition, nine pounds of erg daily, with no other obvious effect than that their milk gave a b caseous cream, which did not yield good butter. These statements furnish another proof to the toxicologist that the ruminants suffer less from vegetable poisons than other animals.

Another interesting topic of inquiry is the action of ergot on the gravid uterus of mammals. Chapman 7 says "it never fails, in a short time, to occasion abortion." We have the testimony of Percy at Laurent, that a decoction injected into the veins of a cow caused the animal to calve speedily; and in one out of three experiments, M. Combes has stated, the ergot caused the abortion of a bitch 8. Diers found that it caused uterine contractions in dogs, rabbits, and cows. Large doses given to bitches induced an inflammatory condition of the uterus, and destroyed both mother and her young. However, opposition to these statements, we have the evidence of Chatard, Warner, Villeneuve, and others, who failed in producing abortion with it 9.

I am indebted to Mr. Youatt, Veterinary Surgeon to the Zoological Society, and Editor of the Veterinarian, for the following note respecting the effects of ergot on animals:

"I have, for the last six or seven years, been in the habit of administering the ergot of rye to quadrupeds in cases of difficult protracted parturition, in order to stimulate the uterus to renewed increased action. In the monogastric, if I may venture to use the term, the uterus is much more sensitive to the action of ergot than in the ruminants. The uterus of the horse, as well as of the cow, is not so susceptible of its influence; and the dog and cat resist the action of it more than the others. In the pig, the action is equally strong, and produces abortion as quickly as in the horse. The dose is in proportion to the size of the animal. A few grains of ergot will often produce abortion in afemale dog, and in the sow, the quantity of the tincture must be proportionate to the size of the uterus. I have, in a single case, given to a female sheep, who was in the last stages of pregnancy, a half-pint of the tincture of ergot, by the mouth, and the abortion took place immediately. The quantity of the tincture was so small, that it would not have been apparent if it had not been given at the end of the term. The ergot is administered in a tincture of spirits of wine; and the dose is calculated by the weight of the animal. The tincture is given, with a little wine, in the evening, and the animal is kept in a warm room. The dose is repeated every night, until the abortion takes place. The ergot is a powerful stimulant, and produces abortion in cases of difficult parturition. The quantity given to the animal must be calculated by the weight, and the dose is repeated until the abortion takes place. The ergot is a potent remedy in cases of difficult parturition, and produces abortion in cases of difficult protracted parturition, in order to stimulate the uterus to renewed increased action. In the monogastric, if I may venture to use the term,
I have never known it fail of producing considerable effect, when the uterus had been previously exhausted by continued efforts. In the ruminant, with its compound stomachs, I have witnessed many a case of its successful exhibition; have had recourse to it in the cow, the sheep, and the deer, reindeer, and domestic. Parturition has not always been accompanied from false presentation or other causes, but the uterus has in such cases roused to a greater or less degree of action. On the other hand, there are cases recorded by experienced practitioners, in which it has been given in very large doses without producing the slightest effect. I have always referred this to a certain degree of forgetfulness of the construction of the stomachs of ruminants. If the medicine, as is too often the case, is poured hastily down, and from a large vessel, it breaks the floor of the oesophagean canal and falls into the rumen, where it remains perfectly inert. But if it is suffered to trickle down the oesophagean canal, although a portion of it may still enter the stomach, the greater part will flow on through the oesophagean canal and the manyfolds into the fourth or villous stomach, and produce the desired effect."

Man.—These may be noticed under two heads: 1, effects of doses; 2, effects of its continued use as an article of food.

Effects of single or few doses.—Hertwig, Lorinser, Jörg, and Diez, have endeavoured to ascertain the effects of ergot by experimenting in stating that, in doses of from half a drachm to two drachms, nausea, inclination to vomit, dryness of the throat, great elevation to food, uneasiness or actual pain in the abdomen, colicky evacuations, weight and pain in the head, giddiness, some cases of stupor and dilatation of pupils, have resulted from its use. It deserves, however, to be noticed, that these effects have been noticed by some experimenters.

Effects produced by the use of single or a few doses of ergot are conveniently arranged under four heads.

Effects on the uterine system. (Uterine contractions.)—The spurring of rye on the uterus when labour has actually commenced is usually observed in from ten to twenty minutes after the spurring has been taken, and is manifested by an increase in the contractions, and the frequency of the pains, which never cease until the child is born; they often continue for minutes after, and promote the speedy separation of the placenta and the firm contraction of the uterus in a globular form. Contractions and pains caused by ergot are distinguished from natural labour by their continuance; scarcely any interval...
can be perceived between them, but a sensation is experienced, one continued forcing effort. If from any mechanical impediments (as distortion) the uterus cannot get rid of its contents, the violence of its contraction may cause its rupture, as in the cases alluded to by Dr. Merriman, Mr. Armstrong, and Mr. Coward.

Ergot sometimes fails to excite uterine contractions. The cases of failure are for the most part conjectural. The quality of the ergot peculiarities on the part of the mother, and death of the fœtus, have been assigned as such. The two first will be readily admitted; why the remedy should be altogether inert “where the fœtus has been for some time dead, and putrefaction to any extent takes place” cannot be readily explained. Its occasional failure has been urged by Dr. Hamilton as an argument in favour of his notion that ergot acts “in no other way than by influencing the imagination. But on the same ground the sialogogue power of mercury might be denied. Dr. Hamilton’s erroneous estimate of the powers of ergot is referrible to a want of experience of its use; for he admits that he has only had two opportunities in practice of making a fair trial of it; there is usually much less hemorrhage after delivery, when ergot has been employed, than where it has not been exhibited. Lochia discharges are also said to be less; but this is certainly constantly the case. Moreover, it has been asserted “that the menstrual discharge has not recurred after the use of ergot in cases of protracted parturition.” But the inference intended to be conveyed here, viz. that ergot caused the non-recurrence, is incorrect; at least, I am acquainted with several cases in which the effect did not follow the employment of spurred rye, and I know none in which it did.

Ergot has been charged with causing the death of the child; but the charge has been repelled by some experienced practitioners, being devoid of the least foundation. “The ergot,” says Dr. Hosack “has been called in some of the books, from its effects in hastening labour, the pulvis ad partum; as it regards the child, it may with almost equal truth be denominated the pulvis ad mortem, for I believe its operation, when sufficient to expel the child, in cases where nature is alone unequal to the task, is to produce so violent a contraction of the womb, and consequent convolution and compression of the uterine vessels, as very much to impede, if not totally to interrupt, the circulation between the mother and child.” However, Dr. Chapman strongly denies this charge, and tells us that in 200 cases which occurred in the practice of himself and Drs. Dewees and James, the ergot was used without doing harm in any respect; and he adds, “no one believes in the alleged deleterious influence of the article on the

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1 Syn. of Diff. Part. p. 197, 1838.
2 Ibid. Nov. 27, 1840. Did the ergot cause the rupture, in the case related in the Lancet, 1836-7, p. 824, by Mr. Hooper?
3 Dr. Bibby, in Merriman’s Synopsis, p. 198.
4 Pract. Obsrv. relating to Midwifery, part ii. p. 84, 1836.
5 Dr. J. W. Francis, in the 3d Amer. ed. of Denman’s Midwifery, 1829.
7 Elem. of Therap. i. 488, 4th ed.
It is not improbable, however, where the impediment to labor is very great, that the violent action of the uterus may be attended with the result stated by Dr. Hosack. Dr. F. H. Ramsbotham suggested that the poisonous influence of ergot may be extended to the uterus and so may be the cause of premature labor in cases of opium poisoning. He also states that of 36 cases in which he induced premature labor by using the membranes, 21 children were born alive; while in 26 of premature labor induced by ergot only, 12 children only were born alive. This fact strongly favours the notion of the deleterious influence of the ergot on the uterus.

In order to excite abortion, or premature labor, ergot has sometimes been used to produce the desired effect. Hence many experienced accoucheurs have concluded, that for this medicine to have any effect on the uterus it was necessary that the process of labour should have already commenced. But while we admit that it sometimes fails, we have abundant evidence to prove that it frequently succeeds; and practitioners, I think, are now satisfied that, in a large number of cases, it has the power of originating the process of accouchement. Illustrating its power in this respect are referred to by Bayle; others are mentioned by Waller, Holmes, Ramsbotham, and others.

The action of ergot on the unimpregnated uterus is manifested by strong contractions frequently denominated "bearing-down pains," by the obvious influence which it exercises over various morbid conditions of this viscus; more particularly by its checking uterine hemorrhage, and expelling polyposus masses. Tenderness of the uterus and even actual metritis, are said to have been induced by ergot.

Effects on the Cerebro-Spinal System. (Narcotism.)—Weight loss in the head, giddiness, delirium, dilatation of pupil, and vomiting are the principal symptoms which indicate the action of ergot on the brain. Dr. Maunsell has published five cases (viz. one occurred to Dr. Churchill, one to Dr. Johnson, and two to Cusack), in which delirium or stupor resulted from the use of ergot in half drachm and two drachm doses, and was accompanied by depression of pulse. Trousseau and Pidoux found that the repeated use of ergot, dilatation of pupil was the most prominent symptom of cerebral disorder. It began to be obvious in twelve to twenty-four hours after the commencement of the use of ergot, and sometimes continued for several days after its introduction.

2 Ibid. June 15, 1839.
3 Bayle, Bibl. Therap. iii. 550.
5 Lancet, 1836, vol. i. p. 54.
8 Dierbach, Neuesten Bldt. in d. Med. Med. i. 139. 1837.
12 Traité de Thérap. i. 546.
cessation. The cerebral disorder is frequently preceded by uterine contractions, and usually remains for some time after they have subsided.

7. Effects of ergot on the circulatory system.—I have known increased frequency and fulness of pulse, copious perspiration, a flushed countenance, follow the use of ergot during parturition. In most instances the opposite effect has been induced; the patient has experienced great faintness, the pulse has been greatly diminished in both frequency and fulness, and the face has become pale or livid. In one case, mentioned by Dr. Cusack, the pulse was reduced from 120 to 90. Dr. Maunsell has referred to four other cases. The effects on the circulatory system were accompanied with cerebral disorder, of which they were probably consequences. Similar observations, as to the power of ergot to diminish the frequency of the pulse, have been noticed by others.

8. Other effects of ergot.—Nausea and vomiting are not uncommon consequences of the exhibition of ergot when the stomach is in an irritable condition. Various other symptoms have been ascribed to the use of ergot, such as weariness of the limbs and itching of the skin.

2. Effects produced by the continued use of ergot as an article of food (Ergotism, Fr.; Raphania, Linn. Vog. Cull. Good; Convulsion, and Eclampsia typhodes, Sauv.; Morbus spasmodicus, Rothm.; Morbus convulsivus, malignus, epidemicus, cerealis, &c. Kriebelkrankeit, or the creeping sickness, Germ.)—Different parts of the continent, e.g., France (especially in the district of Sologne, Silesia, Prussia, Bohemia, Saxony, Denmark, Switzerland, and Sweden, have been, at various periods, visited with a dangerous epidemic (known by the names above mentioned), which affected the same time, whole districts of country, attacking persons of both sexes and of all ages. So long back as 1597 (Tissot) the use of ergotized rye was thought to be the cause of it. Various circumstances have appeared to prove the correctness of this opinion, which has been further confirmed by the effects of ergot on animals as well as by the occurrence of a disease similar to, if not identical with, ergotism, in consequence of the use of damaged wheat. Several intelligent writers have not acquiesced in this view; and the circumstances mentioned by Trouseau, and by Dr. Hamilton, are certainly calculated to throw some doubts over the usually received opinion.

Ergotism assumes two types, the one of which has been denominated the convulsive, the other the gangrenous ergotism. Whether these arise from different conditions of the ergot, or from peculiarities...
part of the patient, or from the different quantity of the ergot
we are hardly prepared now to say. In convulsive ergotism
symptoms are, weariness, giddiness, contraction of the muscles of
vomiting, formication, dimness of sight, loss of sensibility, vo-
appetite, yellow countenance, and convulsions, followed by
The gangrenous ergotism there is also experienced form-
that is, a feeling as if insects were creeping over the skin,
us appetite, coldness and insensibility of the extremities, fol-
ly gangrene.

—To Dr. Stearns, of the United States, is due the credit of
ing ergot of rye to the notice of the profession as an agent
ly exciting uterine contractions. In 1814 a paper was
ed by Mr. Prescott, on the effects of it in exciting labour-
d in uterine hemorrhage. It was not employed in England
. The following are the principal uses of it:

1. Increase the expulsive efforts of the womb in protracted or
7 labours.—When the delay of delivery is ascribable solely to
contractions of the uterus, ergot is admissible, provided,
there be a proper conformation of the pelvis and soft parts;
that the os uteri, vagina, and os externum, be dilated, or
dilatable, and lubricated with a sufficient secretion; and,
that the child be presenting naturally, or so that it shall form
a mechanical impediment to delivery. A natural position of
is not an absolute essential for the use of ergot, since this
be admissible in some cases of breech presentation. The
stances which especially contra-indicate or preclude the use
medicine are those which create an unusual resistance to the
of the child; such are, disproportion between the size of the
of the pelvis, great rigidity of the soft parts, and extraneous
Moreover, “earliness of the stage” of labour is laid down
Bigelow as a circumstance contra-indicating the use of ergot.
ner period for its exhibition is when the head of the child
sed the brim of the pelvis. Some practitioners assert that a
or lax condition of the os uteri is not an essential requisite for
ition of ergot. It has been contended that one of the valu-
properties of this medicine is to cause the dilatation of the ur-
ce, and cases are not wanting to confirm these statements.

Hasen delivery when the life of the patient is endangered by
malign symptoms.—Thus, in serious hemorrhages occurring
labour, after the rupture of the membranes, and where the
is not situated over the os uteri, the ergot is especially indi-
It has also been employed to accelerate delivery in puerperal
ions. Five successful cases of its use are recorded by Bayle.

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Footnotes:

1. Treat. on Poisons, 3d ed. p. 333; Orfila, Toxicol Gén.
on the authority of Waterhouse, Mitchell, Roche, Brinkle, and Gequin. But the narcotic operation of ergot presents a serious objection to its use in cerebral affections.

3. To provoke the expulsion of the placenta when its retention depends on a want of contraction of the uterus.—In such cases ergot has often proved of great advantage. When the hemorrhage is excessive the ergot must not be regarded as a substitute for manual extraction, since, during the time required for its operation, the patient may die from loss of blood. In retention of the placenta from spasmodic or irregular contraction of the uterus, as well as from morbid adhesion, ergot is improper or useless.

4. To provoke the expulsion of sanguineous clots, hydatids, or polypi from the uterus.—Coagula of blood collected within the womb after delivery may sometimes require the use of ergot to excite the uterus to expel them, as in the case mentioned by Mackenzie. Ergot is also valuable in promoting the expulsion of those remarkable formations called uterine hydatids, and which are distinguishable from the acephalous cysts of other parts of the body by their not possessing an independent life, so that when separated from their pecles they die. A successful case of the use of ergot in this affection has been published by Dr. Macgill. In uterine polypus, ergot has been exhibited with the view of hastening the descent of the tumour from the uterus into the vagina, so as to render it readily accessible for mechanical extirpation; for it is well known, that until this be effected, the patient is continually subject to hemorrhage, which, in some cases, proves fatal. In some instances ergot has caused the expulsion of a polypus.

5. To restrain uterine hemorrhage, whether puerperal or non-puerperal.—Ergot checks hemorrhage from the womb, principally, if not solely, by exciting contraction of the muscular fibres of this viscus by which its blood-vessels are compressed and emptied, and their orifices closed. The experience of physicians and surgeons in various parts of the civilized world has fully and incontestibly established the efficacy of ergot as a remedy for uterine hemorrhage. Maisonneuve and Trousseau have shewn that the beneficial influence of ergot is exerted equally in the unimpregnated as in the impregnated state; proving, therefore, that the contrary statement of Prescott and Villeneuve is incorrect. Even in a case of cancer of the uterus they have found it check the sanguineous discharge. In females subject to profuse uterine hemorrhages after delivery, ergot may be admin-
ERGOT OF RYE.

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preventive, just before the birth of the child. Even in the last stages, a dose or two of ergot may be administered to the delivery being undertaken. To restrain excessive flow of the lochia or catamenia, this remedy is sometimes most

rovoke abortion, and to promote it when this process has
land is accompanied with hemorrhage.—Under certain cir-
ses the practitioner finds it expedient to produce abortion: us hemorrhage during pregnancy, and in deformed pelves not admit the passage of a full-grown fetus. In such cases may be employed with great advantage. When abortion y commenced, ergot may be employed, to quicken the pro-

neck hemorrhage.

scorrhaea and gonorrhœa.—Ergot was first given in leucor-
Dr. M. Hall; and was subsequently employed by Dr. with success; and in eight cases by Dr. Bazzoni, seven were cured by it. Dr. Negri published seven successful use. Its efficacy has been confirmed by many other rs. Dr. Negri also used it with apparent benefit in gonor-
both the male and female. He concludes that "secale has a peculiar action on the mucous membranes; but if ex-
ren there is a state of acute inflammation, their morbid may be considerably increased; on the contrary, when a nic form of inflammation does exist, the secale cornutum a beneficial influence in arresting their preternatural dis-

morrhages generally.—The power possessed by ergot of terine contractions, readily explains the efficacy of this repressing sanguineous discharges from the womb; but we way understand how hemorrhage from other organs can be
by it. We are not, however, to deny the therapeutic a medicine merely because we cannot explain its modus hough we are justified in requiring abundant proofs ere we

It must be acknowledged, that a considerable number of been published in proof of the power possessed by ergot ng hemorrhages from other organs (as the nose, gums, chest, and rectum) than the uterus. But having found it un-
my own practice, seeing that in the hands of others it has s, and knowing how difficult it is to ascertain the influence on hemorrhages, I think further evidence is required to anti-hemorrhagic powers of ergot.

nenorrhœa.—Some few cases have been published tending

; also, Dr. Weihe, in op. cit. vol. xviii. 543.
. 5th, 1851.
9.
= of Drs. Spajrani, Pignacco, and Gabini, in the Lancet for 1830 and 1831; of Dr.
and, Med. Gaz. xiii. 301.
and Pidoux, Trait de Therap. i. 546.
to show that ergot possesses emmenagogue properties. It appears to me to be more calculated to cause than to relieve amenorrhoea.

10. In other diseases.—Ergot has been employed in various diseases with apparent success; viz. intermittent fever, paraplegia, &c.

Administration.—Ergot is usually given in the form either of powder or infusion. The decoction, less frequently the tincture, and still more rarely the extract, are also used. Latterly the changeable extract and oil have been used.

1. Pulvis Secalis Cornuti. Pulvis Ergotæ.—This powder is to be prepared when required for use. The dose of it, for a woman in labour, is twenty grains; to be repeated at intervals of half an hour for three times; for other occasions (as leucorrhœa, hemorrhage, &c.) five to ten or fifteen grains, three times a day: its use should be continued for any great length of time. It may be taken mixed with powdered sugar. It has had the various names of pulvis parturientis (more correctly parturifacientis), pulvis ad partum, pulvis partum accedere, obstetricium, &c.

2. Infusum Secalis Cornuti. Infusum Ergotæ.—Ergot, bruise 3j.; boiling water, 5j.; macerate until cold, in a slightly covered vessel, and strain. The dose, for a woman in labour, is one-third of the whole, to be repeated, at intervals of half an hour, until the whole be taken. Sugar, aromatics (as nutmeg or cinnamon), a little wine or brandy, may be added to flavour it.

3. Decoctum Secalis Cornuti. Decoctum Ergotæ.—Ergot, bruise 3j.; water, 3j. Boil for ten minutes in a lightly covered vessel, and strain. The dose is one-third of the strained liquor, to be repeated at intervals of half an hour, until the whole be taken.

4. Tinctura Secalis Cornuti. Tinctura Ergotæ.—Ergot, bruise 3ss.; rectified spirit, 3j.; digest for four days, and strain. The dose, in lingering labours, is a teaspoonful. This is the formula Dr. Robert. A tincture is recommended by Carus. At Apothecaries' Hall, London, tincture of ergot is prepared by digesting ergot in proof spirit, Qj. Another formula has been published:—Ergot, bruised, 3j.; boiling water, 3j. Infuse for twenty-four hours, and add rectified spirit, 3ss. Digest for ten days. Half a drachm of this tincture is said to be equivalent to ten grains of the powder. One or two spoonfuls of a tincture of ergot (prepared by digesting 3ss. of ergot in 3j. of rectified spirit) mixed with water, has been recommended as an injection into the uterus in difficult labour, is to be introduced between the head of the child and the neck of the uterus a.

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a Neal, Researcher, p. 79.
b Dierbach, op. cit. p. 444.
c Bayle, op. cit. p. 546.
d Dierbach, Neuestes Rsd. in d. Med. 1. 147. 1838.
g Berlinisches Jahrbuch. Bd. xxxviii. 234. 1837.
CEREALIA.

OLEUM ERGOTI; Oil of Ergot.—The liquid sold in the shops as the name of pure oil of ergot is obtained by submitting the tincture of ergot (which is procured by percolation, see p. 925, to evaporation by a very gentle heat. Its colour is reddish brown. Mr. Wright states that this depends on the age of the grain and that when obtained from recent specimens it is not entirely free from colour. Its taste is oily and slightly bitter. It is lighter than water, and is soluble in alcohol and in solutions of the caustic alkalis. It is probably a mixture of several distinct principles. I made a guinea-pig swallow a fluidrachm of the oil; the only obvious effect was copious and frequent diuresis. Fluidrachms diffused through water and injected into the jugular vein of a dog, caused trembling of the muscles, paralysis of the tongue, and great weakness of the fore, legs, which lasted for more than two days. The respiration and action of the heart were exceedingly rapid. The saliva streamed copiously from the mouth. The pupils were strongly dilated before the experiment, and no obvious change in the blood was induced by the oil. Mr. Wright found the oil very toxic. A drachm, he states, injected into the jugular vein caused paralytic action of the pupil, feeble, slow, and intermittent action of the heart, deep and interrupted respiration, general paralysis, insensibility to stimuli and death in two hours and forty minutes.

According to evidence adduced by Mr. Wright the oil possesses the same influence over the uterus as that of the crude drug; that is, it causes powerful uterine contractions. To produce this effect it should be given in doses of from 20 to 50 drops in any convenient vehicle, as cold water, warm tea, or weak spirit and water.

The essential solution of ergot used by Mr. Lever to promote uterine contraction is essentially a solution of the oil of ergot. It was prepared by digesting 3iv. of powdered ergot in f3iv. of ether during 1 day. The tincture was submitted to spontaneous evaporation, the residue dissolved in f3ij. of ether. The dose of this solution is mxv. to mxxx. on a lump of sugar.

STIDOTE.—The proper treatment to be adopted in a case of poisoning by an overdose of ergot has not been accurately determined. The first object would be, of course, to evacuate the poison by the alimentary canal by the use of emetics or purgatives. As the decomposes ergotin, Phebus recommends the employment of saline water. In the absence of this, nitrohydrochloric acid (very diluted) might be exhibited. The subsequent treatment should be conducted on general principles.

OTHER DIETETICAL OR MEDICINAL CEREALIA.

Rice (Oryza sativa, fig. 162) is the ordinary sustenance of many oriental peoples. Being less laxative than the other cereal grains, it is frequently prescribed by medical men as a light, digestible, unirritating article of food in diarrhoea and dysentery; and in consequence it is, with the Public, a reputed drying and strengthening agent. Various ill effects, such as disordered vision, &c. have been attributed to its use.
been ascribed to the use of rice; but without any just grounds. Neither do there appear to be any real foundation for the assertions of Dr. Tyler, of malignant cholera (which he calls morbus oryzae) is induced by it.

Fig. 162.  Fig. 163.  Fig. 164.


2. COMMON MILLET (Panicum miliaceum, fig. 163,) and ITALIAN MILLET (Seta italic), are cultivated in Italy as articles of food.

3. MAIZE or INDIAN CORN (Zea Mays, fig. 164) is nutritive; but being deficient in gluten, is not adapted for manufacture into bread. It is apt to occasion diarrhoea in those unaccustomed to it. In America, Asia, and some parts of Europe it is used largely for human sustenance.

ORDER VIII.—ACORACEÆ, Lindl.—THE SWEET FLAG TRIBE.

ACOROIDEÆ, Agardh, Schott.

Essential Character.—Flowers hermaphrodite, surrounded with scales. Sepals leafless, not rolled up. Stamens complete, opposite the scales, with two-celled anthers turned inwards. Ovaries distinct. Fruit baccate, finally juiced. Seeds albuminous, with the embryo in the axis. Rhizome jointed. Leaves ensiform, embracing each other in the bud (Schott).

Properties.—Acorus Calamus is the only plant of the family whose properties are known.


Lancet, 1833-34, vol. i.

Dundeeon, Elem. d'Hygiène, p. 280.

Perianth of six pieces or scales, inferior. Stigma sessile, indeliscent. (Hooker.)

Anticipate [two-edged] scape rising much above the stem thick, rather spongy, with many long roots, aromatic, like part of the herbage, but much more powerfully so. Leaves two or three feet high, bright green, near an inch broad. Stalk leaves, except being thicker below the spadix, and not quite Spadix about a foot above the root, a little spreading, two inches long, tapering, covered with a mass of very numerous et, pale green flowers, which have no scent, except when A very narrow wavy membrane may be observed at the base spadix, which, perhaps, ought to be taken into the generic ter as a spathe (Smith).—Perennial: flowers in June.

—It is a native of this country, growing in watery places about banks of rivers, and is very plentiful in the rivers of Norfolk, so the London market is supplied. It grows also in other coun-

Europe, in Asia, and in the United States.

cirtion.—The dried underground stem (rhizoma, L.; radix perii seu radix calami aromatici, Offic.) occurs in the shops in pieces four or five inches long, and about as broad as the jointed, somewhat curved, of a spongy or corky texture ally; of a yellowish brown or fawn colour externally, and buffy, slight roseate hue, internally. Their fracture is short: their surface is marked transversely with the vestiges of the leaves were attached to it; the lower surface has numerous dark points, ended by small light-coloured elevated circles, from which the rise. Their taste is warm and bitter; their odour is aromatic.
ELEMENTS OF MATERIA MEDICA.

COMPOSITION.—The fresh rhizome was analysed by Trommsdorf, and obtained the following results:—Volatile oil, 0.1; soft resin, 2.3; gum, with some phosphate of potash, 5.5; starchy matter (like inulin), 1.6; woody matter, 21.5; and water, 65.7. Meissner found traces of copper in the rhizome.

The active constituents are the oil, the resin, and the extractive.

1 of the common sweet flag (called in the shops oleum calami aromaticum) is obtained by distilling the fresh rhizome with water. Its odour is similar to, though less agreeable than, that of the rhizome. Its colour is yellow. It is bought by snuff-makers, so that it is used, I presume, for scenting snuff. It is also used in the preparation of aromatic vinegar (see p. 403).

CHEMICAL CHARACTERISTICS.—Iodine blackens the rhizome (especially when it has been boiled), thereby indicating the presence of iodine, the blue iodide of starch. Acetate and diacetate of lead, and nitrate of mercury, cause precipitates with the decoction. These precipitates consist principally of metallic oxides or subsalts and the extractive. Nitrate of silver produces a precipitate of the iodide of silver, which is insoluble in nitric acid, but soluble in ammonia. The decoction reddens litmus.

PHYSIOLOGICAL EFFECTS.—It is an aromatic stimulant and mildly astringent. Vogt arranges it with the excitantia volatilia, and regards it as approaching angelica root on the one hand, and cascarilla and usta barks on the other.

USES.—It is rarely employed by medical practitioners, though it might be frequently substituted, with good effect, for the more costly aromatic stimulants. It is a useful adjunct to other stimulants and astringents. It has been employed in continued asthenic fevers accompanied with much prostration of strength and greatly weakened digestive power. For the cure of ague, the dried root powdered is made into a tea by the country people in Norfolk. It is well adapted for dysenteric cases accompanied with, or dependent on, an astatic condition of the digestive organs, and is especially serviceable in gouty affections. It has also been used as a local agent, viz. in the formation of astringent baths, poultices, and gargles, as an application to foul-odorated ulcers, &c.

ADMINISTRATION.—In powder, the rhizome may be given in doses from a scruple to a drachm. The infusion is perhaps the most suitable preparation; it is made by boiling a jigger of the rhizome in 3 jiggers of boiling water; the dose is two or three table-spoonfuls. The tincture is an objectionable preparation, as the oil of the rhizome is evaporated by boiling. The tincture (Ph. Bor.) is procured by extracting 3 jiggers of the rhizome in 3 jiggers of spirit (sp. gr. 0.900); the dose is 1 drachm tea-spoonful.

* Lehre d. Pharmakologie, i. 421, 4th Aufl.
* Sir J. E. Smith, Eng. Flora, ii. 158.
ORDER IX.—ARACEÆ, Schott, Lindl.—THE ARUM TRIBE.

Fig. 165. Fig. 166. This order is distinguished from the preceding one by its naked unisexual flowers, arranged upon a spadix within a spathe. Its prevailing property is acridity, especially remarkable in Dieffenbachia Seguina, or the Dumb Cane, a native of the West India Islands, two drachms of whose juice have been known to prove fatal in two hours.

Arum maculatum (Wake-Robin or Cuckoo-pint, fig. 165) is the only indigenous plant of the order. Every part of it is acrid; but, by drying or heating, it loses this property. From the underground tubers is manufactured, in the island of Portland, a starchy substance, called Portland Arrow-root or Portland Sago. The substance which I have received under this name is a white amylaceous powder. Examined by the microscope the particles are found to be exceedingly small. They are circular, mullet-shaped, or polyhedral. The angular appearance of some of them probably arises from compression. The hilum is circular, and apparently lies in a small depression. It cracks in a linear or stellate manner.

Arum Colocasia (fig. 166) is cultivated in Egypt for the nutritious matter got from the tubers. Arum esculentum is cultivated in the West Indies for a similar purpose.

Fig. 167. Arum Colocasia.

ORDER X.—PALMÆ, Juss.—THE PALM TRIBE.

Fig. 168. Fig. 169. Cocos nucifera or the 1 valued spathe, with branched spadix.

Cocos nucifera is remarkable for its dichotomous stem.
Essential Character.—Flowers hermaphrodite, or frequently polygamous. Perianth six-parted, in two series, persistent; the three outer segments often smaller than the inner sometimes deeply connate. Stamens inserted into the base of the perianth, usually definite in number, opposite the segments of the perianth to which they are equal in number, seldom three; sometimes, in a few polygamous genera, indefinite in number. Ovary one, three-celled, or deeply three-lobed; the lobes or cells one-seeded, with an erect ovule, rarely one-seeded. Fruit baccate or drupaceous, with fibrous flesh. Albumen cartilaginous, and either ruminate or furnished with a central or ventral cavity: embryo lodged in a particular cavity of the albumen, usually at a distance from the hilum dorsal and indicated by a little nipple, taper or pulley-shaped; plumule included, scarcely visible; the cotyledonous extremity becoming thickened at germination, and either filling up a pre-existing cavity, or one formed by the liquefaction of the albumen in the centre.—Trunk arboreal or semi-arborescent, simple (fig. 169), occasionally shrubby and branched (fig. 169), rough with the dilated halved sheathing bases of the leaves or their scars. Leaves clustered, terminal, very large, pinnate or flabelliform, plaited in vernalion. Spadix terminal, often branched, enclosed in a one or many valved spathe (fig. 168 a). Flowers small, with bractlets. Fruit occasionally very large. (R. Brown, 1810.)

Properties.—The stems of many palms (e. g. Sagus levis and farinifera, Saguerus, Rumphi, Phoenix farinifera, and Caryota wrens) yield a feculent matter, called Sago. By incision into the spathe at the top of the stem, some (e. g. Cocos nucifera, Caryota wrens, and Saguerus Rumphi) a saccharine liquor, termed Sweet Toddy, is procured, which, when fermented, constitutes Palm Wine, and yields by distillation Arrack or Rack (see p. 364). A wax-like substance exudes from the stems of some (e. g. Cerroylon Andicola). The fruits of the palms vary in uniformity in their properties: thus, some are oily (e. g. Elaeis), some are saccharine and nourishing (e. g. Phas dactylifera), some are acid (e. g. Caryota wrens and Saguerus Rumphi); others are astringent (e. g. Latania borbonica), or acid (e. g. Calamus Rotang). The seeds, likewise, are not uniform: those of Cocos nucifera are oleaginous, while those of Areca Catechu are astringent.

1. SA’GUS RUMP’HII, Wild. L.—THE MALAY OR RUMPHIUS’S SAGO-PALM.

Sagus farinifera, Gärta.


(Sago; Facula caudicis. Sago; Medulla facula, L.)

History.—Sago is not mentioned by the ancient Greeks and Romans. Fern. Lopez 2 is the first author in whose works I have found any notice of it. By the earlier writers it was variously called sago, sagu, and saga 3. In Java the word Saga signifies bread 2.


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3 C. Bæhin, Pinax.
Berry backwardly imbricated with cartilaginous scales. Seed solitary. Embryo lateral. (Roxburgh.)

Sp. Char.—Arborescent, armed, with strong straight spines. Leaves pinnate. (Roxburgh.)

The stature of this tree seldom exceeds thirty feet. Before maturity, and previous to the formation of the fruit, the stem consists of a thin hard wall, about two inches thick, and of an enormous volume of tissue (commonly termed the medulla or pith), from which the farina, called sago, is obtained. As the fruit forms, the farinaceous medulla disappears, and when the tree attains full maturity, the stem is no more than a hollow shell. The utmost age of the tree does not exceed thirty years.

—Peninsula of Malacca and the Malay Islands. It is an inhabitant of low marshy situations.

SAGUS LEVIS, Rumph.—THE UNARMED SAGO-PALM.


(Sago; Fecula caudicea, Offic.

ANY. Gen. Char.—Vide supra.

Char.—Arborescent, unarmed. Embryo lodged in or near the base of the seed. Leaves pinnate. (Roxburgh.)

—Sumatra, Borneo, and the islands between them. Grows abundantly in low swampy lands.

GUE'rus RUM'PHIUS, Roxb.—RUMPHIUS'S WINE SAGO-PALM.

Palma Indica vinaria secunda, Sagerus, sive Gomutus Commuto, Rumph.

Sex. Syst. Monoeica, Polysandra.

(Sago; Fecula caudicea, Offic.


Char.—The only species.

—Islands eastward to the Bay of Bengal.
MANUFACTURE OF SAGO.—A farinaceous substance, called sago, is claimed to be obtained from two species of Cycas (vide Cycadaceae). But the sago of English commerce is obtained from one or more palms. All the three just mentioned (viz. Sagus Rumphi and levis and Sagurus Rumphi) yield it. Dr. Roxburgh says, the granulated sago met with in Europe is got from Sagus levis. Marsden, on the other hand, says the Sagus Rumphi yields the sago of the shops. The manufacture of sago varies somewhat in different localities. In the Moluccas it is procured as follows:—When the tree is sufficiently mature, it is cut down near the root, and the trunk split into portions of six or seven feet long, each of which is split into two parts. From these the medullary matter is extracted, and with an instrument of bamboo or hard wood, is reduced to powdery-like sawdust. This is mixed with water, which is then strained by a sieve. The filtered liquor deposits the farina, which, after two or more eductions, is fit for use. This is raw sago meal.

For exportation, the finest meal is mixed with water, and the past rubbed into small grains of the size and form of coriander seed. Within the last few years, the Chinese of Malacca have invented a process by which they refine sago so as to give it a fine pearl lustre. The quantity of sago afforded by the sago-palm is prodigious. Five and six hundred pounds is not an unusual produce for one tree.

DESCRIPTION OF SAGO.—Sago occurs in commerce in two states, pulverulent and granulated.

1. Pulverulent Sago; Sago Meal: Sago Flour (Farina Sagu).—This is imported in the form of a fine amylaceous powder. It is whitish with a buffy or reddish tint. Its odour is faint, but somewhat unpleasant and musty. Examined by the microscope it is found to consist of oval, more or less ovate, particles, many of which appear as if truncated, so that they are more or lessmullov-shaped. Some of them resemble in form a conical bottle cut off at the neck. From their strong lateral shading they are obviously convex. Many of the particles are more or less broken. Most of them have an irregular or tuberculated surface. The hilum, when perfect, is circular; it cracks in the form of a single slit, or of a cross, or in a stellate manner. The surface of the particles presents the appearance of a series of concentric rings or annular lines, which, however, are much less distinct than in potato starch. These lines are indicative of the concentric layers of which each particle is composed.

2. Granulated Sago (Grana Sagu).—Of this there are two kinds, pearl sago, and common brown sago.

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1 In the Edinburgh Pharmacopoeia it is said to be the “Farina from the interior of the trunk of various Palmae and species of Cycas.”
2 Fl. Indica, iii. 629.
3 Hist. of Sumatra.
4 Crawford, Hist. of the Indian Archipelago, vol. i. 383 et seq. and vol. iii. 348.
WINE SAGO—Palm.

_White Sago_ (Sagum perlatum).—This occurs in small hard grains resembling in size that of a pin's head, inodorous, and having a brownish or pinkish yellow tint, and are translucent. By the aid of a solution of chloride of silver can be bleached and rendered perfectly white (bleached sago). I am informed that the dealers pay seven pounds per hundred of this. Bleached sago resembles some of potato sago which I have met with, and which is sold as pearl sago. Pearl sago swells up in cold water. Examined under a microscope, it is found to contain a similar kind of particles, but all ruptured, and presenting very indistinct traces of these peculiarities are doubtless produced by the process of bleaching.

_Starch or Brown Sago_ (Sagum fuscum) occurs in larger grains. I have usually met with consists of grains about the size of pearl barley; but I have received from Dr. Douglas, of Edinburgh, a sample of some nearly as large as grey common sago is whitish or brownish white: the same grain is found on one part of its surface, and brownish on another. Under a microscope, the grains of common sago are found of particles like those of pulverulent starch, perhaps somewhat broken and less regular in their shape.

Adulteration.—Potato sago is sometimes sold for white or bleached pearl sago. The grains can be distinguished by the microscope. The largest particles of potato sago are larger than those of pearl sago; moreover, the particles of potato sago are more regularly oval and ovate, more distinctly ringed, smoother, and less broken than those of genuine sago. When their circular hilum cracks it frequently forms two slightly diverging rents (see fig. 173). I have two varieties of potato sago, one in grains, about 173.

100 of Potato starch.

Potato sago is sometimes sold for white or bleached pearl sago. The grains can be distinguished by the microscope. The largest particles of potato sago are larger than those of pearl sago; moreover, the particles of potato sago are more regularly oval and ovate, more distinctly ringed, smoother, and less broken than those of genuine sago. When their circular hilum cracks it frequently forms two slightly diverging rents (see fig. 173). I have two varieties of potato sago, one in grains, about 100 of potato sago (pearl potato sago), the other in larger pieces, received from Professor Guibourt, who tells me it is from Paris (see Potato Starch).

Rece.---The quantity of sago on which duty was paid in 1834 was 26,895 cwts. It is brought from Singapore, in bags, & c.

4.---Sago has not been analyzed; but its composition led to be analogous to that of other starchy bodies (p. 47).

3.---Starch possesses the characteristics of starch. A cold decoction forms a blue compound (iodide with iodine. A filtered infusion (prepared with cold water) of pulverulent starch, or of brown sago, undergoes no change in the addition of a tincture of iodine. But a mixture of pearl sago becomes blue with iodine. This evi-
of brown sago is rendered milky by nitrate of silver, diacetate of lead, and protonitrate of mercury; but the cold infusions of pulverulent and of pearl sago are scarcely affected by these tests.

Physiological Effects.—It is nutritive and easy of digestion, and is an important article of food in some parts of the East. "The Malay sago palm," says Dr. Roxburgh, "is the tree, the pith of which is the staff of life to the inhabitants of the Moluccas."

Uses.—Sago puddings are occasionally brought to table. But the principal use of sago is to yield a light, nutritious, easily digested and non-irritating article of food for the invalid, in febrile and inflammatory cases. For this purpose it should be boiled in water (in some cases milk is preferred), the solution strained, and flavoured with sugar and spices, or even with a little white wine, when the use of this is not contra-indicated.

4. ARE’CA CAT’ECHU, Linn. E.—CATECHU PALM.

Sex. Syst. Monoeaa, Hexandria.

(Semen.—Extract of the kernels, E.—Carbo seminis, Offic.)

History.—Areca nuts are not mentioned in the writings of the ancient Greeks and Romans. Avicenna speaks of them under the name of Fufel1.


Sp. Char.—Trunk straight and slender, from forty to fifty feet high. Fronds pinnate; leaflets compound, linear, opposite, pinnately veined. Spatha erect, ramus. Male flowers hexandrous. Seed of a round conic form, and obtuse. (Roxburgh.)

Hab.—Cultivated in all the warmer parts of Asia.

Description and Uses of the Seeds.—The fruit of the Catechu palm is about the size and shape of a small egg, yellowish, smooth. Within the fibrous pericarp is the seed (Areca nut; Betel nut; Pinang nut). This is about the size of a nutmeg, roundish conical, flattened at the base, hard, horny, inodorous, externally reddish brown, internally brown with whitish veins. The principal part of the seed is the ruminate albumen, at the base of which is the embryo2. According to Morin3, these seeds are composed of tannin (principally), gallic acid, glutin, red insoluble matter, fixed oil, gum, oxalate of lime, lignin, &c. With lime and the leaves of Piper Betel, these nuts form the celebrated masticatory of the East, called betel. They are usually cut into four equal parts; one of which is rolled up with a little lime in the leaf of the Piper Betel, and the whole is chewed. The mixture acts as a stimulant, and ting[es the saliva].

The Indians have an idea that by this means the teeth are fastened, the gums cleansed, and the mouth cooled. Peron4 w

1 Lib. ii. p. 301. Venet. 1564.
2 Roxburgh's Plants of Coromandel, pl. 75.
3 Journ. de Pharm. viii. 449.
4 Voyage aux Terres Australes.
that he preserved his health, during a long and difficult
the habitual use of the betel, while his companions, who
it, died mostly of dysentery. In this country, areca-nut
used as a tooth-powder. I know of no particular value
over ordinary charcoal, except, perhaps, that derived
water hardness.

CUTTURE OF PALM CATECHU.—From the seeds is obtained an
extract, which constitutes two (or perhaps more) kinds of
ses called catechu in the shops. It is largely procured in
out Sirah, in the following manner:—“Areca nuts are
cy come from the tree, and boiled for some hours in an iron
ney are then taken out, and the remaining water is inspis-
continued boiling. This process furnishes Kasu, or most
tera japonica, which is black, and mixed with paddy husks
impurities. After the nuts are dried, they are put into a
ity of water, boiled again, and this water being inspissated,
mer, yields the best or dearest kind of catechu, called
is yellowish brown, has an earthy fracture, and is free from
ure of foreign bodies.”

USES OF PALM CATECHU.—None of the commercial extracts,
dchu, are distinguished by any name referring to the catechu.
the description hitherto given of palm catechu is too
rave to enable us to recognize it with certainty.”

OTHER MEDICINAL PRODUCTS OF PALMAGGIE.

OELEM Palme) is imported from the western coast of Africa, principally from Guinea, where it is procured by
expression from the fruit of the Elais guine-
censis (fig. 174). It has a solid consistence,
a rich orange-yellow colour, a sweetish
taste, and an agreeable odour, somewhat
similar to that of the rhizome of the
Florentine orris. By exposure to light
it is bleached. It consists of Oleine,
Margarine, and about two-thirds of its
weight of Palmitine. The last-mentioned
substance is a white solid fat, composed
of palmitic acid (C16 H32O6) and glycerine.
The Africans use palm oil as butter. It is
emollient and demulcent, like the other
fixed oils, but is rarely employed in
medicine. By the public it is occasion-
ally employed by way of friction in
bruises, sprains, &c. It is a constituent
of the common black bougie. Its ordi-
nary use in this country is in the manu-
facture of yellow soap (see p. 566). It
readily becomes rancid. It may be
bleached by the solar rays, by sulphuric
acid, or by chlorine.

Pract., Historical and Statistical, on India.
out of the varieties, properties, composition, effects, and use, of catechu, vide Acacia
frondosa, and Nauclea Gambir.
The term Dragon's Blood (Sanguis Draconis) is applied in commerce to certain resinous substances which are mostly obtained from some palms of the genus Calamus. But the term is also applied to a product of the Dracoæus Draco [L. Leguminosæ]. Lieut. Wellstead says, that in Socotra, Dragon's blood exudes spontaneously from the stem of a tree. Dragon's blood is now never used in medicine in this country. The following are the kinds of it which I have with:

a. Dragon's blood in the reed; Sanguis Draconis bacitis. This occurs in dark reddish brown sticks, of from twelve to eighteen inches long, and from a quarter to half an inch in diameter, enveloped with a leaf of the Talipat palm (Corypha umbraculifera), and bound round with sheaves of cane (probably the stem of Calamus petreus). It is supposed to be obtained from a species of Calamus, perhaps C. Draco.

b. Dragon's blood in oval masses; Dragon's blood in drops; Sanguis Draconis in lacrymis, Martius. This occurs in reddish brown lumps of the size and shape of an olive, enveloped with the leaf of Corypha umbraculifera or Corypha Lecythis, which thus connects them together in a row, like the beads of a necklace. It is rare in English commerce. It is obtained, according to Rumphius, by rubbing or shaking the fruit of Calamus Draco in a bag. A resinous exudate is by this means separated, and is afterwards softened by heat, and made up into these masses.

c. Dragon's blood in powder. This is a reddish powder of very fine quills imported from the East Indies. It is probably the dust obtained from the leaves of the C. Draco, in the way just described.

d. Dragon's blood in the tear. Sanguis Draconis in gronis, Martius. It occurs in irregular pieces, not exceeding the size of a horsebean. T. W. C. Martius says, pieces of the fruit of the Calamus Rotang are frequently found internally.

e. Lamp Dragon's blood. Sanguis Draconis in massis. This is of inferior quality. It occurs in large masses, which, when broken, present a heterogenous appearance.

Other varieties of Dragon's blood are described, but I have never met with them.

Dragon's blood is composed of red resin (called dracoin), 90-7; fixed oil, benzoic acid, 3-0; oxalate of lime, 1-6; phosphate of lime, 37-9.

It is inert, or nearly so, but was formerly reputed an astringent. It is a constituent of some tooth-powders and tinctures, but is never prescribed by medical practitioners. Its principal consumption is for colouring spirit and turpentine varnishes.

ORDER XI.—MELANTHACEÆ, R. Brown.—THE COLCHICUM TRIBE.

Essential Character.—Perianth inferior, petaloid, in six pieces, or, in consequence of the cohesion of the claws, tubular; the pieces generally involute at the summit. Stamens six; anthers mostly turned outwards. Ovary three-celled; style tridif or three-parted; stigma undivided. Capsule generally divisible into three pieces; sometimes with a loculicidal dehiscence. Seeds with a membranous testa; albumen dense, fleshy. (R. Brown.)

Properties. Poisonous: operation acro-narcotic. This is well shewn in four genera Colchicum, Veratrum, and Asagroa. MM. Pelletier and Caventou extracted what they considered to be veratria from each of these genera. According to Hesse and Geiger the active principle procured from Colchicum colchicinum:

* Athenæum, May 16, 1835; also, Journ. of Royal Geographical Society.
* Pharmacognosie.
* Herberge, Journ. Pharm. xvii. 225.
OLICHICUM AUTUMNA'LE, Linn. L. E. D.—THE COMMON MEADOW SAFFRON.

Sex. Syst. Alexandria, Trigynia.
(Cormus et semina, L. E.—Bulbus et semina, D.)

Dioscorides⁸ speaks of Colchicum (κολχικα), and says in Messenia and at Colchis. From the latter place it rests name. Dr. Sibthorp⁹ found three species of Colchicum in viz. C. autumnale, C. montanum, and C. variegatum. The these he considers to be the Colchicum of Dioscorides. It lies admitted into the Pharmacopoeia Graeca, printed at Athens.

NY. Gen. Char.—Perianth single, tubular, very long, rising spatha; limb campanulate, six-partite, petaloid. [Stamens inserted into the throat of the tube. Ovarium three-celled. three, filiform, long. Stigma somewhat clavate.] Capsule cell; cells united at the base. (Hooker, with some additions.)

Sp. Char.—Leaves plane, broadly lanceolate, erect (Hooker).

Root fibrous. Cormus (improperly called root or bulb) ovate, fleshy, large, covered with a loose brown membrane. The leaves are produced in the spring along with the fruit, and disappear before the flower appears. Flowers several, lilac or pale purple, arising from the cormus by a long, narrow, white tube. Fruit oblong, elliptical, composed of three cells, which may be regarded as distinct capsules, with intermediate fissures. Seeds small, spherical, with a rough brown testa, and large fleshy strophioila; internally they are white, and consist of a minute embryo lodged in a horny elastic albumen. The flowers appear in September, and the fruit the following spring or summer.

Hab.—Moist rich meadows in many parts of England and in various countries of Europe.

Collection.—The activity of the cormus varies at different seasons of the year. It is greatest about the months of July and August, between the withering of the leaves and the sprouting forth of er. At this period the new cormus is fully developed, and exhausted itself by the production of the flower. But many cormi brought to market have already pushed forth their flowers, re broken off, so as to prevent the circumstance from being

⁸ Lib. iv. cap. 84.
observed. "I have seen many **cruits**." says Dr. Lindley *, "sent to

* Flora Medica, p. 380.

**town in this state, which nevertheless found a ready sale, and at the**

* Ph. Lond.

**best price." The **seeds** should be gathered when fully ripe. The**

**London market is principally supplied from Gloucestershire, but**

**partly also from Hampshire and Oxfordshire.**

**DESCRIPTION.—The cormus, commonly called the bulb or root, when**

**gathered at the proper season, is about the size of a chestnut, and**

**somewhat resembles in external appearance the bulb of the common**

**tulip (Tulipa Gesmeriana); which, as well as other liliaceous bulbs,**

**are distinguished from the cormus of Colchicum by being composed**

**of laminae or scales, whereas the cormus of Colchicum is solid. It**

**is rounded on one side, flattened on the other, where is perceived the**

**fibrous germ of a new cormus, which, if allowed to grow, shoots up**

**and bears the flower, while the old cormus wastes, becomes insipid**

**and inert. It is covered by two coats, an inner reddish yellow one**

**and an external brown one. Internally, the cormus is white, flesh**

**solid, contains a milky juice, is very feculent, and has an acid bit**

**taste. "Before drying the cormus, it should be cut transversely**

**thin slices, the dry coats being previously removed.**" The slice**

**are to be quickly dried, in a dark airy place, with a heat not exceed**

**ing 170° F.**" Dr. A. T. Thomson **+** recommends the slices to**

**dried upon clean white paper, without artificial heat, but the time**

**required for this is an objection to it in practice. The dried slice**

**(radix siccata, Offic.) should be about the eighth or tenth of an in**

**ch thick, rounded, oval, with one notch only on one part of their**

**circumference (not fiddle-shaped), inodorous, of a greyish-white color**

**and an amylaceous appearance.**

**The seeds (semina) are about the size of those of white mustard,**

**odourless, and have a bitter acid taste. Their other qualities have**

**been described above.**

**COMPOSITION.—The Colchicum cormus was analyzed in 1810 by**

**Melandri and Moretti ; in 1818 by Stoltze °, and in 1820 by Pelle**

**tier and Caventon.**

**Analysis of Pelletier and Caventon.**

<table>
<thead>
<tr>
<th>Analysis of Pelletier and Caventon.</th>
<th>Cornin</th>
<th>Ditto in October.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatty matter composed of:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Olein &amp; Stearin.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supergallate of veratrine.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yellow colouring matter.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gum.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Starch.</td>
<td></td>
<td></td>
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<tr>
<td>Inulin in abundance.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lignin.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ashes, a minute quantity.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colchicum cormus.</td>
<td></td>
<td></td>
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</tbody>
</table>

**Stoltze's Analyses.**

<table>
<thead>
<tr>
<th>Cornin</th>
<th>Ditto in October.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volatile acid matter</td>
<td>trace</td>
</tr>
<tr>
<td>Soft resin</td>
<td>0°04</td>
</tr>
<tr>
<td>Crystallizable sugar.</td>
<td>0°41</td>
</tr>
<tr>
<td>Uncrystallizable sugar</td>
<td>5°91</td>
</tr>
<tr>
<td>Bitter extractive</td>
<td>1°30</td>
</tr>
<tr>
<td>Difficulty soluble extractive</td>
<td>0°81</td>
</tr>
<tr>
<td>Gum, like tragacanth</td>
<td>7°46</td>
</tr>
<tr>
<td>Starch</td>
<td>2°32</td>
</tr>
<tr>
<td>Lignin</td>
<td>0°61</td>
</tr>
<tr>
<td>Extractive, soluble in potash.</td>
<td>5°04</td>
</tr>
<tr>
<td>Water</td>
<td>99°90</td>
</tr>
</tbody>
</table>

* Flora Medica, p. 380.
+ Ph. Lond.
°° Ditto, p. 344.
°°° Bull. de Pharm. vol. ii. p. 217.
°°°° Thomson's Org. Chem. 446.
°°°°° Journ. de Pharm. vi. 364.
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ris will be described hereafter (vide Asagres officinalis).

existence in colchicum seeds of a new principle, called colchicins, colchicis,
cine, has been announced by Geiger and Hesse. It was prepared from diges-
ticin seeds boiling alcohol; this dissolved a supersalt, which was precipi-
ted maghiz, and the precipitate treated with boiling alcohol. By evapora-
tion, colchicins was deposited. The following are said to be its properties:—It is
silable alkaline substance, without odour, but having a bitter taste. It is
feebly alkaline, but neutralizes acids, and forms crystallizable salts.
The bitter taste. It is soluble in water, and the solution precipitates the
t of chloride of platinum. Nitric acid colours colchicins deep violet,
asses into indigo blue, and quickly becomes, first green, and then yellow.
rated sulphuric acid colours it yellowish brown.

icina is said to be distinguished from veratria by the following charac-
—1st, it is soluble in water, whereas veratria is not; 2dly, it is crystal-
whereas pure veratria is not; 3dly, it does not possess the acridity of
and it differs from the latter in this, that when applied to the nose it
excite sneezing, whereas the least portion of veratria occasions a most
strenuous sneezing.

icina is a powerful poison. One-tenth of a grain, dissolved in weak
ke a young cat in about twelve hours. The symptoms were saliva-
rhonas, vomiting, a staggering gait, cries, convulsions, and death. The
t and intestines were violently inflamed, and had extravasated blood
out their whole course.

ove statements require confirmation.

ICAL CHARACTERISTICS.—A cold decoction of the fresh
orms a deep blue precipitate (iodide of starch) with a solution
e. Sesquichloride of iron communicates a faint bluish tint
 of iron) to the decoction. Acetate and diacetate of lead,
onitrate of mercury, form white precipitates with the cold
n. Nitrate of silver produces a precipitate which is at first
but becomes in a few minutes black. Tincture of nutgalls
al a slight dirty-looking precipitate, which is somewhat dim-
the effect of heat. Pelletier and Caventou a regard this
ate as a mixture of the tannates of starch and inulin (and of
). When heated to 122° F. the tannate of starch dissolves,
that of inulin. Fresh prepared tincture of guaiacum with a
 of acetic acid produces a cerulean blue colour with the
mus, indicating the presence of gluten.

IOLOGICAL EFFECTS. a. On Vegetables.—Not yet determined.

: Animals.—Colchicum is a poison to animals. It acts as a
itant, reduces the force of the circulation, and causes inflam-
of the alimentary canal. Animals, for the most part, refuse
on it. It has, however, been eaten by deer and cattle, and
onous to them. It is said to prove injurious at spring-time
ore, we are told that when dried it may be eaten in hay
nity. Stürck and Kratochwill gave it to dogs, on whom
as an acrid poison, and caused death. Sir E. Home in-

a de Chems. x. 465.

a de Pharm. vi. 365.


c Colchicis, p. 17.

a by Wibmer.

rm. 1816.
jected 160 drops of a vinous infusion of colchicum into the jugular vein of a dog; all power of motion was instantly lost, the breathing became slow, the pulse hardly to be felt. In ten minutes it was 80 in twenty minutes 60, in an hour 115, with the respiration so quick as hardly to be counted. In two hours the pulse was 150, and very weak. The animal was purged, vomited, and very languid: he died in five hours. On dissection, the internal coat of the stomach was found inflamed, in a greater or less degree, universally. From this experiment it appears that the action of colchicum on the alimentary canal is of a specific kind.

In opposition to the above statements it deserves notice that Only has frequently given to dogs, in the month of June, two or three corms without perceiving any sensible effects; from which he infers that climate and season of the year have great influence on the deleterious properties.

It has been said that horses eat colchicum with impunity; but it is probable that this statement is erroneous. Withering\(h\) states, on the authority of Mr. Woodward, that, "in a pasture in which were seven horses, and eaten down nearly bare, the grass was closely cropped, even under the leaves, but not a leaf bitten."

Some further information on the effects of colchicum on dogs will be found in Sir C. Scudamore's *Treatise on Gout and Rheumatism*, 3d ed. p. 477, 1819.

\(\gamma\). On Man.—In small and repeated doses colchicum has a tendency to promote the action of the secreting organs, especially of the intestinal mucous membrane. The kidneys, the skin, and the liver are less certainly and obviously affected by it. The most constant effects observed from the use of larger doses are nausea, vomiting, and purging. Reduction of the frequency of the pulse is a common, though not an invariable effect. Mr. Haden\(i\) was, I believe, the first to direct attention to the advantages to be taken of this effect in the treatment of inflammatory diseases. In some experiments on healthy individuals by Dr. Lewins\(j\), debility, a feeling of illness and headache, were experienced. This feeling of debility is however, to be referred to the evacuations produced; for, as Dr. Blow\(k\) has observed, the number of motions is sometimes considered without any proportionate depression of strength ensuing. "I have known," says Dr. B. "even twenty stools occasioned by a single dose of colchicum, the patient not complaining of the least debility." The action of colchicum on the secretory apparatus is not confined to that of the alimentary canal: after the use of three or four full doses of this medicine copious sweating is often produced, especially when the skin is kept warm. On other occasions the kidneys are powerfully acted on. In one case, mentioned by Dr. Lewins, seventy drops of *Vinum Colchici* caused the discharge of upwards of a pint of urine by vomiting. Violent salivation resulted in a case recorded in

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\(a\) Txtcol. Gen.
\(b\) Brit. Plants, ii. 452, 7th ed. 1830.
\(i\) Pract. Obsrv. on the Colchicum autumnale. 1820.
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in journal. Chelius, of Heidelberg, asserts, that, in gout or rheumatism, colchicum occasions a striking increase in the quan-
tric acid contained in the urine: in one case it was nearly in the space of twelve days. But this effect is by no means 
; as Dr. Graves has pointed out. Indeed, it not unfre-
happens, in acute rheumatism, when the urine is loaded with 
od or the urates, that the use of colchicum diminishes the 
of these matters in the urine; so that it would seem rather at the formation of uric acid in the system than to provoke 
ation.

some circumstances colchicum acts as anodyne: thus in 
d rheumatic cases it sometimes speedily relieves the pain in 
sprising manner.

cessive or poisonous doses colchicum acts as a powerful poison. 
: related by Mr. Fereday, where two ounces of the wine of 
s of colchicum were swallowed, the symptoms were acute 
bowels, coming on in about an hour and a half after 
, vomiting, acute tenesmus, small, slow, and feeble pulse, cold 
weakness of limbs. The nausea, vomiting, and pain in the 
, continued with undiminished violence, the pulse became 
ceptible and intermitting, the urine was suppressed, the 
hurred, purging of copious liquid stools came on, and loss 
for a minute or two after getting out of bed. The patient 
y-seven hours after swallowing the poison. On a post-
examination, the skin of most parts of the body was found 
ered with a purple efflorescence: no inflammation was 
 in the alimentary canal; two red patches were found, one 
omach, and the other in the jejunum. These were produced 
fusion of a small quantity of blood, in the one case, between 
cular and mucous coats; in the other, between the peritoneal 
cular coats. Ecchymosed spots were observed on the sur-
he lungs, of the heart, and of the diaphragm. More recently 
poisoning by a decoction of the seeds has been recorded; 
by the leaves of this plant.

r. Fereday's case the only indications of an affection of the 
system were weakness of the limbs, the temporary loss of 
d the slowness and feebleness of the pulse.

 deserving of notice, that in this case, also in another 
by Chevallier, likewise in a third mentioned by Mr. Dillon, 
Mr. Haden's case, no convulsions were observed; and 
three first cases no insensibility. In the last case, how-
r. Haden mentions that at "ten P.M. she fell into an apo-
kind of sleep, which terminated in death before morning." 
markable that convulsions are ascribed to veratria by Ma-

1 Wood and Bache's United States Dispensatory, 3d. ed. 
3 Ibid. vol. vii. p. 549. 
4 Ibid. vol. i. p. 160. 
5 Journ. de Chim. Méd. t. vi. 2e Série, p. 505. 
6 Ibid. viii. 531. 
8 Mejandra's Formulary, by C. T. Haden.
In one case of far poisoning from an ounce and a half of the tincture of colchicum delirium occurred.

The above account of the effects of colchicum applies both to the corms, the seeds, and the leaves. The flowers are likewise poisonous, and a fatal case from their use is mentioned by Dr. Christison. They have been recommended for medicinal use.

Uses.—The following are the principal diseases in which Meadow Saffron has been employed:—

1. In Gout.—The circumstances which of late years have led to the extensive employment of colchicum in gout are the following:—About seventy years ago, M. Husson, a military officer in the service of the king of France, discovered, as he informs us, a plant possessing extraordinary virtues in the cure of various diseases. From this plant he prepared a remedy called Eau Médicinale, which acquired great celebrity for abating the pain and cutting short the paroxysm of gout. Various attempts were made to discover the nature of the active principle. In 1782, MM. Cadet and Parmentier declared that it contained no metallic or mineral substance, and that it was a vinous infusion of some bitter plant or plants. Alyon asserted that it was prepared with Gratiola; Mr. Moore said that it was a vinous infusion of white hellebore with laudanum; Mr. Wantz said that it was a vinous infusion of Colchicum. Although most writers have adopted Mr. Wantz's opinion, we should bear in mind that the prohibitory offer of its correctness, viz. analogy of effect, cannot be admitted to be conclusive, as is well shewn by the fact, that there has been advanced in favour of the identity of other medicines with the Eau Médicinale.

The power of Colchicum to alleviate a paroxysm of gout is admitted by all; but considerable difference of opinion exists as to the extent of this power, and the propriety of employing it. Sir Evers Home, from observation of its effects on his own person, regarded it as a specific in gout, and from experiments on animals concludes that its beneficial effects in this malady are produced through the circulation.

Dr. Paris observes—"As a specific in gout its efficacy has been fully ascertained: it allays pain, and cuts short the paroxysm; has also a decided action upon the arterial system, which it can never appear to control through the medium of the nerves." But if by the word specific is meant a medicine infallibly, and on all patients, producing given salutary effects, and acting by some unknown power on the disease, without being directed by indications, undoubtedly Colchicum is no specific for gout.

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2 Treat. on Poisons, 3d ed. p. 792.
3 Dr. E. G. Jones, An Account of the Remarkable Effects of the Eau Médicinale d’Husson in the Cure of Gout.
4 Edmon. de Chimie.
5 Two Letters on the Composition of the Eau Médicinale, 2d ed. 1811.
7 Phil. Trans. 1816.
8 Pharmacologia, vol. ii. p. 175, 6th ed.
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Colchicum alleviates a paroxysm of gout I have before men-
bred that alleviation is palliative, not curative. It has no
power to prevent a speedy recurrence of the attack; nay, accord-
ingly Charles Scudamore 1, it renders the disposition to the
attack of colchicum in gout is an interesting though
alleviation of the system. Furthermore, by repetition its
most moderate of Colchicum in gout is an interesting though
satisfactory part of our inquiry. I have already stated that
this remedy acts as a specific, that is, as operating by some
influence. Others, however, and with more propriety, refer
to its known physiological effects. "Colchicum, Dr. Barlow 4,"-purges, abates pain, and lowers the pulse.
effects are accounted for by assigning it to a cathartic and
operation, and it is this combination perhaps to which its
virtue is to be ascribed." The fact that a combination of
and a narcotic (as elaterium and opium, mentioned by Dr.
and white hellebore and laudanum, recommended by Mr.
has been found to give, in several cases of gout, marked and
temporary relief, seems to confirm Dr. Barlow's opinion. The
tained by Chelius, and adopted by Dr. G. Hume Weather-
that colchicum relieves gout by augmenting the quantity of
in the urine, is not supported by fact, as I have already
said. Whether it acts by preventing the formation of uric
system I am not prepared to say.

do gout occurring in plethoric habits, blood-letting should
use of Colchicum. This medicine should then be exhi-
doses, so as to produce a copious evacuation by the bowels,
the quantity must be considerably diminished. Though
essential to the therapeutical influence of Colchicum, it
fitted by most that, in a large number of cases at least, it
the alleviation of the symptoms. Hence, many practi-
commend its combination with saline purgatives, as the
as magnesia. Sir Charles Scudamore has experienced "the

able success from a draught composed of Magnesia, gr. xv.
Magnes. Sulphat. 3j. ad 3ij.; Aceti Colchici, 3j. ad 3ij.; with
led water the most agreeable, and sweetened with any plea-
to, or with 15 or 20 grains of Extract. Glycyrrhiza."

THEUWATISM.—The analogy existing between gout and rheu-
as led to the trial of the same remedies in both diseases.
therapeutical powers in the latter disease are much less
than in the former. Rheumatism may affect the fibrous tis-
ne joints, the synovial membrane, the muscles or their ap-
overings, the periosteum, or the neurilemma, constituting thus
disease, which may be denominated respectively the

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1 Treat. on Gout and Rheumatism, 3d ed. p. 197.
3 Treat. on Gout, p. 201.
5 Treat. on Headaches, p. 88. 1833.
fibrous, or ligamentous; the synovial, arthritic, or capsular; the muscular; the periosteal; and the neuralgic forms of rheumatism. Of these colchicum is said to produce its best effects in the synovial form. It is remarkable, however, that in all the severe cases of this variety of rheumatism which have fallen under my notice, the disease has proceeded unchecked, or was scarcely relieved by the use of colchicum. In one instance, that of my much-lamented friend, the late Dr. Cummin (whose case is noticed by Dr. Macleod, in the *Lond. Med. Gaz.* xxi. 358), the disease proved fatal by metastasis to the brain. In another melancholy but not fatal case, the gentlemaías lost the sight of both his eyes, and has both knee-joints rendered stiff. In neither of these cases was colchicum of the slightest aid.

Of the mode of administering colchicum in "rheumatic gout," recommended by Mr. Wigan, I have no experience. He gives eight grains of the powder in some mild diluent every hour until active vomiting, profuse purging, or abundant perspiration, take place, or at least till the stomach can bear no more. The usual quantity is eight or ten doses; but while some take fourteen, others can be content with only five. Though the pain ceases, the more active effects of colchicum do not place for some hours after the last dose. Mr. Wigan declares colchicum "the most easily managed, the most universally applicable, the safest, and the most certain specific, in the whole compass of our opulent Pharmacopoeia. But its use in these large doses requires to be carefully watched.

3. In Dropsy.—Colchicum was used in dropsy with success by Störck. It has been employed in dropsical cases with the twofold view of purging and promoting the action of the kidneys. Given in combination with saline purgatives, I have found it beneficial in some cases of anasarca of old persons.

4. In inflammatory diseases generally.—Colchicum was recommended as a sedative in inflammatory diseases in general by the late Mr. C. T. Haden. He used it as an auxiliary to blood-letting for the purpose of controlling arterial action; and gave it in the form of powder, in doses of six or seven grains, three or four times a day in combination with purgatives, in inflammatory affections of the lungs and their membranes, and of the breasts and nipples. In chronic bronchitis it has also been found useful by Dr. Hastings.

5. In fevers.—The late Mr. Haden, and more recently Dr. Lewin, have spoken favourably of the use of colchicum in fever. In my opinion it is only admissible in those forms of the disease requiring an active antiphlogistic treatment. In such it may be useful as an auxiliary to blood-letting and cathartics.

6. In various other diseases.—For expelling tape-worm, colchicum...
Common Meadow Saffron.

been found efficacious by Chisholm and Baumbach. *In some affections of the nervous system, as chorea, hypochondriasia, &c.* Mr. Raven* employed it with advantage. *In humoral and other chronic bronchial affections,* I have found it of great, especially when these complaints were accompanied with venous swellings.

istration.—The cormi and seeds of meadow saffron have employed in substance, in a liquid form, and in the state of

ulus Cormi Colchici.—Dose, from two to eight or nine

To preserve it Mr. Wigan recommends it to be kept mixed

ulus Seminum Colchici.—Dose the same as that of the cor-

The seeds are to be preferred to the cormi, as being more uni-

acteria [Seminum] Colchici, L. Ed.; Tinctura seminum Col-

(Meadow Saffron seeds bruised [ground finely in a coffee-

ate for fourteen days, and strain, L. "Percolation is much

same writer also asserts, that the activ-

profits against bruising them. But were his assertion

(3s. to 5s.) I have repeatedly given 5s. at a

without any violent effect. Dr. Barlow, who prefers this to the

advices that in gout a drachm, a

and a half, or two drachms of the tincture, should be given

repeated the following morning. If this quantity fail to

briskly, a third dose may be administered the ensuing night.

ally, the tincture has been employed as a liniment, to relieve

ptic, gouty, venereal, and other pains.

Tinctura [Seminum] Colchici Composita, L.; Spiritus Colchici

(Meadow Saffron seeds, 3v.; Aromatic Spirit of ammonia, Oij. Macerate for fourteen days, and strain). Dose, 5s. to 5s. —This preparation was recommended by Dr. Williams as

of greater value when acidity or flatulence prevails, than the

Colchici, and better adapted to the palates of those who

to the flavour of white wine." It is seldom employed. Mr.

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Brande* says, doubts are entertained as to the propriety of employing ammonia in it.

5. **VINUM SEMINUM COLCHICI**.—No formula for this exists in any of the British pharmacopoeias. The following is Dr. Williams' formula:—Meadow Saffron seeds, dried, $\frac{2}{3}j$; Sherry Wine, Oj. (via measure). Macerate for eight or ten [fourteen] days, occasionally agitating, then filter. The average dose is $f\frac{3}{5}ss$ to $f\frac{3}{5}j$. I have given it to the extent of $f\frac{3}{5}j$. Dr. Williams says it may be gradually increased to $f\frac{5}{6}j$.

6. **VINUM [CORMI] COLCHICI, L. E.** (Meadow Saffron corms, dried and sliced, $\frac{1}{6}$vij. Sherry Wine, Oij. Macerate for four to seven, $E.$ days, [express strongly the residuum, $E.$] and strain.—Average dose, $f\frac{3}{5}ss$ to $f\frac{3}{5}j$.—Sir E. Hume† thought that the second and subsequent deposits which take place from this wine, contain the principle which acts on the stomach and bowels, while that which cures the gout is retained in permanent solution. But Sir G. Scudamore‡ found the sediment to be inert.

7. **ACETUM [CORMI] COLCHICI, L. E. D.** (Fresh Meadow Saffron cormus, sliced, $\frac{1}{2}$j; Distilled Vinegar, $f\frac{1}{2}xvij.$; Proof Spirit, $f\frac{1}{3}$j. Macerate the meadow saffron cormus with the vinegar, in a covered glass vessel, for three days; afterwards press and strain the liquor and set it by, that the dregs may subside: lastly, add the spirit to the clear liquor).—Though the Colleges order the fresh cormus to be used, druggists frequently prepare it with the dried, on account of the impossibility of procuring the fresh at all seasons of the year. Hence it is to be regretted that the Colleges have directed the late to be employed, as it leads to variation in the mode of preparation. In practice, one part of the dried cormus may be considered equal to three parts of the fresh: for Mr. Battley§ says the cormus loses about 67 per cent. of its weight in drying; and Mr. Bainbridge¶ obtained 2 lbs. 15 ozs. of dried slices from 8 lbs. of fresh cormi. To proof spirit used in preparing the acetum is for the purpose of checking decomposition. By the action of the acetic acid on the colchicum of the cormus, an acetate of this alkaloid is obtained. Sir C. Scudamore§ regards an acetic preparation of colchicum as milder than the wine or tincture made with the same relative weights of corm and liquids, though it is a most efficient preparation in gout. He advises, as I have before mentioned, that it should be given in combination with magnesia, by which its acid menstrum is destroyed (acetate of magnesia being formed), and the active principle of the colchicum left in the most favourable state for administration. The average dose is from $f\frac{3}{5}ss$ to $f\frac{5}{6}j$.

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* Dict. of Mat. Med. 1839.
† Phil. Trans. 1837.
‡ Treatise on Gout, 3d edit. p. 513.
§ Hudson, Practical Observations on Colch. nitram. p. 77.
¶* Observations on the Use of Coleusivum.
HERMODACTYL.

8. EXTRACTUM [CORMI] COLCHICI ACETICUM, L. E.—(Fresh Meadow Saffron cor-


is, lb. j.; Acetic [pyrolineous, Ed.] acid, f 3ij. Bruise the cornum gradually sprinkled with the acetic acid, then press out the juice, and evaporate it in an earthen vessel which is not glazed with lead [over the vapour bath, Ed.] to a proper consistence.)—This liquid contains the acetate of colchicina. It is a very favourite remedy in the treatment of gout and rheumatism, and was introduced into practice by Sir C. Scudamore. Dr. Paris 7 observes that he "found it useful in promoting healthy discharges of bile." He occasionally combines it with blue pill, calomel, or potassio-tartrate of antimony. The dose is from gr. j. to gr. iij. twice or thrice a day.

EXTRACTUM COLCHICI CORMI, L.—(Fresh Meadow Saffron cor-


is, lb. j. Bruise the cornum, sprinkled with a little water, in a mortar; then press out the juice, and evaporate it, unstrained, to a proper consistence.)—This is a favourite preparation with Dr. , of St. Bartholomew's Hospital, in the early stage of acute mastitis. The dose is gr. j. every four hours.

OXYMEL [CORMI] COLCHICI, D.—(Fresh Cormus of Meadow "wine mea-


on, cut into thin slices, 5j.; Distilled Vinegar, Oj. (wine mea-


on, lb. ij. Clarified Honey, by weight, lb. ij. Macerate the meadow on with the vinegar in a glass vessel for two days; to the liquor, gly expressed from the cornum and filtered, add the honey, and boil down the mixture to the consistence of a syrup, frequently stirring it with a wooden rod.)—The active principle of this preparation is apt to be injured by boiling, and hence its strength is uncertain. It is used in gout, rheumatism, dropsy, and humoral asthma. The dose is 5j. gradually increased to 3ij. or more, twice in the day.

SUCCUS COLCHICI; Preserved Juice of Colchicum.—The mode of preparing and preserving vegetable juices has been already described (see p. 385). Mr. Bentley informs me that from one cwt. of fine cormi gathered at the end of August, and well bruised and squeezed, he obtained four imperial gallons and f 3xij. of a light fawn-coloured juice. This juice becomes darker colored by exposure to light. After standing forty-eight hours the spirit is added to it. A quantity of fecula is deposited, and the liquor acquires a paler color. Exposure to light appears to render it somewhat paler. The best dose of Mr. Bentley's succus colchici is five minims.

SIDOTE.—See VERATRUM ALBUM.

2. HERMODACTYLUS, Auct.—HERMODACTYL.

FRACTA.—Among the later Greek and the Arabian physicians, a medicine called hermodactyl (hermodaktulos, from ἔρμητ, Mercury or Hermes; and δακτυλός,


7 Append. to the 8th ed. of the Pharmacologia.
a finger) was in great repute as a remedy for arthritic diseases. It was first mentioned by Alexander of Tralles, who flourished A.D. 560. Paulus of Eginus, who lived A.D. 650, Avicenna, Serapion, and Mesue, also speak of it. It is deserving of special notice, that under the name of *Surogen* or *Hermodactyl* (Surogen comprehends the *κολχικὸν* and *εφίμερον* of Dioscorides, and the *ηρμοδάκτυλον* of Paulus).

**Natural History.**—The cormi brought from Oriental countries in modern times under the name of *hermodactyls*, answer to the descriptions given of ancient substance bearing this name. I am, therefore, induced to believe that to be identical with the latter. Their resemblance to the cormi of Colchicum *autumnae* leads me to reject the notion of Matthiolus, at one time entertained by Linnaeus, and adopted by Martius, that they are produced by *Iris tuberosa*. That they are the underground stems of some species of Colchicum can scarcely I think, be doubted by any one who carefully examines them. Notwithstanding the statements of Mr. Want and of Sir H. Halford, I cannot admit hermodactyls to be the cormi of *Colchicum autumnae*, though this is the old species of *Colchicum* admitted into the new Greek Pharmacopoeia. They resembling the latter in several circumstances, they possess certain distinctive peculiarities. Some of the most eminent pharmacologists of Europe (e.g. Gourary, Goebel, Goiger, Geoffroy, &c.) also regard them as distinct. *The Colchicum illyricum*, mentioned in many works as yielding hermodactyl, is unknown to modern botanists. The cormus of *Colchicum byzantinum* is too large to be con formed with hermodactyl. *Colchicum variagatum* has been supposed by several botanists and pharmacologists to be the source of hermodactyl, but further evidence is required to establish the opinion. This plant is a native of Sicily, Crete, Greece, and Portugal. Dr. Sibthorp found it on Helisson, Parma, and the mountains of Greece. It is not improbable, I think, that *Colchicum isoblocodiodes* may yield hermodactyl, which Dale tells us is brought from Syria. For Dr. Lindley informs me that this species of Colchicum was found by Coke at Chesney near the Euphrates, where it was very common, flowering in March. The cormi were not brought over. *Iris tuberosa* was not found there. Forskål found *Colchicum montanum* (which Sprengel, in his *Syst. Veg.* regards as identical with *C. bulbulociodieidae*) at Kurma, in Arabia.

**Description.**—Mesue says that hermodactyl is either long, like the finger or round. Of the round, he adds, there are three kinds,—the white, the red, and the black, the white being the best. Through the kindness of my friend, Professor Royle, I have had the examination of two kinds of hermodactyl, procured by him in the bazaars of Northern India, brought, he thinks, from Surat or Bencoolen, and probably imported there from the Red Sea.

1. Tasteless *Hermodactylus*. *Sorinjan sheeras* (i.e. sweet sorinjan). 

*Hermodactylus*, Auct. nostrae statis.—In their general form, these cormi resemble those of Colchicum *autumnae*. They are flattened, cordate, hollowed out or grooved on one side, convex on the other. At their lower part (forming the base of the heart) is a mark or disk for the insertion of the root fibers. The size varies; the specimens I have examined were from 2 to 1 inch in length, 1 inch in breadth, and about ½ an inch in depth. They have been deprived of their coats, are externally dirty yellow or brownish, internally white, easily broken, farinaceous, opaque, odourless, tasteless, or nearly so, worm-eaten. They agree precisely with hermodactyls furnished me by Professor

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* Lib. xi.  
* Opera, lib. iii. cap. 78.  
* Lib. ii. cap. 352.  
* De simplicibus, cap. 194.  
* *Pharmakojesont*, 42.  
* On the Treatment of Gout.  
* Prod. Fl. Greese, ii. 250.  
* Pharmacologia, p. 243, ed. 3rd.  
* Fl. Egypt, Arab. p. 77.
WHITE HELLEBORE.

They are readily distinguished from the corms of Colchicum autumnale by the following characters, which are correctly stated by Geoffroy:—

not rugose, are white internally, are moderately hard, easily broken, a whitish powder; whereas the dried corms of Colchicum autumnale, softer, and have a reddish or greyish tint both internally and externally.

*Hermodactyl.* Sorinjan tulk (i.e. bitter sorinjan,) Royle.  *Bulbs of lycium.* & *Hermodactylus rubescus et piger* (Avicenna and Mesue). Of this variety are distinguished from the preceding by their bitter smaller size, and by having externally a striped or reticulated appearance of colour for the most part is darker; in some specimens it is blackish.

is ovo-cordate; 1 inch in height or length, 1/2 of an inch broad, and an inch thick, grooved or hollowed on one side, convex on the other; ish yellow colour, semi-transparent, has a horny appearance, and is longitudinal stripes, indicating a laminated structure. A second is Glasgow, reticulated externally, white internally, less flattened, and able shape, the concave or hollow side of the cormus being continued b below the mark for the attachment of the root fibres. The other f the size and shape of a large orange pip, but flattened or grooved on one of them are worm-eaten, and one is blackish brown externally.

tion.—Lecanu* analysed hermodactyls (the tasteless variety), and ob-following results:—Starch (forming the principal constituent of the 1), fatty matter, yellow colouring matter, gum, supermalates of lime and chlorides of potassium. absence of veratrum or colchicina to be ascribed to the cormus having decomposition by keeping? No inulin was detected.

1. Characteristics.—Both the tasteless and bitter hermodactyls are by tinture of iodine, showing the presence of starch. A cold decoction of bitter variety produced an intense blue precipitate (iodide of starch) of iodine. Tincture of galls, and solutions of protominate of iodide of diacetate of lead, caused a cloudiness in the cold decoction.

And Uses.—No modern experiments have been made to determine : of hermodactyl. The tasteless variety is probably inert, or nearly e bitter variety, I suspect, possesses some activity. Is its operation o that of the cormus of Colchicum autumnale?

2. Of the treatment of gout and arthritis, Paulus says, "some, in the of all arthritic diseases, have recourse to purging with hermodac-it is to be remarked, that the hermodactylus is bad for the stomach, nauseas and anorexia, and ought, therefore, to be used only in the case o are pressed by urgent business; for it removes rheumatism speedily, ro days at most, so that they are enabled to resume their accustomed t." *

RA'TRUM AL'BUM, Linn. L. E. D.—WHITE HELLEBORE.

*Sect. Syst. Polygama, Monocia.*

(Radix, L. D.—Rhizomas, E.)

:Y.—This is, I think, the ταλάνδος λευκός of Dioscorides, and therefore, of other ancient writers, as Hippocrates and stus. On this point, however, considerable difference of as existed. Schulze*, while he acknowledges the great between Veratrum album, Linn. and the white hellebore of es, is of opinion that the true hellebore (both white and

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1 Trait. de Mat. Méd. t. ii. p. 79.
2 Goebel, Pharm. Wurcz. p. 271.
3 Journ. de Pharm. xi. 250.
4 Adams's Translation, vol. i. p. 337.
5 Diss. medic. stat. Toxicol. Veterum, Hale, 1788.
black) of Theophrastus is wholly lost. And Dr. Sibthorp\(^5\) regards *Digitalis ferruginea* as the white hellebore of Dioscorides, an opinion from which Sir J. Smith, the editor of the *Prodromus*, expresses dissent. The term *veratrum* is said by Lemery to be derived from *vera atrum* (truly black), in reference to the colour of the rhizome, but this etymology is improbable.

**Botany. Gen. Char.**—Flowers polygamous. *Perianth* six-parted; segments broad, concave, imbricating, nearly equal, striated, not excavated at the base. *Stamens* six, equal, inserted into the base of segments; *filaments* subulate; *anthers* reniform, with confluent *Ovary* with three diverging *stigmas*. *Capsule* three-horned, separating into three many-seeded follicles. *Seeds* compressed, winged at the apex. *(Lindley.)*

**Sp. Char.**—Panicle decussate. *Bracts* equaling the flower. *Pedicels* pubescent. Segments of the *perianth* somewhat erect or obtuse, serrulate. *Leaves* ovate-oblong, plaited. *(Sprengel.)*

Fig. 176.

Root composed of numerous flesh brownish-white fibres, arising from a perennial, cylindrical, fleshy, subterranean stem or *rhizome*, which is brown externally, brownish-white internally, and placed obliquely in the earth. *Stem* up to four feet high. The plant flowers from June to August.

Two varieties (by some considered distinct species) are included here:

1. *albiflorum* (*V. album*, Bernh.) with deep pound raceme and white flowers.
2. *viridiflorum* (*V. Lobelianum*, Bernh.) with compound raceme and greenish flowers.

**Hab.**—Mountainous regions of Europe. Abounds in the Alps and Pyrenees.

**Description.**—The *rhizome* (*radix* or *ratri*, offic. *radix hellebori albi*) is single, double- or many-headed, having the form of a cylinder, or, more frequently, of a truncated cone. It is from two to five inches long, and about one inch in diameter, rough, wrinkled, grey, or blackish-brown externally, whitish internally. Portions of the root fibres are usually attached to it, as well as some soft, fine, hair-like fibres. At the upper extremity of the rhizome we frequently observe the cut edges of numerous concentric, woody, or membranous scales; they are portions of the dried leaf-sheaths. When cut transversely, the rhizome presents a large central portion (frequently called *medulla*), which varies in its qualities, being woody, firm, casseous, or spongy, in different specimens. This is separated

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\(^5\) *Prod. Fl. Graec. i. 439.*

\(^*\) For some interesting information respecting the ancient hellebore, consult Dierbach, *de mittle d. Hippocrates*, p. 107.
WHITE HELLEBORE.

mandulating line from a thick woody ring, in which the take their origin. On the outside of this is a narrow but brown, epidermoid coat. The odour of the dried rhizome the taste is at first bitter, then acrid. By keeping, the apt to become mouldy.

ATION.—White hellebooe rhizome was analyzed in 1820 by Petier and Caventou, who obtained the following results:—

per (composed of olein, stearin, and a volatile [cevadic?] galate of veratria, yellow colouring matter, starch, hig-

er, and gum. The ashes contained much phosphate of lime, carbonate of potash, and some traces of silica and lime, but no chlorides. They could not obtain the vola-
ic acid in a crystalline form.

a discovered two new vegetable bases in the rhizome of this plant; he has called Jericin, the other Barytin.

ia (See p. 960).

This has been so called in consequence of its being precipitated in acetic or phosphoric acid by sulphuric acid or the sulphates,

So called from Jerca, the Spanish name for a poison obtained of white hellebore*. It is a crystalline substance, which forms, with tric, and hydrochloric acids, difficultly soluble compounds."

AL CHARACTERISTICS.—A decoction of the rhizome under

he addition of a solution of gelatin, no change, shewing e of tannic acid; but with the sesquichloride of iron, it ive green (gallate of iron). With tincture of galls it tightly turbid (tannates of veratria and starch). With ace-

licate of lead, and protonitrate of mercury, it formed precipitates. The rhizome left after the decoction had been rom it, became, on the addition of a solution of iodine, of starch).

OGICAL EFFECTS. a. On Vegetables.—Not ascertained.

imals generally.—" The best account of its effects is con-
a thesis by Dr. Schabel, published at Tübingen, in 1817.
together the experiments previously made by Wepfer, Äiberg, and Orfila, and adding a number of excellent expe-
his own, he infers that it is poisonous to animals of all erse, dogs, cats, rabbits, jackdaws, starlings, frogs, snails, that it acts in whatever way it is introduced into the sys-
me stomach, windpipe, nostrils, pleural membrane of the xternal wounds, or the veins; that it produces in every im-
toms of irritation in the alimentary canal, and injury of ystem; and that it is very active, three grains of the ex-
to the nostrils of a cat having killed it in sixteen

* Linn. vol. vi. p. 363.
** Aar, Central Blatt für 1837, S. 191.
*** Aar, p. 196.
**** TREATISE ON POISONS, 3d ed. p. 700.
γ. On Man.—Its local action is that of a powerful acid. Applied to the Schneiderian membrane, it excites violent sneezing. Enataxis even is said to have been induced by it. Its operation when swallowed, or placed in contact with the skin, is also that of an emetic irritant.

Its remote action is on the secretory apparatus, the stomach and intestines, and the nervous system. In small and repeated doses it promotes secretion from the mucous surfaces, the salivary glands, the kidneys, and the uterus, and increases the cutaneous exhalation. In larger doses it causes vomiting, purging, pain in the abdomen, tenesmus, and occasionally bloody evacuations, and great prostration of strength. In some instances a few grains even have had the effects. Schabel says there is no substance which so certainly as promptly provokes vomiting; and Horn employed it as a sure emetic. In addition to the local action which it exercises, when swallowed, on the stomach and intestines, it possesses a specific power of influencing these viscera: for Etmüller has seen violent vomiting result from the application of the rhizome to the abdomen; a Schröder observed the same occurrence where the rhizome was used as a suppository. In excessive doses it operates as a narcotic-like poison, producing gastro-intestinal inflammation and an affection of the nervous system. The symptoms are, violent vomiting and purging (sometimes of blood), tenesmus, burning sensation of the mouth, oesophagus, stomach, and intestines, constriction of the throat with a sense of strangulation, gripping pain in the bowels, small, in some cases almost imperceptible pulse, faintness, cold sweats, tremblings, giddiness, blindness, dilated pupils, loss of voice, convulsions, and insensibility, terminating in death. A cutaneous eruption has in some instances followed the use of white hellebore.

I am indebted to Dr. Wm. Rayner, of Stockport, for notes of three cases poisoning by infusion of white hellebore. The symptoms resembled those mentioned, except that there was no purging. All three cases rapidly recovered.

Hutchinson remarked, that when death did not occur, palpitation and intermittent pulse, besides dyspeptic and nervous symptoms, remained for some time.

These effects were not observed in Dr. Rayner’s cases.

In its action on the system, Veratrum album is more closely related to cebadilla and meadow saffron than to any other medicaments. It is more acrid and less stupefying than Helleborus niger, with which it has been so frequently compared both by ancients and moderns. Orfila ascertained by experiment on animals that it is more active as a poison than the last-mentioned substance. It exercises no known chemical influence over the tissues by which it is distinguished from the mineral irritants, as baryta and emetic tartar, with which Schabel compared it.

* Greding, Sämtl. med. Schrift. Th. 1, S. 179.
* Archiv, B. x. H. 1, S. 161.
* Opera omnia, tom. ii. pt. 2, p. 144.
* Orfila, Toxicol. Gen.
* Schwartz’s Pharm. Tab. 2a Aug.
* Toxicol. Gen.
Jaws.—It is but rarely employed, principally on account of the alleged uncertainty of its operation. But from the few trials which I have made with it, I suspect this uncertainty is much exaggerated, this principally referrible to the varying lengths of time which the same has been kept after its removal from the earth, for, like colcumi, it deteriorates by keeping. The following are the principal uses in which it has been employed:—

1. In affections of the nervous system, as melancholia, mania, and delirium. As an emetic, purgative, and promoter of the secretions generally, we can easily understand that it may prove occasionally officinal.

2. In chronic skin diseases, as herpes, Dr. C. Smyth* gave the tincture internally with benefit. As external applications, the decoction of ointment are used in scabies (hence the Germans call the rhizome Kratrazwikel, i.e. itch-root), tinea capitis, &c.; but their use is quite free from danger.

3. In gout it was given in combination with opium, by Mr. Moore†, a substitute for, or in imitation of, the Eau Médicinale. The dose, a paroxysm of gout, was from forty minims to two drachms of a tincture composed of three parts of Vin. Veratri albi and one part of Midland amanum.

4. In amaurosis and chronic affections of the brain occurring in aged habits, it is employed as an errhine or sternutatory (hence its German name, Nieszwikel, i.e. sneeze-root). It is usually diluted in some mild powder. The German snuff called Schneeberger zed to contain it.

5. To destroy pediculi, the decoction is used as a wash.

6. As an emetic, it was employed by Horn.

ADMINISTRATION.—The following are the principal modes of action:—

1. PULVIS VERATRI; White Hellebore Powder.—The dose of this at commencement should not exceed one or two grains. This quantity will sometimes occasion nausea and vomiting; but Greding found in some cases eight grains, and, in a few instances, a scruple of the bark of the rhizome in powder were required to excite vomiting. An errhine, not more than two or three grains, mixed with eight or of some mild powder (as starch, liquorice, Florentine orris, or orris) should be employed at one time. It is a constituent of the Fumatum Sulphuris compositum (see p. 461).

2. VINUM VERATRI, L. Tinctura Veratri albi; Tincture of White Hellebore. (White Hellebore, sliced, 3vij.; Sherry Wine, Oij. bercate for fourteen days, and strain).—As a substitute for Colchicum in gout and rheumatism, the dose is ten minims twice or thrice

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* Greding, Bäumt. mediz. Schriften, T. 1, S. 179.
† Two Letters to Dr. Jones, 1811.
daily. This quantity is to be gradually increased. A full dose acts as an emetic and cathartic.

3. DECOCTUM VERATRI, L. D.; Decoction of White Hellebore (White Hellebore, bruised, 5x.; Distilled Water, Oij.; Rectified Spirit, 3xiij. Boil the hellebore in the water down to a pint, as when it is cooled add the spirit).—This preparation is only used as an external application in skin diseases (scabies, lepra, tinea capitis, &c.) and to destroy pediculi. When the skin is very irritable, the decoction will sometimes require dilution. If the surface to which it is applied be denuded, absorption of the veratrum may occur, and constitutional symptoms be thereby induced; hence it is a dangerous application, especially to children.

4. UNGUENTUM VERATRI, L. D.; Ointment of White Hellebore (White Hellebore, powdered, 5ij.; Lard, 3viij.; Oil of Lemons, 55x.; Mix., L.—The Dublin College omits the oil of lemons).—This ointment is used in the treatment of the itch as a substitute for the disagreeable, though far more effective, sulphur ointment. Like the decoction there is danger of the absorption of the active principle of the rhizome when the ointment is applied to raw surfaces; it is, therefore, an unsafe remedy for children.

Antidotes.—Astringent solutions have been recommended; and in one case, which fell under my notice, infusion of nutgalls seemed to give relief. The supposed benefit has been referred to the use of tannic acid with veratrum, by which the solubility and activity of the latter are diminished; but Schabel found that three drachms of a tincture of white hellebore, given with infusion of galls, to a child proved fatal in twenty minutes. Hahnemann recommends coffee both as a drink and in oyster. Demulcent liquids, and in some cases opiates, may be useful. The other parts of the treatment must be conducted on general principles. Stimulants will be usually required on account of the failure of the heart’s action.

4. ASAGRHGA OFFICINALIS, Lind.—SPIKE-FLOWERED ASAGRHGA

Veratrum officinale, Schlect.; Helonias officinalis, Don, L. E.

Sex. Syst. Hexandria, Trigynia.

(Semen; Sabadilla, L.—Sabadilla; Fruit of Veratrum Sabadilla of Helonias officinalis, and probably of other Melanthaceae, E.)

History.—This plant was described by Schlechtendahl, afterwards by Mr. Don, and subsequently by Dr. Lindley. The seeds were known to Monardes in 1573. They were called Sadailla, or Cevadilla, or more properly Cebadilla (from the Spanish Cebada, barley), on account of the supposed resemblance of the inflorescence of the plant to that of Hordeum.

* Quoted in Brandt and Ratzburg’s *Giftgewächse*, Abt. 1, p. 28.
* See p. 964.
* *Lisasen*, vi. 45
SPIKE-FLOWERED ASAGREA.

SY. Gen. Char. — Flowers polygamous, racemose, naked. A six-partite; segments linear, veinless, almost equal, with a furrowed excavation at the base, equal to the stamens. Stamens alternately shorter; anthers oblong, as if united, after dehiscence shield-shaped. Ovaries three, quite simple, attenuated into an obscure stigma. Follicles three, acuminate, papery; seeds scimitar-shaped, corrugated, winged. — Bulbous herbs, with grass-like leaves, and small, pale, densely-racemose flowers. (Lindley.)

Sp. Char. — The only species known.

Leaves linear, acuminate, subcarinate, roughish at the margin, four feet long, and three lines broad, Scapes round, about six feet high. Raceme, a foot and a half long, very dense, very straight, spiciform. Flowers white, with a bractea at the base. Anthers yellow.

Hab. — Eastern side of the Mexican Andes, near Barranca de Tioselo (Schiede). Neighbourhood of Vera Cruz (Hartweg).

Description. — The cebadilla, cewadilla, or sabadilla of the shops (sabadilla; semina sabadilla mexicana) comes from Vera Cruz and Mexico. It consists of the follicles (some containing seeds, others empty), loose seeds, stalks, and abortive flowers of the Asagrea officinalis, and of Veratrum Sabadilla also.

Follicles, commonly termed capsules, rarely exceed, or even half an inch in length, and are about one line or a line and a half at the base. They are ovate-oblong, acuminate. Their colour is yellowish-brown, or reddish grey. The coats of each are thin, of a papery consistence. Each fruit is composed of three mutually adherent towards the base, open at the superior part. The receptacle, fruitstalk, and the remains of the withered calyx, are usually present in the cebadilla. Seldom more than one or two, though sometimes three, are found in each follicle.

Seeds are two or three lines long, scimitar-shaped, pointed, brown, shining, wrinkled or corrugated, slightly winged. They are whitish or grey. Embryo straight, next the lodged in fleshy albumen. They have little odour, but a sour, persistent taste.

Position. — Two analyses of cebadilla have been made about the same time (1819); one by Meissner; and a second by Pelletier and Caventou. The following are the results:

2. Journ. de Pharm. vi. 333.
Meissner's Analysis.

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatty matter (olein and stearin)</td>
<td>24.63</td>
</tr>
<tr>
<td>Wax (margarine)</td>
<td>0.10</td>
</tr>
<tr>
<td>Sabadilla (veratrum)</td>
<td>0.58</td>
</tr>
<tr>
<td>Resin (soluble in ether)</td>
<td>1.45</td>
</tr>
<tr>
<td>Hard resin (insoluble in ether)</td>
<td>8.45</td>
</tr>
<tr>
<td>Bitter extractive with the acid which is united to the sabadillium</td>
<td>5.97</td>
</tr>
<tr>
<td>Sweet extractive</td>
<td>0.65</td>
</tr>
<tr>
<td>Extractive separable by alkalis</td>
<td>25.14</td>
</tr>
<tr>
<td>Gum</td>
<td>4.20</td>
</tr>
<tr>
<td>Vegetable jelly (phyteumaculata)</td>
<td>1.11</td>
</tr>
<tr>
<td>Salt of potash</td>
<td>1.05</td>
</tr>
<tr>
<td>Oxalate of lime combined with bassorin</td>
<td>29.56</td>
</tr>
<tr>
<td>Lignin</td>
<td>6.40</td>
</tr>
<tr>
<td>Water</td>
<td></td>
</tr>
<tr>
<td>Cebadilla</td>
<td>100.00</td>
</tr>
</tbody>
</table>

The ashes contained oxide of copper.

1. Cevadic or Sabadillic Acid.—This is a crystalline, fusible, volatile acid, having an odour analogous to butyric acid. It is soluble in water, alcohol, ether. It is obtained by the saponification of the oil of cebadilla (fatty acid). Cevadate of ammonia causes a white precipitate with the persalts of iron. The composition of this acid is unknown.

Oil of cebadilla given me by Mr. Morson is green, lighter than water, and has a faint, somewhat rancid taste.

2. Veratric Acid, of Merck a.—This is a crystalline, fusible, volatile acid, soluble in alcohol, slightly so in water, but insoluble in ether. According to Schroetter it consists of C_{18}H_{20}O_{10} + 64.

3. Resin.—The two resins found by Meissner, but overlooked by Pelletier and Caventon, are probably endowed with activity. Courber obtains a resin from cebadilla seeds, sabadillina, resin of veratrum, and gum resin of sabadillina.

Resin of veratrum (veratrin, Courber) is a brown solid, fusible at 360°, soluble in ether (by which it is distinguished from veratrum), and in water it combines with acids, but neither saturates them, nor forms with them any saltizable salts. It consists of C_{20}H_{28}O_{10}. Its action on the animal eviscerates has not been determined.

Gum resin of sabadillina (resinogumme, Courber: monohydrate of saliss lact. Alter.) is a reddish solid, soluble in water and alcohol, but slightly so in ether. It saturates acids, but does not form crystalline compounds with them. It is dissolved in its saline combinations. It consists of C_{20}H_{14}O_{10}. It differs from anhydrous sabadillina in containing an atom more water. More it is distinguished from this alkali in not being crystallizable.

Sabadillina is said, by Simon b, to be merely a compound of resin and crude resin of veratrum. Dr. Turnbull found it inferior in activity to veratrum.


Chemical Characteristics.—The brownish coloured decoction of cebadilla reddens litmus, owing to the presence of freestick. Sesquichloride of iron deepens the colour of the decoction, and causes an olive brown precipitate. Alkalis deepen, whilst acids diminish, the colour of the decoction (by their action on the colouring matter, Pelletier). Acetate and diacetate of lead, phosphate of mercury, and sulphate of copper, form precipitates from the decoction. Oxalate of ammonia renders it turbid (oxalate of copper).

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The effects of small and repeated doses have factorily ascertained. Large and poisonous doses cause pain in the throat and stomach, nausea, vomiting, purgation of strength, convulsions, delirium, and sometimes eruption. Even the external application of the powder angerior effects. Plenck tells us of a young man who temporarily insane by the application of powder of the head. Lentin says an infant, whose nurse had powder in its hair, died in convulsions. Plenck's the skin, the tincture causes a stinging sensation simi-duced by veratria. After its use for some days, a slight ars on the skin. Rubbed over the cardiac region, it in reduces the frequency and force of the pulse in a. The alcoholic extract has nearly the same effects, internally, as veratria. It also induces sensations of heat on the surface of the skin, and sometimes acts as a padilla has been employed internally, as an anthelmintic, l-worms and tape-worms. Dr. Turnbull has given th benefit in painful rheumatic and neuralgic affections. applicable in all the maladies for the relief of which been recommended, it is rarely administered by the the powder of the seeds has been used to destroy pedi- the Germans called the seeds Läusesaamen, or lice-seeds. t be applied with safety to children, and especially is broken. I have already referred to the dangerous of its employment. The tincture has been used as a chronic rheumatism, and, rubbed over the heart, in
ADMINISTRATION.—The following are the preparations of Cebadilla which have been employed in medicine.

1. PULVIS SABADILLE.—Pulvis contra pediculos; Poudre de Capcin; Powder of Cebadilla.—The dose for an adult is from two to six grains; gradually increased. In one case of tape-worm, half a drachm was taken daily for fourteen days.

2. TINCTURA SABADILLE.—Saturated Tincture of Cebadilla, Turbull. (Cebadilla seeds, freed from their capsules and bruised, in quantity; Rectified Spirit, as much as will cover them. Digest ten days).—Used as a rubefacient liniment in chronic rheumatism and paralysis. It is rubbed over the heart in nervous palpitation.

3. EXTRACTUM ALCOHOLICUM SABADILLÆ; Alcoholic Extract of Cebadilla.—Evaporate the saturated tincture, with a very gentle heat to a proper consistence. Dose, 1-6th of a grain, gradually increased. It is given, in the form of pill, in rheumatic and neuralgic cases.

4. VERATRIA, L. E.; Veratrine; Veratrina, Thomson; Sabadilla, Meissner.—This vegetable alkaloid was discovered about the same time (1819), by Meissner in Germany, and by Pelletier and Caventou in France. Courbe probably was the first who obtained it pure.

PREPARATION.—The following process for making veratrina, obtained in the London Pharmacopoeia, is nearly identical with the one described by Soubeiran, and is a modification of one given by Courbe.

"Take of Cebadilla, bruised, lb. qtr.; Rectified Spirit, Cong. iii.; Diluted Sulphuric Acid; Solution of Ammonia; Purified Animal Charcoal; Magnesia as much as may be sufficient. Boil the Cebadilla with a gallon of the spirit for an hour, in a retort to which a receiver is fitted. Pour off the liquor, and to what remains, add another gallon of spirit, and the spirit recently distilled, and pour off the liquor; and let it be done a third time. Press the Cebadilla, and let the spirit distil from the mixed and strained liquors. Evaporate what remains to the proper consistence of an extract. Boil this three or more times in water to which a little diluted sulphuric acid has been added, and with a gentle heat evaporate the strained liquors to the consistence of a syrup. Into this, when cold, put the magnesia to saturation, frequently shaking [them]; then press, and wash. Let this be done twice or thrice; then dry what remains, and dry with a gentle heat in spirit two or three times, and as often strain. Afterward let the spirit distil. Boil the residue in water, to which a little sulphuric acid and animal charcoal are added, for a quarter of an hour, and strain. Lastly, the charcoal being thoroughly washed, cautiously evaporate the [mixed] liquor, until they have the consistence of a syrup, and drop into them as much ammonia as may be sufficient to throw down the veratrina. Separate this, and dry it."

The process of the Edinburgh Pharmacopoeia is as follows:

"Take any convenient quantity of Cebadilla; pour boiling water over it in a covered vessel, and let it macerate for 24 hours; remove the Cebadilla, squeeze, and dry it thoroughly with a gentle heat. Boil it now in a mortar, and separ..."
nia thus obtained is not pure, but sufficiently so for medicinal use.
A coloured substance it may be obtained white, though at considerable
solution in very weak mururistic acid, decolorization with animal charcoal,
precipitation with ammonia.”

ERY.—The following statement applies to the process of the
College, and is perhaps correct as far as it goes:—Cebadilla
rectified spirit veratria in combination with a vegetable acid.
The alcoholic extract is treated with water and sulphuric acid,
solution of the sulphate of veratria is obtained. Magnesia
oses this, unites with the sulphuric and vegetable acids, and
the alkaloid, which is taken up by rectified spirit. The ex-
tained by distilling off the spirit is then boiled in water with
acid and animal charcoal: the acid unites with the alkaloid,
the charcoal abstracts colouring matter. Ammonia being
 to the strained solution, combines with the sulphuric acid, and
as a precipitate, which, when dried, constitutes commercial
al veratria (veratria, L. and E.)
nerbe’s process, a drachm of commercial veratria may, it is
procured from one pound of cebadilla.
mercial veratria was said by Courbe to be composed of pure
, sabadillina, resin of veratria (veratin, Courbe), and gum-
veratria (resinigomme, Courbe). These are separated from
ater by the successive action of water, ether, and alcohol, as
by the following table:—

| veratria | yields to boiling water | 1. Sabadillina, which crystallizes on cooling. |
| veratria | insoluble in boiling water | 2. Roots of Veratria, left in the cold solution. |
|         |                        | 3. Veratria, soluble in ether. |
|         |                        | 4. Gum-resin of veratria, insoluble in ether, |
|         |                        | but soluble in alcohol. |

nature of sabadillina has been already pointed out (p. 958).
erties.—Commercial veratria is pulverulent, odourless, and
a gummy aspec. Both the hydrochlorate and sulphate are soluble
in water.

**Characteristics.**—Veratrum is known by the following characters:—Its
alkalinity, its combustibility, its uncrystallizability, the diffi-
crystallizability of its salts, its solidity at ordinary temperatures,
its ready solubility in alcohol, its being almost insoluble in water,
its sparingly soluble in ether, and by the intense red colour which
it assumes when mixed with strong liquid sulphuric acid (see
Saliolin.* Nitric acid renders commercial veratrum reddish, and forms a yellow
solution with it (see Morphia and Narcotina). A solution of veratrum
in dilute acetic acid produces a whitish precipitate (tannate of
veratram) with tincture of nutgalls, a white one (hydrated veratram)
with ammonia, and an intense red colour with concentrated sulphuric
acid. Carbazotic acid does not occasion a precipitate (see p. 18).
To these chemical peculiarities must be added those characters
derived from its physiological effects:—A minute portion of veratram
causes violent sneezing, and a small quantity of a solution of five
grains of veratrum in a fluid drachm of rectified spirit, rubbed on the
wrist or forehead, produces, within three or four minutes, heat and
tingling.

The **London College** gives the following characters of veratrum:—Dissolves
slight in water, more soluble in alcohol, but most in sulphuric ether. It
has no smell, and a bitter taste. It is to be cautiously administered.

**Composition.**—The following is the composition of pure veratram,
according to **Couerbe**:

<table>
<thead>
<tr>
<th>Atoms</th>
<th>Eq. Wt.</th>
<th>Per Cent.</th>
<th>Couerbe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon</td>
<td>34</td>
<td>204</td>
<td>70.83</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>22</td>
<td>22</td>
<td>7.64</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>1</td>
<td>14</td>
<td>4.96</td>
</tr>
<tr>
<td>Oxygen</td>
<td>6</td>
<td>48</td>
<td>16.67</td>
</tr>
<tr>
<td>Veratram</td>
<td>1</td>
<td>288</td>
<td>100.00</td>
</tr>
</tbody>
</table>

**Physiological Effects.**

**a. On Animals.**—Magendie has shown that the local action of veratrum is that of an irritant. Placed in
the nostrils of a dog the acetate of veratrum provoked violent and continual
sneezing. When introduced into the intestinal canal it caused inflammation. Applied to parts whence absorption goes on actively
(as the pleura and tunica vaginalis), it occasions tetanus and death in
a few minutes. Forcke gave moderate and gradually increasing
doses (from \( \frac{1}{8} \) to \( \frac{1}{4} \) of a grain) of veratrum for 20 days. It caused vomiting
and occasionally foaming at the mouth. The stools continued hard.
Dr. Bardsley observed vomiting and giddiness (reeling) produced in
animals to whom he gave veratrum.

**b. On Man.**—Applied to the nose a minute quantity excites excessive sneezing. Rubbed on the skin in the form of ointment,
causes a sensation of heat and tingling (called by Dr. Turnbull electro-
stimulation). This effect is not confined to the part and its immediate
neighbourhood where the application has been made: for some
similar sensations are occasionally experienced in distant parts.

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* Formulaire, p. 162, 8th ed.
* Unterneh. über d. Veratrum, 1837.
* Hoop. Facta and Observ. 1829.
en internally, in small or medicinal doses, veratria excites a
of warmth in the stomach and bowels, which extends to the
and extremities. Tingling and various anomalous sensations
a current of hot or cold air or water passing over the skin) are
red in various parts of the body. Nausea and vomiting are
ormally excited by a full dose. On the secretions and exhalations
on is not very uniform. It frequently produces perspiration,
unfrequently diuresis. Forcke mentions increased secretion
va and of tears produced without the contact of the veratria
with the conjunctiva or mouth. The bowels are for the most
ined, so that purgatives are not unfrequently required during
of it. Yet in some cases veratria has caused copious bilious
ons. In some instances it has promoted, in others diminished,
petite. Forcke mentions that a postular eruption is sometimes
ed by it. Dr. Bardsley generally found the pulse become slower
pressed after the use of veratria.
not acquainted with any cases of poisoning in the human
ay excessive doses of veratria. Vomiting and convulsions
probably be induced.

Veratria is employed externally or internally: sometimes
ways at the same time. It has been tried in the following

In neuralgia it has been used by Dr. Turnbull, Dr. Ebers of
, and Dr. Forcke. It is applied in the form of ointment,
ing from twenty to forty grains of veratria to an ounce of lard.
dions are to be continued until the heat and tingling caused
veratria have acquired a considerable degree of intensity.
, according to my own experience, it fails to give relief in a
majority of cases, yet in some few its effects are highly bene-
and in none is it injurious. As a remedy for neuralgia, it is,
er, far inferior to Aconitum and its alkali Aconitina.

In some nervous diseases (Neuroses, Cull.)—Veratria has been
sively used in this class of diseases, but for the most part em-
ily. If it possess any therapeutical power, "a more extended
tence is required to establish its claim to our regard". Among
aladies against which it has been used (in some instances in-
ly, but mostly externally) are,—nervous palpitation, paralysis,
g-cough, epilepsy, hysteria, hypochondriasis, &c.

In rheumatism and gout.—Dr. Bardsley gave it internally in
atism, but with no remarkable results. Externally it has been
ed in the form of ointment by Sir C. Scudamore and Dr. Turn-
should not be applied while the inflammation is of an active
. It would appear to be best adapted for the neuralgic forms of
atism.

In dropsy.—Dr. Bardsley administered it internally in dropsy,

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* Paris, Appendix to the 8th ed. of the Pharmacologia.
* See the treaties of Turnbull and Forcke, before referred to.
but says it possesses "no particular claims to the attention of the profession." Ebers employed veratria endermically, and also, in the form of ointment, epidermically. It acted as a diuretic, and gave relief.

**ADMINISTRATION.**—The ordinary veratria of the shops is administered in doses of one-sixth of a grain, three times a day. On account of its acridity it should not be given in solution, but in the form of pills.

1. **Pilula Veratriae; Veratria Pills;** Turnbull.—Veratria, gr. j.; Extract of Hyoscyamus; Liquorice powder, a, gr. xij. Let 12 pills be made, of which one may be taken every three hours.

2. **Tinctura Veratria; Veratria Embrocation;** Turnbull.—Veratria, 3j.; rectified Spirit, 3j. Dissolve. This embrocation is sometimes used as a substitute for the ointment. Magendie (Formulaire) directs a tincture of veratria to be prepared by dissolving four grains of the alkali in an ounce of alcohol. Only from 10 to 25 drops are taken, in a cup of broth, as a substitute for the tincture of colchicum.

3. **Unguentum Veratria; Veratria Ointment;** Turnbull.—Veratria, 3ss.; Olive Oil, 3j.; Prepared Lard, 3j. M.

4. **Sales Veratriae.**—The sulphate and tartrate of veratria (prepared by saturating veratria with sulphuric or tartaric acid) are sometimes used instead of the uncombined alkali. The dose and mode of administration are the same as for the latter.

**ANTIDOTE.**—*Vide Veratum album.*

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**OTHER MEDICINAL MELANTHACEÆ.**

The fruit and seeds of *Veratrum Sabadilla*, Ph. Ed. are said to be brought from the Antilles, under the name of *Cebudilla* (*Semia Sabadilla Cariba*), but I have never met with them. *V. Sabadilla* is a native of Mexico and the Antilles. Its leaves are radical, oval-oblong, obtuse, ribbed. Its stem is almost leafless. The panicle is nearly simple. The flowers have short pedicels, and are nodding. The rhizome of *Veratrum viride* is used in the United States as a substitute for that of Veratrum album.

**ORDER XII.—LILIACEÆ, Lindl.—THE LILY TRIBE.**

**Essential Character.**—Calyx and corolla confounded, coloured, regular, occasionally cohering in a tube. Stamens six, inserted into the sepals and petals; anthers opening inwards. Ovary superior, three-celled, many-seeded; stig- one; stigma simple or three-lobed. Fruit succulent, or dry and capsular, three-celled. Seeds packed one upon another in one or two rows; embryo with the same direction as the seed, in the axis of fleshy albumen, or uncertain in direction and position. Roots fibrous or fasciculate. Stem none, except bulb; or tuberous, or creeping, or erect, or arborescent. Leaves with para
d veins, membranous, not articulated with the stem; either sessile or with narrow leafy petiole. (*Lindley.*)

**Properties.**—Not uniform.

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2 See Forcke, *op. supra cit.*
I. AL'OÉ, Linn. E.—AL'OÉ.

Aloe spicata, L.; and A. vulgaris, D.; Undetermined Species of Aloe, B.

Sex. Syst. Hexandria, Monogynia.

(Succus proprius spissatus foliorum ex varia Aloeae speciebus.)

ORY.—Neither Aloe plants nor the inspissated juice of their sap are mentioned by Hippocrates or Theophrastus; but both are referred to by Dioscorides and Pliny.

Gen. Char.—Perianth tubular, six-cleft, fleshy, nectariferous, at the base, the sepals of the same form as the petals, and imbricating them. Stamens hypogynous, as long as the perianth, or even longer. Capsule membranous, scarious, three- or four-celled, three-valved, with a loculicidal dehiscence. Numerous, in two rows, roundish or angular. (Lindley.)—Succulent plants.

The following species furnish the greater part of the so-called in the shops aloe:

1. AL'OÉ VULGA'RIS, Lam. D. —Aloé, Dioscor. Sibth. Stem woody, simple, cylindrical, short. Leaves fleshy, amplexicaul, first spreading, then ascending, lanceolate, glaucous green, flat above, convex below, armed with hard, distant, reddish spines, perpendicular to the margin; a little mottled with darker colour; the parenchyma slightly coloured brown, and very distinct from the tough leathery cuticle. Scape axillary, glaucous reddish, branched. Spike cylindrical-ovate. Flowers at first erect, then spreading, afterwards pendulous, yellow, not larger than the stamens. (Lindley.)—Beneath the epidermis of the leaves, in peculiar parallel vessels, is found a brownish-yellow, bitter, resinous juice. This plant is a native of the Indian Islands and Barbary, and is cultivated in the West Indies, Italy, and Malta. It yields Barbadoes Aloes. A. vulgaris has been used by some botanists into A. abyssinica and A. barbadensis.

AL'OÉ SOCOTR'NA, Lam. De Cand.—Stem woody, straight, one half feet high or more, naked below, where it is strongly...
marked with the scars of leaves. Leaves amplexicaul, ascending, ensiform, green, curved inwards at the point, convex below, rather concave above, marked with numerous small white marginal serrature, the parenchyma abounding in a bright brownish-yellow juice. Raceme cylindrical, unbranched. Flowers scarlet at the base, pale in the middle, green at the point. Stamens unequal, three of them longer than the flowers. (Lindley.)—The leaves contain, in peculiar vessels, a yellow juice, which, when exposed to the air, becomes violet, and ultimately brown. This juice is more copious and bitter than that of Aloë vulgaris. Aloë socotrana is said to be a native of the island of Socotra, and to yield socotrine (or real hepatic?) aloes; but further evidence is required to establish these statements. Locke Wellstead¹ says, the hills on the west side of this island are covered for an extent of miles with aloe plants; as he observes, that it is not likely, at any future period, that the whole quantity will be collected which might be required.

3. A'loë spica'ta, Thunb. L. D.—Stem three to four feet high, thick as a man’s arm. Leaves thick, fleshy, broad at the base, gradually narrowing to the point, channelled, full two feet long, tantly toothed, with a few white spots; their parenchyma almost colourless. Spike a foot long, very compact, with the flowers c panulate and horizontal. The three petals broader, ovate, obtus white, with a triple green line, the sepals narrower, less concave. Stamens much longer than the perianth. The flowers are filled with a purplish honey. (Lindley.)—This species is a native of the interior of the Cape of Good Hope, and contributes to yield Cape Aloes.

Preparation.—The finest kind of aloes is obtained by evaporating the juice which flows spontaneously from the transversely-cut leaves. This juice is lodged in vessels running longitudinally beneath the epidermis. The exudation of it is promoted by dipping the leaves in hot water. But if pressure be employed the propelaloeetic juice becomes mixed with the mucilaginous liquid of the leaves, and thus an inferior kind of aloes is obtained. A still commoner variety is procured by boiling the leaves, from which the juice has been previously allowed to escape, in water.

In the island of Socotra the leaves are plucked at any period, as by any one who chooses to take the trouble; and after being placed in a skin, the juice is allowed to exude from them.

In Barbadoes the aloes is best procured in the month of March. It is obtained as follows:—“Every slave hath by him three or for

¹ Journal of the Royal Geogr. Soc. vol. v. ¹ Wellstead, Ibid.
boiled to perfection, and fit to be poured into gourds or
vessels, or other vessels, for use. Dr. Wright says, that in
the leaves contained in hand-baskets or nets, are boiled in
and the strained liquor evaporated to a proper consistence,
poured into gourds or calabashes.

George Dunsterville, surgeon of Algoa Bay, and lately one of
is, has furnished me with the following information respecting
the manufacture of Cape aloe. "A shallow pit is dug, in which is
a bullock's hide or sheep's skin. The leaves of the aloe
the immediate vicinity of this pit are stripped off, and piled
in the skin, to variable heights. These are left for a few days.

The exudate from the leaves, and is received by the skin be-

The Hottentot then collecting in a bucket or other convenient
is the produce of many heaps, which is then put in an iron pot
of holding 18 or 20 gallons. Fire is applied to effect evac-
uation, during which the contents of the pot are constantly stirred
at burning. The cooled liquor is then poured into wooden
about three feet square by one foot deep, or into goat or
ins, and thus is fitted for the market. In the colony, aloe
about 2½d. to 3½d. per lb." Mr. Dunsterville also informs
the Hottentots and Dutch boors employ indiscriminately
the species of Aloë in the preparation of Cape aloe. He adds
the Cape aloe, which is usually prized the highest in
fish market, is that made at the Missionary Institution
of ep (a small village about nine miles from Algoa Bay, and
habited by Hottentots and their missionary teachers). Hence
ed Bethelsdorp Aloë. Its superiority arises, not from the
ent of a particular species of Aloë, for all species are indis-
ably used, but from the greater care and attention paid to what
ally called 'the cooking of the aloe,' that is, the evapora-
indica, E*). A few years ago this kind of aloes was brought by way of Smyrna, and hence was frequently termed Turkey Aloes. But since the expiration of the charter of the East India Company it is usually brought by way of Bombay. It comes over in skins contained in casks (holding from 11 to 15 cwt. each), kegs, and chests. Its consistence and colour are subject to considerable variation. The exterior portion of each skinful is usually hard, but the internal portion is frequently soft or even semiliquid.

The hardened portions vary in colour in different parts of the mass; sometimes they are garnet red, at other times much paler and when quite dry are golden red, and yield a golden yellow powder. By exposure to the air the colour is deepened. The fracture of fine selected pieces is smooth, glassy, and conchoidal; but Socotrine aloes of excellent quality often breaks with a roughish fracture. The finest kind of Socotrine aloes which I have met with had a semitransparent red colour observed when we break a fine piece of myrrh. Thin films of pure and hardened Socotrine aloes are usually translucent or nearly transparent. The odour of fresh broken pieces (especially when breathed on), is very fragrant, and is much stronger in recent and soft specimens. The same agreeable odour is obtained by heating the aloes on a point of a knife in a cave. By distillation with water we obtain a liquid having the same odour, but free from any bitter taste. When fresh, Socotrine aloes possess considerable acidity, and Mr. Hemmell informs me, that the preparation of the Compound Extract of Colocynthis has frequently observed the fatty acid of the soap set free by the acid of Socotrine aloes.

When a package of Socotrine aloes arrives at a druggist's warehouse, it is usually garbled or sorted. The finest, clear, and hard pieces are separated for sale. The soft portions are placed up in slabs or in shallow tin trays, or other vessels, and exposed to a gentle heat to harden them (hardened Socotrine aloes), and at the same time to preserve the favourite colour of this kind of aloes. Mr. Whipple, who has had great experience in these matters, informs me, that "the loss would be frightful, if after selecting or separating the clean aloes, the skins were not washed and the aloes obtained subjected to subsequent evaporation."

In the Edinburgh Pharmacopoeia the following characters are assigned to the Aloë socotrina:

"In thick pieces, translucent, and garnet red; almost entirely soluble in spirit of the strength of sherry. Very rare."

But Socotrine aloes as imported is not "in thin pieces;" the character being given to it in the garbling process, or by drying.
and strained (cooked Socotrine Aloes) by which its colour is impaired, and its other qualities somewhat altered.

Socotrine aloe has long been regarded as the best kind of aloe, its commercial value is now below that of Barbadoes aloe, suspect, inferior in activity.

Socotrine aloe is mentioned by Avicenna and Mesue, both of whom it as the best kind. By Féér, and some other continental it is confounded with Cape aloes.

Socotra is probably procured to be Socotrina. In 1833, the quantity exported from this as 83 skins, or 2 tons. But a much larger quantity might be if required. Sir Whitlaw Ainslie says that the greater the extract now sold under the name of Socotrine aloe is in the kingdom of Melinda.

Samples (one of which I have in my museum) brought direct from Socotra, by a friend of Professor Royle, are largely covered with foreign substances, as sand, skins, &c.

Socotrine: Liver-coloured Socotrine Aloes (Aloë vera. ? Aloë indica E.†). I have never met with any de- of this kind; and I suspect continental writers confound the foregoing variety. In English commerce it is always l as distinct.

brought to us from Bombay (hence it is sometimes called Bom- India Aloes) in skins, contained in casks holding from 200 tons. Its odour is very much the same as that of the Socotrine perhaps it is a little less fragrant. It is distinguished from er by its opacity and its liver colour. I have a sample of es quite soft or semiliquid. The similarity of the odour of e and hepatic aloes leads to the suspicion that they are ob- om the same plant; and which is further confirmed by the
water, alcohol, ether, and dilute sulphuric acid, but is readily solubilized in a solution of caustic potash, forming a red-coloured liquid.

3. Barbadoes Aloes: Aloes in gourds (Aloë barbadensis, Ph. Ed.). This is the kind denominated by most continental writers (as Geiger, Theodor. Martius, Pfaff, Fée, and others), Hepatic Aloes (Aloë hepatica), but its colour is not constantly that of the liver. It is imported from Barbadoes or Jamaica in gourds, weighing from 60 to 70 pounds, even more than this. It varies in colour from a dark brown or black (brown or black Barbadoes aloes) to a reddish brown or liver-coloured (liver-coloured or hepatic Barbadoes aloes): even in the same go a difference of colour is occasionally observed. The fracture varies, sometimes being dull, at other times glossy. Its unpleasant odour, which is much increased by breathing on it, will always distinguish it from the foregoing kinds. Its powder is of a dull or yellow colour. This kind of aloes is obtained from the Aloë vulga

4. Cape Aloes (Aloë capensis: A. lucida of Geiger).—This kind is imported, as its name indicates, from the Cape of Good Hope, is brought over in chests and skins, the latter being preferred, as aloes contained therein are usually purer and more glossy. It has a shining resinous appearance, is of a deep brown colour, with a greenish tint, and has a glossy or resinous fracture; its edges thin laminae, viewed by transmitted light, have a yellowish or ruby colour; its odour is stronger and more disagreeable than Barbadoes aloes; its powder is greenish yellow. Some of the commoner kinds of Cape aloes have a rough fracture. The finest kind of Cape aloes is called Bethelsdorp aloes (see p. 907).

Occasionally it has been imported of a reddish brown colour, that of the liver, and opaque (liver-coloured or hepatic Cape aloes). Some years since an experienced dealer bartered 3 lbs. of Capaloes for 1 lb. of what he thought to be the genuine hepatic aloes, but which turned out to be a fine sort of Cape aloes. I presume this is the kind which Professor Guibourt, to whom I sent a specimen of it, terms Aloès hépatique faux. Its odour, when breathed instantly detects it.

Cape aloes is procured from Aloë spicata, and perhaps also other species, as A. arborescens, Mill., A. Commelyni, Willd., A. m. formis, Willd.\(^{v}\)

5. Fetid, Horse or Caballine Aloes. (Aloë caballina).—I have never met with any aloes under this name in English commerce. From Dr. Guibourt I have received two substances, which he denominates Aloès Caballin.

\(^{a}\) One is impure or foot Cape aloes.
\(^{b}\) The other is in black, opaque masses. Its fracture is uniform. It is cult to pulverize, adheres to the pestle, gives a greenish powder, has little odour, and yields a dark brown decoction. It is probably prepared by boiling the leaves in water.

\(^{v}\) Hist. des Drogs. simpl. t. ii. p. 418, 3\(^{rd}\) éd.

\(^{v}\) Lindley, Flora Medica.
Professor Guibourt says Caballine aloes is procured either in the
mountains which furnish ordinary aloes, or in Spain or Senegal.

6. Mocha Aloes (Aloë de Mochd).—Under this name I found in a
rug warehouse, where it had lain for many years, an impure kind of
aee, in large irregular masses, opaque, and black externally, inter-
xixed with sand, strings, &c. In its brittleness, colour, and the pale
flour of its decoction, it resembles Cape aloes. The interior of the
case is not uniform: in some places it is dark and opaque, somewhat
like Barbadoes aloes, in other places it resembles Socotrine aloes,
here and there we find portions having the transparency and
viscous appearance of Cape aloes. Recently this kind of aloes has
been imported under the name of Mocha aloes from Muscat, in
baskets containing nearly 2 cwt. each.

7. Indian Aloes (Aloë indica; not the Aloe indica of the Edinburgh
Pharmacopoeia.)—Through the kindness of Professor Royle, I have
examined four kinds of aloes brought from the interior of India:

a. Aloe from Northern India.—Is dull, black, and brittle, and has little odour.
It came from the northern parts of India, where it is common in the
bazaars. It is probably the kind which Ainslie says resembles Bar-
badoes aloes.

b. Guzerat Aloes.—Is dark, more gummy in its appearance and feel, more difficult
to fracture. It came from Guzerat.

c. Salem Aloes.—In blackish masses. It was brought from Salem. It is dis-
tinguished from all the preceding by the numerous large air cavities
observed in its interior. Its odour is analogous to that of Socotrine aloes.
Its price is marked one anna and nine pice [about twopence-halfpenny]
per pound.

d. Tezhipolii Aloes.—Resembles Cape aloes in its brittleness, odour, and colour,
but is more opaque. Its price is marked two annas [about threepence]
a pound.

These aloes are probably the produce, in part at least, of Aloë in-
tica; a species with reddish flowers, common in dry situations in
e north-western provinces of India, and which, if known to Rox-
rgh, was included by him in the A. perfusia, Linn. and perhaps
so of A. vulgaris, or the plant mentioned by Rheede.

**COMPOSITION.**—Aloes has been analysed by Trommsdorf, by Bouil-
lon-Lagrange and Vogel, by Braconnot, and by Winkler.

<table>
<thead>
<tr>
<th>Trommsdorf</th>
<th>Bouillon-Lagrange and Vogel</th>
<th>Winkler</th>
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<tbody>
<tr>
<td>Sociotrine</td>
<td>Barboees</td>
<td>Sociotrine</td>
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<tr>
<td>Extractive</td>
<td>68</td>
<td>53</td>
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<td>Resin</td>
<td>32</td>
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<td>albumen</td>
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<tr>
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<td>73</td>
<td>73</td>
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<tr>
<td>Bitter matter</td>
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<td>60</td>
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<tr>
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<tr>
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<tr>
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<td>1</td>
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<tr>
<td>Albumen</td>
<td>0</td>
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</tr>
</tbody>
</table>

* Hist. des Drug. ii. 419.
* Mr. Whipple tells me, that in dissolving and straining Mocha aloes, he has never found less than
* the vest of impurities (sand, stones, &c.)
* * Mat. Ind. vol. ii. p. 16.
* * Boyle, Bot. of the Himalayan Mountains.
* * Hort. Malab. ii. i. 3.
* * Ann. de Chim. t. cxviii. p. 11. 1803.
* * Ibid., p. 155.
* * Journ. de Physiol. t. loxxiv. p. 334. 1817.
1. Aloesin, Pfaff. (Saponaceous Matter; Extractive; Bitter Principle), is the principal constituent of aloes. It is contained in the cold infusion of, and also in a decoction which has cooled; it may be obtained from either by evaporation. Thus procured it is a brown and bitter mass, readily soluble in water, but difficultly so in spirit of wine. In pure alcohol or ether it is so insoluble, or nearly so. Besides carbon, hydrogen, and oxygen, it contains nitrogen, for it yields ammonia by destructive distillation, and furnishes carboxylic acid when treated by nitric acid. Aloesin is probably a mixture or compound of various proximate principles. Obtained as above, Braconnot says it contains some of the pupe-coloured principle, which may be removed by oxide of lemon.

2. Resin.—The substance which deposits from a decoction of aloes as it is usually denominated resin. Braconnot says it is a mixture of aloes pupe-coloured principle; while Berzelius regards it as apotheâme, combined unaltered extract. It is transparent, brown, fusible, soluble in alcohol, and alkaline solutions. The pupe-coloured principle of Braconnot is an odorless and tasteless powder, combustible, but not fusible; and is prepared by digesting aloes with water and oxide of lead: a compound of the pupe principle and oxide is procured, which is to be washed and decomposed by weak nitric acid, the oxide is dissolved, and the pupe principle left. From Braconnot's observations, this principle seems to be rather oxidized extractive (apotheâme, Berzelius' resin).

3. Vegetable Albumen.—This term is applied to a substance insoluble in both water and alcohol.

4. Aloetic Acid.—This is the acid which Trommsdorf supposed to be the acid of aloes redens litmus, darkens ferruginous solutions, but not precipitate gelatin; hence Trommsdorf assumed the presence of gallic acid. But while gallic acid causes a blue colour with the perox终of iron, infusion of aloes produces an olive brown one. Furthermore, if excess of diacetate of lead is added to the infusion, and sulphured hydrogen is passed through the liquor, to throw down the excess of lead, the boiled and strained liquor possesses the property of becoming olive brown on the addition of sesquichloride of iron. Hence it appears to me that the acid is a peculiar one, and I have accordingly termed it aloetic acid. It must not be confounded with an acid obtained by the action of nitric acid on aloes, and which has also been termed aloetic acid.

Meissner has given the name of Aloine to a supposed alkali in aloes, which, when the solution was brown, and acted as an alkali on reddened litmus paper. Sulphuric acid, aloine formed a crystalline salt.

Winkler regards aloes as a neutral vegetable salt, composed of two principal substances (viz. a non-bitter resin, and a bitter substance), and an acid a colouring, non-bitter matter.

Fabron has obtained a fine violet colour from the recent juice of the Aloë, which has been proposed as a dye for silk. It is formed by the action of the air on the juice.

Chemical Characteristics.—Aloes is almost completely soluble in boiling water. The cold decoction of Cape aloes is much more coloured than that of any other kind of aloes. Barbadoses aloes, the deepest coloured decoction. When the decoction of aloes the substance called resin is deposited. The clear solution redens litmus, strikes a deep olive brown tint (aloetate of iron) with sesquichloride of iron, is deepened in colour by alkalis, but is unchanged by gelatin. Diacetate of lead forms a copious yellow precipitate with it.

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3 Ann. de Chet. xxv. 301.
OLOGICAL EFFECTS.  

**a. On Vegetables.**—Not ascertained.

**Animals.**—Aloes is the ordinary purgative for solipedes (the ass, the zebra, &c.) as it is both safe and sure. In horses, prepared by two or three bran-mashes to soften the dung, is from five to seven drachms. It acts slowly, requiring sixteen to forty-eight hours for its operation. Mr. Youatt infers that aloes is a valuable purgative for the dog, in doses of from three drachms, and with the addition of from one to three grains of calomel. Barbadoes aloes is preferred by veterinarians, as more effective than Cape aloes, in the ratio of about seven to one, as it is a more pungent and intense irritant to oxen, sheep, and pigs, but, as in the ass, it operates slowly. Moiroud injected into the veins of an ox of five hundred pounds of aloes dissolved in water with a little alcohol, next day an ounce more, without any other effect than the formation of a large quantity of urine. The dung, however, was not digested, but by a thin pellicle formed by altered intestinal mucus. This mucus was collected and analyzed subsequent to the death of the animal followed three days after the injection: it offered scarcely any of the constituents of the bile.

**Man.**—Taken internally in small doses, aloes acts as a tonic, stimulating the digestive process, strengthening the liver, and promoting the secretions, especially that of which organ it is thought specifically to influence. In large doses it acts as a purgative. There are, however, some peculiarities in its cathartic operation deserving of notice. In the first
elapse before they are produced. Secondly, aloes acts especially on
the large intestines, and a full dose is in some persons apt to produce
heat and irritation about the rectum and tenesmus, and, in those
troubled with hemorrhoids, it is said not unfrequently to increase, or
even to bring on, the sanguineous discharge. Fallopins tells us
that of one hundred persons who used aloes as a purgative, ninety
were affected with the hemorrhoidal flux, which ceased when the
use of aloes was omitted. But though this statement has been cited
as an objection to the use of aloes, it is of little importance
as there is no evidence that the disease was brought on by aloes. The
uternus, in common with all the pelvic viscera, is stimulated by aloes.
A determination of blood towards these organs, and a fullness of the
blood-vessels (especially of the veins), are produced, and thus uterine
irritation and menorrhagia are apt to be increased by aloes, while
amenorrhoea and chlorosis it may occasionally act as an emmena-
gogue. Dr. Wedekind says that small dose of aloes often occasion
erection, and increase the sexual feelings.

The purgative effects of aloes do not arise merely from their local
action on the alimentary canal, since this effect is sometimes pro-
duced when the medicine has been neither swallowed nor given by
the rectum. Thus Monro primus tells us, that the tincture of aloes
applied to a caries of the bone produced purging; and it is said
that an aloetic pill used as a stimulant to an issue had a similar
effect; lastly, applied to a blistered surface it has the same opera-
tion. So that the purgative action of aloes appears to be of a speci-
kind.

According to Dr. Wedekind, the operation of aloes depends on
the increased secretion of bile, which is produced by the specific ac-
tion of this medicine on the liver. He founds this opinion on the re-
results of various experiments. Thus he says, that if aloes be added to
purgatives (a laxative infusion and sulphate of soda), whose opera-
tion is speedy, its effects do not take place for some hours after those
cased by the other purgatives; and he also asserts, that the evacu-
ations in the second purging differ from those of the first both in ap-
pearance and smell. Moreover, he found that as long as the stools
were white or gray in icterus, the aloes did not purge even when ex-
hibited in large doses; but the purgative effect supervened immedi-
ately after the faecal matter began to contain bile, proving that the
presence of bile in the intestinal canal is a necessary condition of the
purgative effect of aloes. But in Moirund’s experiment above quoted,
no effect seemed to be produced on the hepatic secretion.

In all probability, the increased secretion of bile, the irritation
about the rectum, the disposition to hemorrhoids, and the vascular
excitement of the sexual organs, all of which are said to be produced
by aloes, are the effects of a stimulant action exerted by this medicin
the venous system of the abdomen, and especially of the
vegetable aloe, ascribed a diuretic effect to aloes, and his state-
is corroborated by Moirou's experiment.

Barbados, and is said not to be so apt to occasion hemorrhoids as
Vogt places it between jalap and rhubarb. From rhubarb is distinguished by its more stimulant influence over the large
Gouty blood and the pelvic organs: from senna by its feebler action as a
diuretic, by its slow operation, and by its tonic influence when given
in doses. It irritates less powerfully than either jalap or
It is further, its influence over the blood-vessels of the pelvic
is greater than these.

The uses of aloes may be readily inferred from the remarks
made. It is evidently not adapted for those cases in which
syphilitic action is required; and it is, therefore, useless to add it to
lives to quicken their operation. It is well fitted for cases of
where there is a scanty secretion of bile, and for torpid
ctions of the large intestines, especially when attended with de-
terine action. Some of the ill effects ascribed to the use of
are probably imaginary, and others are much exaggerated.
However, advisable to avoid the use of this purgative in inflam-
mitious and organic diseases of the liver, in biliary calculi, in
ical impediments to the passage of the blood through the
es of the portal veins, in hemorrhage from any of the pelvic
(as the uterus and rectum), in irritation of the rectum, prostate
or bladder, in pregnancy, &c. For we have many other
efficient purgatives, to the use of which, in these cases, no ill
quences have been ascribed. While, therefore, I concur with
thegill in advising that the exhibition of aloes should be
when the menses are about to cease, I am not prepared to
that " the piles, strangury, immoderate discharges of the menses,
pains in the loins, representing labour pains, and other
complaints," are frequently induced by this medicine. On
contrary, I suspect this catalogue of the evils of aloeic purges to
ich overcharged. "Aloetic medicines," says Dr. Denman,
are forbidden during pregnancy, lest they should do mischief to their supposed deobstruent qualities; but they are cheap and conveniently given in the form of pills, and I have not observed any bad effects from them. The emaciation, stricture of the rectum, enteritis, referred by Dr. Greenhow to the long-continued use of aloeic medicines, ought doubtless to be ascribed to other causes.

The following are some of the cases in which the use of aloes has been advised:

1. In loss of appetite, and dyspepsia, depending on a debilitated condition of the digestive organs, accompanied by costiveness, but unattended with any signs of local irritation, aloes may be given in small doses as a stomachic.

2. In habitual costiveness, depending on deficiency of bile, or on sluggish condition of the large intestines—particularly in hypochondriacal or studious persons, or in those whose habits or occupation are sedentary—aloes, given in sufficient doses to purge, will be found a very useful medicine. A torpid state of the colon, with large fecal accumulation, is not unusual in females. In such the use of aloes is often attended with much benefit.

3. To excite the menstrual discharge aloes is frequently employed. It has been supposed that by determining an afflux of blood to the pelvic organs, aloes would stimulate the uterine vessels, and thus relieve deficient menstruation connected with atomic conditions of the uterus. But it often fails; indeed Dr. Cullen says that it rarely succeeds.

4. To reproduce the hemorrhoidal discharge aloes has been frequently employed in large doses. Serious affections of the head, or of other parts, have sometimes disappeared on the occurrence of the hemorrhoidal flux; and, therefore, in persons who have been subject to this discharge, but in whom it has stopped, it is advisable to attempt its re-establishment, with the view of relieving other most serious disorders.

5. To promote the secretion of bile where a deficiency of this fluid does not arise from hepatic inflammation—as in some forms of jaundice which are unconnected with biliary calculi, inflammation, mechanical obstruction of the ducts, &c.

6. In cerebral affections.—The compound decoction of aloes is the most valuable stimulating purgative for elderly persons in whom a tendency to apoplexy exists, especially in cold and phlegmatic habits. It will frequently be necessary to conjoin other cathartics, as the infusion of senna.

7. As an anthelmintic, a decoction of aloes, used as an enema, has been efficacious in the small thread-worm (Ascaris vermicularis).

Administration.—On account of its nauseous taste, aloes is frequently given in the form of pill (pilula aloetica, offic.) One or two grains seldom fail to produce one stool, which seems to be men

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* Treat. of the Mat. Med.
aloes.

Evacuation of what may be supposed to have been present for the time in the great intestines (Cullen). The ordinary dose is five grains; but ten, fifteen, or even twenty grains are sometimes given.

1. PILULÆ ALOES COMPOSITÆ, L. D.; Pilulae Aloes, E.; Compound Pills of Aloes.—(Aloes [hepatic, D.], powdered, 15. ; Extract of Genia, 3 ss.; Oil of Caraway, 1 xel.; Syrup, as much as may be sufficient, L. D. Beat them together until incorporated.—The Edinburgh College orders of Socotrine Aloes, and Castile Soap, equal parts; Conserve of Red Roses, a sufficiency. Beat them into a proper pill mass. This pill may be also correctly made with the finer qualities of East Indian Aloes, as the Socotrine variety is very scarce; and many, not without reason, prefer the stronger Barbadoes Aloes. E.—the addition of Syrup, ordered by the London and Dublin Colleges, unnecessary and improper, for the aloe and extract react on each other, and become so soft, that not unfrequently some powder is necessary to give the mass a proper consistence. This pill is a valuable purgative in habitual constiveness. Dose, five to fifteen grains.

2. PILULÆ ALOÉS CUM MYRRHA, L. D.; Pilulae Aloes et Myrrha, E.; Pilule Rufa, offic.; Pills of Aloes and Myrrh; Rufus's Pills.—(Aloes [hepatic, D.]; Socotrine or East Indian, E.], 5 ij. [four parts, E.]; Saffron [one part, E.], Myrrh, of each 5 ij. [two parts, E.]; Syrup [Conserve of Red Roses, E.], as much as may be sufficient. Rub the aloe and the myrrh separately to powder; then beat the whole together until incorporated.)—Used as a purgative in chlorosis and amenorrhœa. Dose, ten to twenty grains.

3. PILULÆ ALOËS ET ASSAFETIDÆ, E.; Pills of Aloes and Asafetida.—(Aloes (Socotrine or East Indian), Assafetida, and Castile Soap, equal parts. Beat them, with Conserve of Red Roses, into a proper pill mass.)—Used in dyspepsia attended with flatulence and costiveness. Dose, ten to twenty grains.

4. PILULÆ ALOËS ET FERRI, E.; Pills of Aloes and Iron.—(Sulphate of Iron, three parts; Barbadoes Aloes, two parts; Aromatic Powder, six parts; Conserve of Red Roses, eight parts. Pulverize the aloe and sulphate of iron separately; mix the whole ingredients, and beat them into a proper mass, which is to be divided into five-grain pills.)—A valuable emmenagogue in atomic amenorrhœa and chlorosis. Dose, one to three pills.

5. PULVIS ALOÈS COMPOSITUS, L. D.—Compound Powder of Aloes. (Aloes [hepatic, D.], 3 ss.; Guaiacum Resin, 5 ij.; Compound Powder of Cinnamon, 3 ss. Rub the aloe and the guaiacum resin, separately to powder; then mix them with the compound powder of cinnamon).—Purgative and sudorific. Seldom used. Dose, ten to twenty grains.


* Dr. Duncan, Edinburgh Dispensatory.

Boil down the liquorice, carbonate of potash, aloes, myrrh, and saffron, with the water, to a pint [f3xii. E.]; and strain then add the compound tincture of cardamom.)—A most valuable preparation. A mild cathartic, tonic, antacid, and emmenagogue. Used in the before-mentioned cases, in doses of f3ss. to f3ij. Acidulous salts, and most metallic salts, are incompatible with it. It be desirable to conjoin chalybeates with it, either the *Ferri Potas- sio-tartras*, L. (p. 863), or the *Ammonia Ferro-tartras* (p. 867) may be added to the cold decoction without undergoing decom- position.

8. **Extractum Aloës Purificatum**, L.; *Extractum Aloes Hepaticum*, D.; Purified Extract of Aloes.—Aloes powdered, 3xv. Boiling Water Cong. j. Macerate for three days with a gentle heat; afterwards strain and set by, that the dregs may subside. Pour off the clear liquor, and evaporate it to a proper consistence.—A most unnecessary preparation. It is intended to deprive the aloes of the substance called resin, on which its irritating and griping qualities have been erroneously supposed to depend. Dose, five to fifteen grains.


Macerate for fourteen [seven, D. E. with occasion agitation, E.] days, and strain.—The *Dublin College* dissolves the liquorice in 3xvj. of water, and adds f3xvj. of proof spirit, instead of the water and rectified spirit used by the London and Edinburgh Colleges.—“This tincture cannot without difficulty and delay be prepared by percolation, E.”—Purgative and stomachic. Dose, 3ij. to 3j.


Macerate for fourteen days, frequently shaking, and strain. The *Edinburgh College* uses Aloes (Socotrine or East Indian), 5ss.; Cardamom seeds ground; Ginger in coarse powder, of each 5ss.; Sherry, Oij. Digest for seven days, and strain through linen or calico. Wine of Aloes is purgative in doses of 3ss. to f3ij.; stomachic in doses of f3ij. to f3iij.

12. **Aloë Colata**; Strained Aloes (Melt Aloes in a metallic vessel
SQUILL.

Heated by steam or hot water, and strain through a hair or wire sieve). By this process aloes is deprived of foreign matters with which it is frequently mixed. Its physical properties suffer some change. Its colour for example is deepened.

Aloes is a constituent of several other preparations, (as *Extractum Colocynthidis compositum*, *L. D.*, *Pilule Colocynthidis, E.*; *Pilule Rhei compositei, L. E.*; *Pilulæ Cambogiae, E.*; *Pilulae Sagapeni compositei, L. D.*; *Pilulae Sagapeni composita, L.*; *Tinctura Rhei et Aloes, E.*) which will be described hereafter.

2. *SQUILL’LA MARITIMA, Steinheil, E.*—THE SEA ONION, OR OFFICINAL SQUILL.

*Scilla maritima, Linn. L. D.*

*Sear. Syst. Hexandria, Monogynia.*

(Bulbus recens, L. Bulbus, D. Bulb, E.)

**HISTORY.**—The Egyptians worshipped a bulbous plant called by Lucian Κρόμβυος, and which Pauw asserts to be the squill, and further suggests that it was the red variety (*Squilla Pancration var. a. Bulbo rufa*, Steinheil). Pythagoras is said to have written a volume on the medicinal properties of squill, and to have invented the *acetum scillae*. Hippocrates employed squill (οξιρις) internally, externally, and as a pessary.

**BOTANY.** *Gen. Char.*—Sepals three, coloured, spreading. Petals, very like them, and scarcely broader. Stamens six, shorter than the perianth; filaments smooth, somewhat dilated at the base, acuminate, entire. Ovary three-parted, glandular and melliaceous at the apex; style smooth, simple; stigma obscurely three-lobed, papillose. Capsule rounded, three-cornered, three-celled. Seeds numerous, in two rows, flattened with a membranous testa. (Lindley, from Steinheil.)


Bulb roundish-ovate, half above ground. The leaves appear after the flowers: they are broad, lanceolate, twelve to eighteen inches long. Scape about two feet high, terminated by a dense long raceme.

**Hab.**—Shores of the Mediterranean, viz. Spain, France, Sicily, Africa, &c. Navarino has long been celebrated for its squills. In its native soil the plant flowers about August.

**DESCRIPTION.**—The fresh bulb (*bulbus recens, L.*; *radix recens, offic.*) is pyriform, of the size of the fist to that of a child’s head, and is composed of thick, fleshy, smooth, shiny scales, attenuated at their edges, closely applied over each other, and attached to a conical disk (a rudimentary stem) which projects inferiorly, and gives origin

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1 *Phil. Dis. on the Egypt. and Chinese*, vol. i. p. 130, 1795.
3 *De victis ratione.*
4 *De ulceribus.*
5 *De Nat. Mul.*
to the root fibres, the remains of which are to be frequently found in the bulbs of commerce. The outer scales are usually dry, thin, coloured, membranous, or papery. By cracking the inner or fleshier scales, numerous spiral vessels may be drawn out. On submitting the cuticle of the scales to a microscopic examination, numerous acicular crystals (raphides) are perceived in cells, which are distinguished from the surrounding angular cells, by being larger and elliptical. The *pulvis scille*, offic. contains nine or ten per cent. of these crystals.

Two kinds of squills, both abounding in an acrid juice, and having a very bitter taste, are met with in commerce; viz. the white (*squilla alba*), and the red (*squilla rubra*), both of which are so called from the colour of the scales. The white is preferred in England.

In the London Pharmacopoeia the fresh bulbs are directed to be preserved in dry sand; and, before drying them, the dry rind is to be removed; they are then to be cut transversely into thin slices, and dried as quickly as possible with a gentle heat.

Dried squill (*radix scilla siccata*, offic.) is, however, for the most part imported, in consequence of the duty being no higher for the than for the recent bulb. It occurs in white or yellowish white, slightly diaphanous pieces, which, when dry, are brittle, but when moist are readily flexible. As their affinity for moisture is great, they should be preserved in well-stoppered bottles, or in a very dry place.

Squill is imported from Malta, and other countries of the Mediterranean. Also from Petersburg and Copenhagen.

**Composition.**—The more recent analyses of squill are those of Vogel, in 1812; and of Tilloy, in 1826. Buchner, in 1811, examined the juice of the fresh bulb.

<table>
<thead>
<tr>
<th>Squill bulb</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acrid volatile matter</td>
<td>45</td>
</tr>
<tr>
<td>Loss</td>
<td>5</td>
</tr>
<tr>
<td>Squill bulb</td>
<td>100</td>
</tr>
</tbody>
</table>

| Acrid bitter resinous extractive (*Scillitina*). | 25 |
| Uncrystallizable sugar. | 20 |
| Gum. | 10 |
| Fatty matter. | 5 |
| Fibrous matter, very fugacious matter. | 5 |

<table>
<thead>
<tr>
<th>Squill bulb.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peculiar bitter extractive</td>
</tr>
<tr>
<td>Mucilage</td>
</tr>
<tr>
<td>Gelatinous matter (<em>Tyrocin</em>).</td>
</tr>
<tr>
<td>Powdered with lime</td>
</tr>
<tr>
<td>Fibrous matter</td>
</tr>
<tr>
<td>Water</td>
</tr>
<tr>
<td>Astringent Acid.</td>
</tr>
<tr>
<td>Loss</td>
</tr>
</tbody>
</table>

1. **Acrid, volatile? matter.**—It is well known that squill, in the recent state, is very acrid, and, when applied to the skin, causes irritation, inflammation, and even vesication. By drying, the greater part of this acridity is got rid of; and hence the acrid principle is usually described as being of a volatile nature, and, in confirmation of its volatility, Athanasius* states, that two ounces of water distilled from fresh squills caused the death of a dog in six hours. However, by others, its volatility is denied; and Vogel says, that six ounces of

---

* Is the red kind the *Squilla Panorota* var. a. *Balbò Rosso*, Steinheil?
* Trade List, Sept. 11, and Nov. 29, 1838.
* Journ. de Pharm. xii. p. 635.
distilled from fresh squills had no effect on dogs. Buchner states, that the bitter scillitin, squill contains, according to his experiments, another, which is combined with phosphate of lime, and which is capable of pitching and inflammation. This acrid matter may be easily decomposed, not volatile, as is generally supposed.

Scillitin (Scillitie, Thomson).—The substance to which Vogel gave the name of Scillitin is a whitish transparent deliquescent substance, which, when a resinous fracture, and may be easily rubbed to powder. Its taste is neutraly sweetish. It readily dissolves in water, spirit of wine, and tartaric acid. The substance sold in the shops under the name of Scillitin is a mucilaginous liquid. Landerer obtained crystals of Scillitin. He says these crystals have alkaline properties.

Crystals (Phosphate of Lime?) The acicular crystals found in the cuticle scales of the bulb, as before mentioned, probably consist of phosphate of lime. These perhaps are the needle-like crystals obtained by Vogel by evaporating the juice of the bulb, and which he regarded as citrate of lime.

Chemical Characteristics.—An aqueous decoction of squills is not an acid, but very bitter. Sesquichloride of iron communicates an inebriating blue colour (gallate of iron) to it. Gelatin has scarcely any effect on it. Nitrate of silver forms a white precipitate (chloride of silver) soluble in ammonia, but insoluble in nitric acid. Oxalate of copper renders the decoction turbid, and after some time causes a precipitate (oxalate of copper). Diacetate of lead and proto-mercury form precipitates in the decoction. Tincture of squills has no effect on it. Starch is not recognizable in it by the action of Alkalis heighten the colour of the decoction.


On Animals.—An ounce of powdered squill acts as a diuretic in cases and other large animals; the same effect is produced on small animals by half a drachm. When the dose is large, squill acts as a poison. It first causes local irritation; then its active principle becomes absorbed, affects the nervous system, and thereby hinders the respiration, causes convulsions, and death. Hillefeld states paralysis produced in a rabbit by nineteen grains of powdered squill. Emmert and Hoering state that squill juice introduced into the abdominal cavity, became absorbed.

On Man.—In small doses it acts as a stimulant to the excretory organs. Thus it promotes secretion from the mucous membranes (chiefly the bronchial and gastro-intestinal) and the kidneys. Its marked effect is that of a diuretic. Its expectorant effects are obvious and constant. Sometimes, when it fails to act on the lungs, it increases cutaneous exhalation. Its influence on secreting vessels is probably to be referred to the local stimulus communicated to those vessels by the active principle of squill in its passage out of the system, for Emmert and Hoering have shown that the juice is absorbed, so that squills may be regarded as an acrid even for these
remote parts. When it proves diuretic in dropsies, it usually
promotes the absorption of the effused fluid—an effect which is, it
indirect, and a consequence of the diuresis. But Sundelin* observes
of squill, that it promotes the secretion of urine less by its local
action of the kidneys, than by its general excitement of the absorp-
apparatus.

By the continued use of squill in gradually increased doses it
disturbs the functions of digestion and assimilation.

In full medicinal doses, squill excites nausea and vomiting. Vom-
ing, also, is not unfrequently produced. When squill provokes
or purgative, its diuretic operation is much less obvious—a cir-
stance which Cullen* refers to the squill being prevented reaching
the blood-vessels and kidneys. Home*, however, alleges that the
diuretic effects are not to be expected unless there be some open-
on the stomach. But the operation on the stomach may be, as Cullen
suggests, a mere test of the activity of the squills. However,
the effect of squill, in strong doses, is not confined to the aliment-
ary canal, is proved by the fact, that when the vomiting and purg-
ating were present, the pulse has been observed to be reduced in frequency,
often to forty beats per minute (Home).

In excessive doses, squill acts as a narcotico-acrid poison,
causes vomiting, purging, griping pain, strangury, bloody urine,
vulsions, inflammation and gangrene of the stomach and intesti-
Twenty-four grains of the powder have proved fatal*.

Considered with reference to its diuretic effect, squill is com-
pared with foxglove. But it exceeds the latter in its stimulant in-
fluence over the urinary organs. On the other hand, foxglove is character-
ized by its powerfully sedative effect on the vascular system; for the
squill has, in some instances, reduced the frequency of the pulse.
Effect is by no means common. Squill, says Vogel*, preponderates
its action on the inferior or vegetative [organic] life; foxglove, on
other hand, in its action on the higher or animal life.

Uses.—The principal uses of squill are as an emetic, diuretic
and expectorant.

1. As a diuretic in dropsies.—It is applicable to those cases of
dropsy requiring the use of stimulating or acrid diuretics, and it
is proper in inflammatory cases. It is an unfit remedy for dropsy
complicating a granular kidney or vesical irritation; but when
conditions are not present, it is adapted for torpid leucorrhoea
and subjects. Hence, it is more serviceable in anasarca than in
ascites or hydrothorax. It should be given so as to excite a
degree of nausea (not vomiting), as recommended by Van Swieten.

By this means its absorption is promoted. The acetate or bital
of potash may be conjoined. Calomel is usually regarded as a

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* Clinical Experiments, p. 387, 1783, 3d ed.
* Vogel, Journ. de Phys. lxxv. 194.
* Pharmacogn. ii. 343, 2nd Aufl.
* Comment. upon Boerhaave's Aphorisms, vol. xii. p. 435.
SQUILL.

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It for promoting the diuretic influence of squill. When it is a purge it is beneficial, but its tendency to affect the bowels is its use.

As an expectorant in chronic pulmonary affections admission of a substance stimulating the capillary vessels of the bronchial membrane. Thus, in chronic catarrh, humid asthma, and winter it is often employed with considerable benefit. It is of course in all acute cases accompanied with inflammation or febrile. In old persons it is often combined with the tinctura cam-

composita, and with good effect. The oxymel or syrup of may be given to relieve troublesome chronic coughs in chil-

as an emetic it is occasionally used in affections of the organs requiring or admitting of the use of vomits. Thus, the is given, with the view of creating sickness and promoting irritation, to children affected with hooping-cough; and some-
hough with less propriety, in mild cases of croup. The great m to its use is the uncertainty of its operation: in one case it dry excite nausea, in another it causes violent vomiting. more, it is of course highly objectionable as an emetic for children with irritible stomachs, on account of its acid prop-
and the irritation it is capable, in these cases, of setting up.

INISTRATION.—The following are the preparations of squills employed:

LVIS SCILLE, D.; Powdered Squill. — The directions of the College for the preparation of this are as follows:—Remove membranous integuments from the bulb of the squill, cut it into dry with an inferior heat (between 90° and 100° F.); then them to powder, which ought to be kept in glass bottles with stoppers. The bulb loses about four-fifths of its weight by so that six grains of the dry powder are equal to half a drachm fresh. Powdered squill readily attracts water from the atmos-
and becomes soft and mouldy; hence the necessity of pre-
it in stoppered bottles and in a dry place. It is usually ad-
ed in the form of pill. The dose of the powder, as an emetic, six to fifteen grains; ten grains being the average. As anulant or diuretic we should commence with one grain, and gran-
crease the dose until slight nausea is excited.

LULAE SCILLE COMPOSITE, L. D.; Pidula Scilleae, E. Com-
squill Pills.—(Squill, fresh dried and powdered, 3i.; Ginger, ed [5iij. D.]; Ammoniacum, powdered, each 5iij.; Soap, 5iij.; Molasses, D.) as much as may be sufficient. Mix the pow-
gather; then beat them with the soap, and add the syrup es, D.] so as to obtain a proper consistence. The Edinburgh takes of powdered Squill, five parts; powdered Ammoniac, and Spanish Soap, each four parts; Conserve of Red Roses, ts; and forms them into five-grain pills.)—Expectorant and

Principally used in chronic bronchial affections. Dose to twenty grains. It readily spoils by keeping.

1
3. **TINCTURA SCILLE, L. D. E.; Tincture of Squills.**—(Squill, dried [in coarse powder, E.] 5v.; Proof Spirit, Oij.; macerate for seventeen days, and strain, L. The directions of the Dublin College essentially differ from these. "Prepare this tincture by percolation as directed for tincture of cinchona, but without packing the firmly in the percolator. It may likewise be obtained by the proof of digestion from the sliced bulb." E.)—Expectorant and diuretic. Used in chronic bronchial affections. Dose m. x to f. 8s.

4. **ACETUM SCILLE, L. D. E.; Vinegar of Squills.**—(Squill, dried, 3v. [3viij. D.]; Distilled Vinegar, Ovj. [Oiii. D. wine sure]; Proof [rectified, D.] Spirit, Oss. [f. 3viij. D.] The relative proportions used by the Edinburgh College are the same as those of London College, except that one-tenth less spirit is employed. Macerate the squill with the vinegar, with a gentle heat, in a covered vessel, for twenty-four hours [seven days, D. Ed.]; afterwards, pour out [the liquor] and set it by, that the dregs may subside; lastly, distil the spirit to the clear liquor.—A most ancient preparation. Expectorant and diuretic. Used in chronic pulmonary affections, dropsies under the regulations before described. Dose 3ss. to 8 in some aromatic water. It is a constituent of the **Mistura Cascae composita, Ph. L.**

5. **OXYMELO SCILLE, L. D.; Syrupus Scille, E.; Oxymel of Squills.**—(Honey [despunated] lbij.; Vinegar of Squills, Oij.; Pure Sugar, lbvij. Dissolve the sugar in the vinegar of squills with the aid of a gentle agitation, E.)—Used as an expectorant in chronic catarrhal asthma, in doses of f. 3j. or f. 5ij. As an emetic it is sometimes given to children affected with whooping-cough or croup, in doses teaspoonful repeated every quarter of an hour until vomit occurs.

**ANTIDOTE.**—No antidote is known. The first object, therefore, in case of poisoning, is to evacuate the stomach; the second, to relieve the inflammatory symptoms which may supervene.

5. **ALIUM SATI'VUM, Linn., L. E. D.—COMMON OR CULTIVATED GARLIC.**

_Sex. Syst. _Hexandria, Monogynia._
(Balbus, L. D.—Bulb, E.)

**HISTORY.**—This plant was well known to the ancients. The Greeks called it _σκόρωπος_. It was used by Hippocrates.

**BOTANY.** Gen. Char. — Flowers umbellate, with a membranous spathe. Perianth six-parted, permanent, equal. Stamens inserted into the base of the perianth; filaments either all alike, or every one tricuspitate, with the _anther_ on the middle point. _Style slightly; stigma simple_. Capsule usually obtusely three-cornered.
COMMON OR CULTIVATED GARLIC. 985

-lobed, depressed, three-celled, bursting into three valves through tips and containing two or one black angular seed in cell. (Lindley.)


Description.—The bulb (bulbus), is composed of cloves, each furled with its proper envelopes. Its odour is strong, irritating, and characteristic: its taste is acrid.

Composition.—Cadet analyzed garlic. He found the constituents: acrid volatile oil, extractive (a little), gum, woody fibre, albumen, stear. The ashes contained alkaline and earthy salts. Bouillon has detected, besides these, sulphur, starch, and saccharine.

Garlic has a very acrid taste, a strong smell, and yellow colour. It is denser than water, and is soluble in alcohol. It contains sulphur, and hence, naling, produces sulphurous acid. According to Cadet, 20lbs. of garlic contain only six drachms of essential oil. It strikes a black colour when rubbed with an iron. It is a powerful irritant, and when applied to the skin, irritation. The Hindoos, according to Dr. Ainslie, prepare a stimulating red oil from garlic, which they give internally inagne, and use externally for rheumatism.

Pharmacological Effects.—Garlic is a local irritant. When swallowed, it operates as a tonic and stimulant to the stomach. Its volatile oil is emitted, quickens the circulation, occasions thirst, and is an expectorant of the system by the different excretions; the activity of it promotes, and to whose excretions it communicates its well-known odour. Large doses occasion nausea, vomiting, and purging. It, says the expressed juice has proved fatal.

Uses.—Employed by the cook as a flavouring ingredient in various dishes, sauces, &c. Rarely used by the medical practitioner. It has been exhibited as a stimulant and stomachic in aid of digestion; as an expectorant in old chronic catarrhs; as a tonic in atonic dropsies; and as an anthelmintic. Externally it been employed as a resolvent in indolent tumours; as a local irritant applied to the feet to cause revulsion from the chest; as an antispasmodic liniment (composed of oil and a juice) in infantile convulsions; as a remedy for some cases of fever, a clove or a few drops of the juice being introduced into the nostrils.

Administration.—A clove may be swallowed either entire, or, conveniently, cut into small pieces. The dose of the fresh clove is one or two drachms. The expressed juice mixed with sugar, infusion of garlic, and a syrup, are sometimes employed.

7 De Candolle, Bot Gall.
8 Gmelin, Handb. d. Chem. ii. 1336.
9 Journ. de Pharm. 1. ii. p. 358.
10 Materia Medica, 1. 181.
11 Quoted by Weismüller, Die Wirk d. Aspermat.

Sex. Syst. Hexandria, Monogynia,
(Bulbus, D.)

History.—The onion was known and used in the most ancient times. It was employed in medicine by Hippocrates. An oil was taken from the hand of an Egyptian mummy, perhaps 2000 years old, and has been made to grow.


Loudon enumerates eighteen varieties deserving of culture.

Hab.—Egypt. Cultivated in kitchen gardens.

Description.—The bulb (bulbus) is tunicated. When cut it evolves an acrid principle, having a well-known odour, and a powerful action on the eyes, causing a flow of tears. Its taste is sweet and acrid. Onion juice is colourless, but by exposure to the air becomes reddish.

Composition.—According to Fourcroy and Vauquelin the bulb contains an acrid volatile oil, uncrystallizable sugar, gum, woody albumen, acetic and phosphoric acids, phosphate and citrate of and water.

Volatile Oil of Onions.—This is acrid, piquant, colourless, and, like that of garlic, contains sulphur.

Physiological Effects.—Analogous to those of garlic, but milder. By boiling onions, the volatile oil is dissipated, and the bulb is deprived of its irritating qualities, and becomes a mild esculent substance.

Uses.—Extensively used as an article of food and as a condiment. It is very rarely employed in medicine, but is adapted to the same uses as garlic. Raw onions are occasionally taken as an emollient in cases of winter cough.

Administration.—A roasted onion is sometimes employed as an emollient poultice to suppurring tumors, or to the ear to relieve pain, or to the sore throat.

The expressed juice has been given to children, mixed with sugar, as an expectorant.

Other Dietetical, Medicinal, or Poisonous Liliaceae.

1. The Crown Imperial (Fritillaria Imperialis) is said to be a narcotic, though Orfila could not recognise any acridity in it.

2. The recent bulb of the Common White Lily (Lilium candidum) has been used as a diuretic in dropsies. The boiled bulb is employed as an emollient.

3. Various species of Allium, besides those already mentioned, are cultivated for culinary purposes: as, A. Porrum, the Leek; A. ascallonicum, the Shallot; A. Schoenoprasum, the Chive; A. Scorodo'prasum or Rocambole. Their virtues are analogous to those of the onion and garlic.

a Muller's Physiol. by Baly, vol. i. p. 29.
b Botanicon Gallicum.
c Encycl. of Gard.
e Brandt and Ratzburg, Gifsgewdchz.
4. Squill’la Panga’tion. Steinheil (Papaveris, Dioscorides) is said by Steinheil to yield a small bulb of a reddish colour, found in commerce under the name of squill.

5. The root of Ake’tris parina’sa is used in the United States as a tonic.

6. Erythro’niun ame’rica’num is emetic.

7. The fresh rhizome of Solomon’s Seal (Convallaria Polygona’tum) is a popular application to bruised parts (the eye, for example), to remove the marks.

8. Xanthor’rea hast’le and X. arbo’rea, natives of New Holland, yield resinous substances. That obtained from the first species somewhat resembles gamboge, and is called yellow gum [resin] of New Holland. It has been described by Mr. Kite, who used it in several diseases. More recently Dr. Fish has used it in the form of tincture, with opium, in fuscus hepaticus and diarrhoea. Mr. Johnston says, this resin contains more oxygen than any other resinous substance hitherto analysed. Its composition is C_{40} H_{20} O_{12}. A red resin, probably from X. arborea (fig. 180), has been recently imported under the name of black-boy gum.

9. The young shoots of Aspar’agus officina’lis are well-known articles of food. They are diuretic, and communicate a peculiar odour to the urine. Aspar’amide (formerly called asparagin) is contained in this plant. Its composition is C_{8} H_{5} N_{5} O_{5} + NH_{3}.

10. Draca’na Dra’co (fig. 117), a native of the Canary Islands and of the East Indies, yields a substance called Dragon’s blood. One of these trees growing at Orotava has long been celebrated for its great size and age. Next to the Baobab trees (Adansonia digitata), it is regarded as one of the oldest inhabitants of the earth.
ORDER XIII.—SMILACEÆ, Lindl.—THE SMILAX TRIBE.

Essential Character.—Flowers hermaphrodite or dioecious. Calyx and corolla confounded, inferior six-parted. Stamens six, inserted into the perianth at the base; seldom hypogynous. Ovary three-celled, the cells one, or many-seeded: style usually trifid; stigmas three. Fruit a roundish berry. Albumen between fleshy and cartilaginous; embryo usually distant from the hilum. —Herbaceous plants or under shrubs, with a tendency to climb. Stems woody.

Leaves reticulated. (Lindley.)

Properties.—Those of Smilax are alone known.

SMILAX, Linn.—SEVERAL SPECIES OF SMILAX YIELDING SAPARILLA.

Smilax officinalis, L.; and probably other species, E.; Smilax Sarasaparilla, D.

(Nor. Syst. Diocca, Alexandria.

(Radix dicta Sarza seu Sarasaparilla.)

History.—Sarsaparilla first appeared in Europe in 1580, and was employed as an antivenerial remedy. The Spanish term Zarzopenilla (from zarza a bramble, and parilla a vine) signifies a fragrant vine.


Species.—The following species yield at least part of the sarsaparilla of commerce:

1. SMILAX OFFICINALIS, Kunth, L. E.—Stem twining, shrub-like, prickly, quadrangular, smooth; the young shoots are unarm and almost round. Leaves ovate-oblong, acute, cordate, net-veined, five to seven-nerved, coriaceous, smooth, a foot long, and five to five inches broad; the young ones are narrow, oblong, acuminate, and three-nerved. Petioles smooth, an inch long, bearing two to four bristles above the base. Flowers and fruit unknown.—Grows in Nicaragua, Trinidad, Granada, on the banks of the Magdalena, near Bajarique. This variety was called Zarzaperilla by the natives, who transmit large quantities to Cartagena and Mompos; whence it is shipped for Jamaica and Spain. It is probably the source of Jamaica, and perhaps also of Lima and Honduras sarsaparillas.

2. SMILAX MEDICA, Schlecht.—Stem angular, armed at the joints with straight prickles, with a few hooked ones in the interval. Leaves shortly acuminate, smooth, five to seven-nerved; inferior ones cordate, auriculate-bastate; upper ones cordate-ovate. Peduncle axillary, smooth, about an inch long. Inflorescence an eight-twelve-flowered umbel. Fruit red, size of a small cherry; contains one to three reddish-brown seeds. Embryo cylindrical, lodgeless; horny albumen. —Schiede found it on the Eastern slope of
THE ONION.

It is carried from the villages of Papantla, Taspan, Misantla, &c. to Vera Cruz, under the name of Zarzoparilla, there introduced into the European market. The roots are dried all the year long, dried in the sun, and then tied in bundles. This species yields Vera Cruz sarsaparilla.

*MILAX SYPHILITICA*, Willd.—Stem round, strong, with two to eight prickles at the knots. Tendril long, attached to the stipules. Leaves oblong-lanceolate, three-nerved, coriaceous, smooth, and shining.—Humboldt and Bonpland discovered it at Granada, on the river Cassiquiare, between Mandavala and Francisco Solano. Von Martius found it in the Brazilian states of Para and Rio Negra. It yields Brazilian sarsaparilla.

*MILAX SARSAPARILLA*, Linn. D.—Stem prickly, somewhat quadrate. Leaves ovate-lanceolate, cuspidate, almost five-nerved, a glaucescent *Wildenow*.—It is a native of Virginia, and other states of the American union. There is no evidence that it is of any of the sarsaparilla of the shops. Yet Th. Martius ascribes the Vera Cruz variety, which, he says, comes under the name of American sarsaparilla, to it.

**Description.**—The roots of the preceding, and perhaps of other s, constitute the Sarsaparilla or Sarza of the shops. These roots, made up in bundles, formed either of the spirally folded (sarsaparilla rotunda), as in the Jamaica and Lima varieties, unfolded parallel roots (sarsaparilla longa), as in the Brazilian variety. Attached to the roots are, in some varieties (as the Lima and Vera Cruz kinds), portions of the rhizome and aerial stem; these parts, before cutting, add the chump. On the aerial stem are the aculei or prickles.

The roots are usually several feet long, about the thickness of a goose quill, wrinkled more or less longitudinally, with root-fibres outer or less abundance attached to them. Their colour varies, or more or less red or brown, frequently with a grayish tint. More or less care in drying, time of year when collected, soil, and other circumstances, doubtless modify the colour. The taste of the root is mucilaginous, and slightly acrid. The acridity is only perceived after chewing the root for a few minutes. The odour is what earthy.

The radix or runners are composed of two parts, the cortex and medullary tissue. (See figs. 182 and 183.) The cortex consists of—1st, cuticle or epidermis; 2dly, a layer of elongated cellular tissue, which shall call the subcorticular tissue; 3dly, a layer of hexagonal cellular tissue. The last-mentioned layer is red in Jamaica sarsaparilla; but in the Hondurans it is thick, white, and amylaceous. The medullary tissue consists of—1st, a ring of elongated cellular

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*Linn.**, iv. 576, quoted from Lindley’s *Fl. Med.*


*Rosa in Brasilica*, Bd. [ii].
tissue analogous to the subcuticular tissue; 2dly, a woody zone
posed principally of reticulated ducts; 3dly, a central tissue ana-
to medulla or pith, consisting of hexagonal cellular tissue, whi-
quently abounds in starch. The apertures seen in the woody
on a transverse section of the root, are the cut extremities of
In structure, then, sarsaparilla root much resembles an exo-
stem, except that it has no medullary rays. The starch globu-
small, and are frequently united in masses of three or four; w
four, the masses have a tetrahedral form.

Quality.—It is not easy to lay down criteria of the goods
sarsaparilla; for, on the one hand, in the absence of a correct
ledge of the active principle of this root, we have no chemica
on which we can rely; and, on the other hand, the immedia
obvious effects of sarsaparilla are so slight that we are unac
ascertain by experience the relative value of different sampl
the drug trade, Jamaica sarsaparilla is esteemed the best; but t
I do not doubt the correctness of this opinion, I confess I a
acquainted with any accurate comparative experiments on wh
is founded.

The colour of the root is not to be absolutely depended on
roots having a deep orange-red tint are preferred. Taste perh
the best criterion: the more acrid and nauseous the taste, the
is the quality of the root. This test has been much insisted
Dr. Hancock. Many druggists prefer mealy sarsaparilla, th
sarsaparilla whose cortex is brittle and powdery, and which, on
fractured transversely, throws out a white dust. But this qu
which is so obvious in Honduras sarsaparilla, depends on the s
ence of starch; and, instead of being a test of goodness, is to
arded as the reverse. The quantity of extract yielded by a weig
weight of the root has been much depended on by Mr. Battley
Mr. Pope as a test of goodness; both these writers have asserted
superiority of Jamaica sarsaparilla, because it yields a larger qu
of extract. But though a sarsaparilla which yields very little ex
cannot be regarded as good, yet it does not follow, especially i
absence of comparative trials, that a sarsaparilla which yields
most abundant extract is necessarily the best, since the quantity
arise from the presence of mucilage and other inert matters.
beard is another criterion of goodness: the greater the quant
root fibres (technically called beard) the better the sarsaparilla.

1. Jamaica Sarsaparilla, offic.; Red-bearded Sarsaparilla (b
Sarzæ jamaicensis. The roots are folded and made up in bu
(sarsaparilla rotunda) of about a foot or half a yard long, an
or five inches broad. These bundles are neither trimmed nor ch
packed. They consist of long, slender runners, furnished wi
numerous small fibrous rootlets (called the beard). Its co
is brownish, but with an orange-red tint, which distingu

other kinds of sarsaparilla, and has given rise to its name of red sarsaparilla. The cortex is reddish, and when examined by the microscope is found to contain some starch globules. The medullary has frequently a reddish tint. When chewed, Jamaica sarsaparilla tingles the saliva. Its taste is not remarkably mucilaginous, but slightly bitter, and after a few minutes slightly acrimonious. Its decoction is deepened in colour by a solution of iodine; but no blue is perceptible. Its powder is pale reddish brown, and when rubbed with water and tincture of iodine becomes blue, but less intensely so than the powder of the Honduras variety. It yields a larger quantity of extract than the other varieties: its extract is perfectly soluble in cold water. From three pounds of average quality about one pound of extract may be obtained (Hemmell; also Battley); but from the same quantity of root of very fine quality, nearly one pound and a quarter of extract may be procured (Hemmell). 874 grains of the cortical portion of the root yielded 484 grains of extract (Battley). According to Mr. Pope, the cortex yields five times as much as the medullium.

Jamaica sarsaparilla is not the produce of the island whose name it bears, but, as I am informed, of the Mosquito shore on the eastern coast of Honduras and of St. Juan, from whence it is brought to Jamaica by way of Jamaica. Occasionally it is brought from Guiana, and is collected in Materia Medica at Apothecaries’ Hall, London, as a sample of sarsaparilla grown in Jamaica. Its colour is pale cinnamon brown. Internally it is mealy. Jamaica sarsaparilla is prepared from the root of Smilax officinalis. Brazilian Sarsaparilla: Lisbon, Portugal, or Rio Negro Sarsaparilla (Radix Sarsaparilla braziliensis). This is usually exported from Brazil. It is brought over unfolded, tied in cylindrical bundles [sarsaparilla longa] of from three to five feet long, and about a foot in diameter. It is free of chump. It has fewer longitudinal cracks than the Jamaica kind, fewer radicles, especially at one end; reddish-brown colour, and abounds in amylaceous matter, both cortex and pith. Its decoction is much paler coloured than Jamaica variety.

Bourne says it is the produce of Smilax siphilitica, and is gathered the year round. After being dried over a fire, the roots are put in bundles with a flexible stem—called Timbotitica; and to them being worm-eaten, they are preserved in the gables of
the houses, where they are exposed to smoke. Dr. Hancock\(^a\) has denied that the "Rio Negro Sarsa" is the produce of \textit{S. siphilitica} because he found no auxiliary spines on a portion of stem adhering to the roots, and Dr. Lindley\(^b\) has admitted the correctness of this inference. But until we know the extent of stem examined, we are not authorised, I conceive, to adopt Dr. Hancock’s conclusion; for in the same bale of apparently the same kind of sarsaparilla we frequently find portions of stem (not exceeding three or four inches in length), some of which have prickles, others are without them, and there is not the least ground for supposing them to have been procured from different species. Professor Guibourt, who has described a second kind of 	extit{Caracca} sarsaparilla as devoid of prickles, tells me that he has since met with them in other samples of the same kind of sarsaparilla.

3. \textit{Lima Sarsaparilla} (\textit{Radix Sarzes de Lima}). Originally imported from Lima, but is now frequently brought from Valparaiso, as sometimes from Costa Rica. I know of one importation of 99,900 lbs. from the latter place. It has a close resemblance to Jamaica sarsaparilla, for which I am told it is extensively sold, but it yields a smaller quantity of extract. It is imported folded (\textit{sarsaparilla rotunda}) in bundles of about three feet long, and nine inches in diameter, with the attached chump contained in the interior of the bundle. Its colour is brown or greyish brown. Occasionally a few roots are found in the bale of good Lima sarsaparilla, which, as well as their rhizome and stem, are light clay-coloured. The stems are square and prickly; the prickles are few and small, except in the clay-coloured variety. It is probably the produce of \textit{Similax officinalis}.

Occasionally a knobby root, (rhizome ?) like the \textit{radix Chine}, with a round stem, and long, smooth, wiry, brown root-fibres, is found in a bale of Lima sarsaparilla. A transverse section of the stem presents, to the naked eye, a structure somewhat similar to that of the common cane. I have received the same root (under the name of \textit{Salsepareille-Squine de Macaraibo}) from Professor Guibourt, who found it in Caraccas sarsaparilla.

4. \textit{Honduras Sarsaparilla; Mealy Sarsaparilla} (\textit{Radix Sarzes et Honduras}). Is imported from Belize and other parts of the Bay of Honduras. The roots are folded and formed into bundles (\textit{sarsaparilla rotunda}), two or three feet long, in the interior of which are found roots of inferior quality, stones, clumps of wood, &c. The roots or runners are furnished with a few rootlets. The colour is dirty or greyish brown. The cortex consists of a thin epidermis, within which is a thick, white, amylaceous layer, which gives to this variety its remarkable mealy appearance when broken. This cortical portion readily cracks transversely, and shells off, leaving the medulla, which is thinner than in the Jamaica kind. The taste of the root is amylaceous, and ultimately somewhat acrid. Its decoction become.

\(^b\) \textit{Fl. Medica}, p. 597.
blue by the addition of a solution of iodine. Its powder is
red, and when rubbed with water and tincture of iodine,
becomes intensely bluish black. From five
pounds of the root of fine quality about one
pound of extract may be produced (Hennell).
A sample, examined by Mr. Battley, yielded
six and a half ounces of extract from three
pounds of root, which is about ten and a
half ounces from five pounds: 874 grains
of the cortical portion of the root yielded
230 grains of extract (Battley). In one
operation, in the laboratory of a friend of
mine, 170 lbs. of root yielded 45 lbs. of ex-
tract. According to Mr. Pope, the cortex
yields twice as much extract as the medi-
tullium.

5. Vera Cruz Sarsaparilla (Radix Sarzæ
de Vera-Cruz). This is occasionally im-
ported from Vera Cruz, but is seldom met
with in the drug-market. The roots are
unfolded (sarsparilla longa) and have the
chump attached. They are thin, tough, of
a light greyish-brown colour, and devoid of
starch in the cortex. Mr. Pope terms this
"lean, dark, and fibrous." The roots or runners give off
rootlets. It yields a deep-coloured decoction, which is
ed by a solution of iodine.

Cruz sarsaparilla is the produce of Smilax medica.

received from Professor Guibourt the following kinds of
illa :

*sceas Sarsaparilla, Guib.* Of this there are two kinds, both of which
ions of the rhizome and aerial stem attached to them. One kind (la pre-
r) occasionally presents spines on the aerial stem. The other (la seconde
mes from Macaraibo (Maracaibo?) Professor Guibourt tells me he
out three years ago, a bale of this second kind, one half of which was
of the root above referred to, which he calls Salsepareille-Squine de
and which he thinks ought rather to be regarded as a China root
r.) than a sarsaparilla.

is sarsaparilla has considerable resemblance to the Lima sarsaparilla of
ommerce.

sceas Sarsaparilla, Guib. (M.S.) "The tuberosities possess a yellow colour-
ple, and the stems are rather spongy than ligneous." This kind also ap-
e to be closely allied to, if not identical with, Lima sarsaparilla.

*ilisian, called Portugal, Sarsaparilla, Guib.* Accompanying this is a
the stem of some monocotyledonous plant (Timbotitica) used in tying
bundles. The sample sent me by Professor Guibourt has some re-
to what I have above called Vera Cruz sarsaparilla; but the quantity
ll to draw any accurate conclusion from it.

* Hist. des Drag. t. ii. p. 577.
* Hist. des Drag. t. i. p. 578.
4. *Brazilian Sarsaparilla en Souches*, Guib. (MS.) This I think, is identical with our Vera Cruz sarsaparilla. "I thought at first," says Professor Guibert, "that it came from the Brazils, because it appeared to me identical with the species which constitutes the sarsaparilla called *Tampico Sarsaparilla*.

5. *Mexican*, called *Honduras, Sarsaparilla*, Guib. This is not the Honduras sarsaparilla of English druggists. Its colour is paler and yellower than that of the species just described, and when broken, it gives off a white dust, in consequence of being deficient in the white amylaceous layer which is so abundant in the Honduras variety of our commerce.

The sarsaparilla which Guibert (MS.) regards as the washed Honduras (*Salseparelle Honduras lavée?* Guib.), appears to me to be a distinct species.

6. *Jamaica Sarsaparilla*, Guib. This is not Jamaica sarsaparilla of English druggists. It appears to me to be very similar to the *Salseparelle Honduras*, as described by Guib. Both kinds have a roseate amylaceous cortex.


**Composition.** — Sarsaparilla was analyzed by Cannobio's Pfaffmann; by Batka; and by Thuneuf.

<table>
<thead>
<tr>
<th>Cannobio's Analysis</th>
<th>Pfaff's Analysis</th>
<th>Batka's Analysis</th>
<th>Thuneuf's Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ritter acrid resin</td>
<td>2.8</td>
<td>Balsamic resin</td>
<td>2.6</td>
</tr>
<tr>
<td>Gummy extractive 5%</td>
<td>2.5</td>
<td>Acrid extractive</td>
<td>3.9</td>
</tr>
<tr>
<td>Extractive similar</td>
<td>to cinchona</td>
<td></td>
<td>3.7</td>
</tr>
<tr>
<td>Common extractive 94%</td>
<td>Woody fibre</td>
<td>2.2</td>
<td>7.5</td>
</tr>
<tr>
<td>Gummy extractive 14%</td>
<td>Starch</td>
<td>trace</td>
<td>5.7</td>
</tr>
<tr>
<td>Starch</td>
<td>Woody fibre</td>
<td>3.0</td>
<td>7.0</td>
</tr>
<tr>
<td>Moisture</td>
<td>Loss</td>
<td>3.0</td>
<td>9.9</td>
</tr>
</tbody>
</table>

Sarsaparilla [Vera Cruz] 100% 100%

1. A crystalline matter (paratannic acid)
2. A colouring crystalline matter
3. An essential oil
4. Gum
5. Bassorin
6. Starch
7. Albumen
8. Extractiform matter
9. Gluton and glutine
10. Fibrous and cellular tissue
11. Lactic acid
12. Acetic acid
13. Salts, namely, chlorides of calcium, potassium, and magnesium, carbonate of lime, oxide of iron, and alumina.

**Sarsaparilla.**

1. Oil of Sarsaparilla. — Berzelius states that 100 lbs. of the root yield 1 gallon of volatile oil; but there must be some error in this statement.

The following experiments were made by a friend, a manufacturing chemist, who gave me the products for examination. 140 lbs. of Jamaica sarsaparilla were distilled, by steam heat, at twice, with 220 gallons of water. 50 gallons of milky liquor were obtained, which were again submitted to distillation until 100 gallons had passed over. 20 lbs. of common salt were added to the distillate, and heat being applied, 3 gallons were drawn over. The liquor was allowed to stand until the solution of carbonate of ammonia, and contained a few drops of a

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7. *Ibid. xx. 689, 1836.*
SARSAPARILLA.

which was heavier than water, was soluble in rectified spirit, and had the acid taste of sarsaparilla. 100 lbs. of Jamaica sarsaparilla were distilled 100 gallons of water. The distilled liquor was acid, and formed a precipitate with solutions of acetate of lead. It was re-distilled; the liquor at passed over was not ammoniacal, but towards the end of the process so.

SMILACIN.—Discovered in 1824 by Palotta, who termed it pariglin. Folchi, the same time, also procured it, and gave it the name of *smilacin*. If, in 1831, called it *saleeparin*. In 1833, Batka announced that the active principle of this root was an acid, which he termed *paralnic acid*. Lastly, in 1855, Poggiale showed the identity of these different substances.

Procured by decolorizing a concentrated hot alcoholic tincture of sarsaparilla with charcoal. The tincture deposits, on cooling, impure smilacin, may be purified by repeated solution and crystallization. Soubiran, after being more economical process.

It is been frequently asserted, that the active principle of sarsaparilla resides in the cortical portion only of the root; but Poggiale asserts that the medulla is not inert.

Smilacin is a white, crystallizable, odourless, and, in the anhydrous state, tasteless substance; very slightly soluble in cold water, more so in boiling and depositing from the latter by cooling. Its solution has the bitter taste of sarsaparilla, and froths on agitation. It is soluble in alcohol, and oils. It does not combine with acids to form salts. Strong sulphuric acid turns it red, then violet, and lastly yellow. It dissolves in cold and pure nitric acid; the solution becomes red and afterwards gelatinous, when it is soluble in strong nitric acid; if the solution be heated, nitrous vapors; and by evaporation a solid residuum is obtained, which is soluble in water, from which it precipitates in white flocks, as the liquid cools.

Smilacin is closely allied to, if it be not identical with, saponin. Now, as the readily converted into an acid (esculic acid), so probably is the former; perhaps, the paralnic acid of Batka may not be absolutely identical with it, but bear the same relation to it that esculic acid does to saponin.

Smilacin has the following composition:

<table>
<thead>
<tr>
<th>Poggiale (Mean of 13 analyses)</th>
<th>Henry</th>
<th>Petersen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon</td>
<td>62.53</td>
<td>62.50</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>8.92</td>
<td>9.76</td>
</tr>
<tr>
<td>Oxygen</td>
<td>28.06</td>
<td>27.74</td>
</tr>
</tbody>
</table>

Anhydrous Smilacin 100.00 100.00 [Pariiina] 100.00

Poggiale gives the following formula for its atomic constitution, C8 H7 O3; L. Henry assumes C9 H9 O4, and Petersen C9 H8 O4. As no definite and of smilacin has been obtained, these formulæ are of little value. Things that hydrated [crystallized] smilacin contains 8.56 water.

Wierer gave it to nine syphilitic patients. In doses of six grains the stoically supported it; but nine grains caused weight at the stomach and bowels. It appeared to relieve the patients’ symptoms, and, in one case, seemed to act a cure. According to Palotta, pariglin, in doses of from two to thirteen grains, acts as a debilitant, reducing the circulation, sometimes producing colic of the esophagus, and exciting nausea and diaphoresis. He thinks it useful in chronic rheumatism, skin diseases, &c.

STARCH.—The large quantity of starch found in Honduras sarsaparilla render this variety nutritious. In the Jamaica and Vera Cruz varieties the starch is very small.

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1. *Journ. de Pharm. x. 543.*
3. *Note. Traité de Pharm. ii. 165.*
4. *Journ. de Pharm. xx. 665.*
4. Resin and Extractive.—These principles require further examination. On them probably depends a part, at least, of the medicinal properties of sarsaparilla.

Chemical Characteristics.—A decoction of sarsaparilla froth greatly when shaken. It scarcely, if at all, reddens litmus. Diacetate of lead, and protoponitrate of mercury, cause precipitates. Alkaline deposits the colour of the decoction. Solution of iodine forms a copious precipitate (iodide of starch) in the decoction of both Honduras and Lisbon sarsaparilla. Sesquichloride of iron slightly deepens a decoction (in different degrees in different specimens), and in some cases causes a flocculent precipitate, which subsides slowly. A strong decoction of Honduras sarsaparilla forms a copious precipitate (starch) on the addition of alcohol.

Commerce.—The following are the quantities of sarsaparilla (which duty (sixpence per lb.) was paid for the last six years):

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1832</td>
<td>129,413 lbs.</td>
</tr>
<tr>
<td>1833</td>
<td>135,140</td>
</tr>
<tr>
<td>1834</td>
<td>138,668</td>
</tr>
<tr>
<td>1835</td>
<td>121,914</td>
</tr>
<tr>
<td>1836</td>
<td>117,522 lbs.</td>
</tr>
<tr>
<td>1837</td>
<td>101,298 lbs.</td>
</tr>
<tr>
<td>1838</td>
<td>71</td>
</tr>
<tr>
<td>1839</td>
<td>14</td>
</tr>
<tr>
<td>1840</td>
<td>14</td>
</tr>
<tr>
<td>1841</td>
<td>16,110 lbs.</td>
</tr>
</tbody>
</table>

The countries from which sarsaparilla was imported in 1831 are thus stated in a parliamentary return:

<table>
<thead>
<tr>
<th>Country</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portugal</td>
<td>107</td>
</tr>
<tr>
<td>Italy and the Italian</td>
<td>71</td>
</tr>
<tr>
<td>Indies</td>
<td>45,063</td>
</tr>
<tr>
<td>United States of America</td>
<td>5,078</td>
</tr>
<tr>
<td>Mexico</td>
<td>21,973</td>
</tr>
<tr>
<td>Guatemala</td>
<td>11,141</td>
</tr>
<tr>
<td>Brazil</td>
<td>17,464</td>
</tr>
<tr>
<td>Peru</td>
<td>107,410</td>
</tr>
<tr>
<td>Total Import</td>
<td>176,654</td>
</tr>
</tbody>
</table>

Retained for home consumption | 107,410

Physiological Effects. a. On Vegetables.—Not ascertained.

b. On Animals.—Not ascertained.

γ. On Man.—Imperfectly determined; no experiments have been made to ascertain its physiological effects.

To the taste, sarsaparilla is slightly acid, and somewhat nauseous. Diaphoresis is by far the most common effect of its internal use. When the skin is kept cool, diuresis is not unusual. But in estimating the diaphoretic or diuretic power of sarsaparilla, we must take into consideration the amount of liquid in which the medicine is usually taken, and the other medicines which are frequently joined with it: for in many instances the diaphoresis or diuresis is referable rather to these than to sarsaparilla.

In several cases I have given the powder of this root in very large doses, in order to ascertain its effects. Nausea, vomiting, and temporary loss of appetite, were alone observed.

Dr. Hancock says, that on one patient, an African, an infusion of four ounces of Rio Negro sarsa acted as a narcotic, producing nausea, great prostration of strength, torpor, and unwillingness...
SARSAPARILLA.

2. The pulse was scarcely altered, unless it were a little re-
sil. Though the effects here stated agree, to a certain extent, 
those ascribed to smilacin, they cannot be regarded as the ordi-
exts of this root.

some conditions of system, especially those of a cachectic kind, 
pularilla acts as a powerful and valuable alterative tonic. Its 
ined use is often attended with improvement of appetite and 
ition, augmentation of strength, increase of flesh, the production 
alfy tone of mind, and the palliation, or, in some cases, 
plete disappearance, of various morbid symptoms—as eruptions, 
sions, pains of a rheumatic character, &c. Sarsaparilla differs 
eral respects from the bitter vegetable tonics. Though it is 
devoid of, yet it does not, as they do, abound in a bitter prin-
. It is not adapted for the cure of intermittents, or of simple 
itly. But its best effects are seen in those depraved conditions 
ystem which the public, and even some medical men, ascribe to 
xistence of a morbid poison, or to a deranged condition of the 
hence it is frequently denominated a purifier of the blood. 
ese who do not adopt the pathological notion here referred to, call 
alterative.

ose varieties of sarsaparilla which abound in starch (as the 
ras kind) possess demulcent and nutritive properties.

es.—By many practitioners sarsaparilla is considered to possess 
edia properties; by others it is regarded as a medicine of 
efficacy. Considering that more than 100,000 lbs. of it are 
illy consumed in this country, the number of those who enter-
ter he latter opinion cannot be small. It has been justly remarked 
Lawrence, that physicians have no confidence in it, and 
s a great deal. I think that this fact is readily explained by 
reumstance, that physicians are much less frequently called in 
scribe for those forms of disease, in the treatment of which, 
se have found sarsaparilla so efficacious.

y practitioners have doubted or denied its remedial activity on 
, it must be admitted, are very plausible grounds; viz. that the 
possesses very little taste and no smell; that by the ordinary 
 of using it, it produces very slight, if any, obvious effects on 
imal economy; and that it has failed in their hands to relieve 
ese diseases in which others have asserted they found it effectual.

are, therefore, disposed to refer any improvement of a patient’s 
under the long-continued use of sarsaparilla, either to na-
changes in the constitution, or to the influence of the remedial 
with which the sarsaparilla was conjoined. But I would 
, that hitherto no experiments have been made to ascertain 
effects the long-continued employment of sarsaparilla may give 
 in the system of a healthy man, and we are not warranted in 
ing that none would result because none are observable from 
ployment of a few doses. Moreover, it is to be remembered

that some of our most powerful poisons prove the most efficacious remedies, when given in such small doses that they excite no obvious effect on the system than the removal of morbid symptoms. Witness the beneficial influence of the minute doses of arsenic acid in lepra. Furthermore, no one has ascribed to sarsaparilla the power of a specific, and its warmest advocates admit its occasional failure. But so often has it been found, that various diseases, which had resisted all other tried remedial means, and were gradually decaying, became stationary, and afterwards subsided, under the influence of sarsaparilla, that a large majority of British surgeons, including the most eminent of the present day, have been compelled to acknowledge its therapeutic power.

As no obvious relationship exists between its known physiological effects and its apparent therapeutic agency, an argument has been raised against its medicinal activity, on the ground that we cannot explain its methodus medendi; but, for the same reason, we may refuse to admit the power of cinchona to cure ague. Mr. Lawrence justly observes, that, although we cannot point out the manner in which a remedy "operates, we are not, on that account, to withhold our confidence in its power. It is enough for us, in medical science, to know that certain effects take place. In point of fact, we are many cases unable to distinguish the modus operandi of medicines, the manner in which their influence is produced." The most probable explanation of the agency of alterative medicines is that offered by Müller, and which I have before had occasion to notice (p. 102). It assumes that these remedies cause changes in the nutritive fluids (the chyle and blood), and thereby produce slight chemical alterations in organs morbidly changed in composition, by which the existing affinities are annull'd, new ones induced, and the vital principle enabled to effect the further restoration and cure. This hypothesis may be used to explain the remedial influence of sarsaparilla.

Sarsaparilla has been found especially serviceable in the following maladies:

1. In invertebrate venereal disease.—It is beneficial principally when the malady is of long continuance, and the constitution is enfeebled and emaciated, either by the repeated attacks of the disease, or by the use of mercury. In such cases it is, as Sir William Fordyce* directly observed, "the great restorer of appetite, flesh, colour, strength, and vigour." When the disease resists, or is aggravated by the use of mercury, sarsaparilla evinces its most salutary powers. It is given to relieve venereal pains of a rheumatic character; to remove venereal eruptions; to promote the healing of ulcers of the throat; and assist in the cure when the bones are affected. In recent chancres, it is of little use; nor does it appear to possess the least power of preventing secondary symptoms. We cannot ascribe to it a

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* Physiology, vol. i. pp. 59 and 363.
with enlarged glands, it will be for the most part advisable to
be use of mercury. In such I have seen the alkalis most
able. When extreme debility is present, the bitter tonics and
acid are often added to sarsaparilla with benefit.

Chronic Rheumatism
Sarsaparilla is often advantageously con-
with powerful sudorifics and anodynes (as opium or hyoscy-
especially when any suspicion exists as to the venereal origin
disease.

Obstinate Skin Diseases
Benefit is frequently obtained by the
Sarsaparilla. Its employment is not confined to cutaneous
of one particular elementary form, since it is given with
fect in papular, vesicular, pustular, and tubercular skin
of a chronic kind, when they occur in enfeebled and ema-
constitutions. Though, in these cases, its value principally
on its tonic and alterative effects, its diaphoretic operation is
couraged by the use of diluents, warm clothing, &c.

Cachectic Conditions of the System Generally
Sarsaparilla may
3, often with the best effects, and never with any ill conse-
save that of occasionally producing slight nausea. Indeed,
the great advantages of sarsaparilla over many other altera-
tonics, is, that although it may fail in doing good, it never
harm beyond that of now and then causing slight disorder
ch. In chronic abscesses, attended with profuse discharge,
of the bones, obstinate ulcers, chronic pulmonary affections
ried with great wasting of the body, enlarged glands, and
other maladies connected with a depraved state of the system,
illa is often a very useful medicine.

Nistration.—Sarsaparilla is administered in substance, and
form of infusion, decoction, extract, and syrup.
iodine. I have been informed that some druggists employ, in the preparation of the powder, the roots from which the extract has been prepared. This fraud may be detected by the powder being also devoid of taste, macerating it in water, and carefully comparing the infusion with one prepared from an unadulterated sample.

2. INFUSUM SARSAPARILLÆ COMPOSITUM, D. Compound Infusion of Sarsaparilla.—(Sarsaparilla root previously cleansed with cold water and sliced, 5j.; Lime Water, Oj. [wine measure]. Macerated twelve hours in a covered vessel, with occasional agitation, and strain.—According to Mr. Battley,* lime water is not so good a solvent for the constituents of sarsaparilla root as distilled water: for 874 grains of root lost only 140 grains by maceration in lime water; whereas the same quantity of root lost 175 grains in distilled water. The dose of his infusion is from $\frac{1}{3}$ v. to $\frac{5}{3}$ v. two or three times a day.

3. DECOCTUM SARZÆ, L. E. Decoction of Sarsaparilla.—(Sarza, sliced [in chips, E.]; and cleansed with cold water, D.]; 3v. [iv. D.]; Boiling water, Oiv. [wine measure,] Macerate for four hours, in a vessel lightly covered, near the fire, to take out and bruise the sarsaparilla. When bruised return it to liquor, and again macerate in the same manner for two hours; afterwards boil down to two pints, and strain.)—An objection has been taken to this, as well as to all preparations of sarsaparilla made by boiling, that the heat employed volatilizes or decomposes the actinic principle of the root. "An infusion of sarsaparilla," says Soubeiran, "which is odoriferous and sapid, loses both its odour and taste by being for a few minutes: these changes speak but little in favour of a decoction. On the other hand, it is known that the fibrous parts of vegetables always give less soluble matters to water, when treated by decoction; and if it be added, that sarsaparilla is completely exhausted by hot water, I cannot see what advantages the decoction can possess over preparations made by other methods." With denying the injurious effects of long boiling, and, therefore, the superiority of preparations made without it, I cannot admit that either a decoction or extract of sarsaparilla is inert. No objection, however, exists to the substitution of an infusion for a decoction. But it is advisable to employ a somewhat larger quantity of the root, and to have it crushed before macerating it. The proportions of root to water, in the above preparation, are such that one ounce of the decoction contains the extractive of one drachm only of the root. Here the extract or syrup is usually conjoined. An infusion or decoction of Jamaica sarsaparilla produces little or no blue colour with tincture of iodine: whereas the corresponding preparations of Honduras sarsaparilla (the kind usually met with, cut in small split lengths, in shops) becomes bluish black on the addition of a solution of iodine. The dose of Decoction Sarzæ is $\frac{1}{3}$ v. to $\frac{5}{3}$ v. three or four times daily.

† Noue. Traité de Pharm. t. ii. p. 468.
SARSAPARILLA.

SARZÆ COMPOSITUM, L. E. Decoctum Sarsaparillae; Compound Decoction of Sarsaparilla.—(Decoction a, boiling hot, Oiv. [*wine measure, D.]; Sassafras, sed; Guaiacum-wood shavings; Liquorice-root, bruised, D.); Mezereon [bark of the root], 3ij. [3ss. E.] Boil an hour, and strain.)—This preparation is an imitated celebrated Lisbon Diet Drink. The objections made to illition in preparing the simple decoction, apply equally to preparation. The additions are for the most part: the guaiacum-wood is useless, water not being able to esin. The volatile oil contained in the sassafras-wood is volatilized by the boiling. The mezereum, an active agent, in small quantity, that it can confer but little medicinal liquorice is employed merely to communicate flavour. In the present formula would be to omit the guaiacum, the quantity of sarsaparilla and mezereum, to substitute r decoction, and to add oil of sassafras. The dose of preparation is from f3iv. to f3vi. three or four times a day. The extract is usually conjoined with it. During its use d be kept warm.

SARZÆ, L. E. Syrupus Sarsaparillae, D.; Syrup of—(Sarza, sliced, 3xv. [lb. D.]; Boiling Water, Cong.); Sugar, 3xv. Macerate the sarsaparilla in the sixty-four hours; then boil down to four pints, and strain ile hot; afterwards add the sugar, and evaporate to a essence.)—Simonis* has successfully prepared the syrup tion method.

To be a very unnecessary preparation; for as Dr. n" justly observes, “it can be much better and more d by rubbing up a few grains of the extract with some . It is, however, frequently prescribed as an adjunct to

Prepared with Jamaica sarsaparilla it is not liable to ts flavour is somewhat agreeable, being very analogous st Indian molasses. Mr. Brande* says, that the above f sufficient strength to render it an effective form of sar- l that it ought to be of such strength that one ounce is t of the simple decoction: of this f3ss. or f3vi. may be hree times a day, diluted with about two parts of water. f solution of potassa sometimes prevents its disagree- stomach.

of Sarsaparilla of the United States Pharmacopoeia is present the famous French Sirop de Cuisinier. It is proof spirit, which extracts the acid principle of theaking up the inert fecula; and the tincture being evapo- id of the alcohol, is made into syrup. By this means ned boiling is avoided. As the editors of the United

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* Journ. de Pharm. xx. 110.
* Lond. Disp. 9th ed.
* Dict. of Med. Med.
States Dispensatory speak most confidently of the remedial value this preparation, I subjoin the formula for its preparation, taken from the American Pharmacopoeia:

Syrup of Sarsaparilla, U. S.—"Sarsaparilla, bruised, lb. ij.; Guainacum raspased, 2ij.; Red Roses; Senna; Liquorice root, bruised, each, 3ij.; Oil of Sassafras; Oil of Anise, each, 3ij.; Oil of Partridge-pearl [Quaethicis procera] an astringent aromatic] 3ij.; Sugar, lb. viij.; Diluted Alcohol, Ox. [wine measure: "Macerate the Sarsaparilla, Guainacum wood, Roses, Senna, and Liquorice in the diluted Alcohol for fourteen days; then express and filter through a Evaporate the tincture, by means of a water-bath, to four pints and a half; add the Sugar, and dissolve it, so as to form a syrup. With this, when cold, the Oils previously triturated with a small quantity of syrup." The dose is 13s. (equivalent to somewhat less than 3ij. of the root), taken three or four a day.

6. EXTRACTUM SARZÆ, L. Extractum Sarsaparilla, D. Estrich of Sarsaparilla. (Sarsaparilla, sliced, lb. iiss. [lb. j. D.]; Boil [distilled, L.] Water, Cong. ij. [Cong. j. wine-measure, D.] Macerate for twenty-four hours, then boil down to a gallon [four pints, 1 and strain the liquor while hot; lastly, evaporate to a proper consistence. Dose 5ss. to 3ij.

7. EXTRACTUM SARZÆ FLUIDUM. E. Extractum Sarsaparilla. fluid., D. Fluid Extract of Sarsaparilla officinalis.—Sarsaparilla, sliced chips, E.] lb. j.; [Boiling, E.] Water, Oij. [Oij. wine measure, E.] Let them boil together for an hour, and pour off the liquor; then twelve pints of water, and repeat the boiling and pouring off. By strongly the liquor from the remaining material, set aside the mix liquors that the fæces may subside; then evaporate the mixture continually boiling down to thirty ounces, and two ounces of rectified spirit. D. "Digest the root for two hours in four pints of the water, take it out, bruise it, replace it in the water, and boil for two hours, filter and squeeze out the liquid; boil the residuum in the remaining two pints of water, and filter and squeeze out this liquor also; evaporate the united liquors to the consistence of thin syrup; add, when the product is cool, as much rectified spirit as will make in all six fluid ounces. Filter.—This fluid extract may be aromatized at will with various volatile oils or warm aromatics." E.)

Jamaica sarsaparilla should be used in the preparation of this extract. Honduras and other inferior kinds of sarsaparilla are to be avoided. The chumps so frequently used by pharmaceutical chemists should be rejected. The small root fibres, commonly called the beard, of Jamaica sarsaparilla, are to be preferred, as containing starch and woody fibre, and a large quantity of the cortical layer. I am informed that they yield a much greater quantity of extract than the runners. Steam heat must be employed to effect the evaporation of the decoction, and the temperature employed should little if at all exceed 212° F. When the concentrated decoction (especially of the Honduras kind) is allowed to cool, as at night, a kind of ferment is readily set, and gas is copiously evolved. The fluid extract is to be preferred to the ordinary more consistent preparation. The quantity of extract obtained from different kinds of sarsaparilla has already noticed. For further information on this point I must refer...
rather on theoretical than practical considerations. I have used it, and believe that when properly prepared from sarsaparilla, it is a most valuable and efficient remedy; and many quantity of it which is consumed by the profession (including some of the most eminent of its members), is at many others entertain a similar opinion of it. It is given of from half a drachm to two or three drachms three or four days. It should be rubbed down with water, and flavoured of of an tincture of orange-peel, or by some volatile oil (as the oil of allspice, lemon, or cinnamon). Alkalis render its flavour it disagreeable, though they frequently increase greatly its power.

TRACTUM SARZAR COMPOSITUM. Compound Extract of Sarsaparilla in any Pharmacopoeia, though kept in the shops. It is mixing, with extract of sarsaparilla, an extract prepared by a decoction of mezereon bark, liquorice root, and guaiacwoods, and a small quantity of oil of sassafras. This prepara used as a convenient substitute for the compound of sarsaparilla. The dose of it, and the mode of exhibiting the same as of the simple extract. Three quarters of an' the compound extract are equal to a pint of the compound n.

OTHER MEDICINAL SMILACEAE.

CHINA Root of the shops (Radix Chinensis orientalis) is the produce of sign (Linn.), and is said to come from the province of Oan, in China. in large, ligneous, knotty pieces, of from three to eight inches long, inch or two thick. Externally it has a grayish-brown colour, and inch light flesh or yellowish-white colour. It is inodorous, and has a
The American China root (Radix Chinae Americana) is brought from and is said to be the produce of Smilax Pseudo-China.

2. Smilax Aspera is used in the south of Europe as a substitute for sarsaparilla; but the substance sold in London under that name is from India, and is the produce of Hemidesmus indicus, and will be described hereafter.

Order XIV.—IRIDACEÆ, Lindl.—The Cornflag Tulipa, L. Juss.

Essential Characters.—Calyx and corolla superior, confounded, either partially cohering, or entirely separate, sometimes irregular, the petals being sometimes very short. Stamens three, arising from the base of the sepals; filaments distinct or connate; anthers bursting externally, long, fixed by their base, two-celled. Ovary three-celled, cells many-seeded; ovules one; stigma three, often petaloid, sometimes two-lipped. Capsule three-valved, with a loculicidal dehiscence. Seeds attached to the inner surface of the cell, sometimes to a central column, becoming loose; albumen either fleshy or densely fleshy; embryo enclosed within it.—Herbaceous plants, seldom under-shrubs, usually smooth; the hairs, if any, simple. Roots fibrous or scurfy. Leaves equitant, distichous in most genera. Inflorescence terminal, in spikes, corymbs, or panicles, or crowded. Bracts spathaceous, partial ones often scarious; the sepals occasionally rather herbaceous.

Properties.—The underground stems and roots usually abound in fine mucilage; but these nutritive substances are generally combined with an astringent principle, which excludes their employment as articles of food. E.g. Morea edulis, M. sibiricum, Gladiolus edulis, and a species of Tigridia have been used as esculent substances. The rhizomes of several species (as I. pseud-acorus, I. germanica, I. sibirica, and I. versicolor) are remarkable, especially in the fresh state, for their acidity, in consequence of which they have been used as purgatives, dialogues, or erethics, or for famous medicinal purposes. The colour and the odour of the saffron are to be regarded as the petaloid qualities of the stigmas of Crocus. The effects of the drug on the nervous system are regarded by De Candolle as similar to those of ipecacuanha and similar flowers.

Crocus Sativus, Allioni, L. E. D.—The Saffron Crocus

Sex. Syst. Triandria, Monogynia.

(Stigmatic exsiccatum, L. Stigmata, E. D.)

History.—Saffron is mentioned in the Old Testament. It is said that, because of the Crocus (κρόκος), Hippocrates employed saffron in cases of uterus and other maladies. The word Saffron (safrān, Asafir) is of Arabic origin.

Botany.—Gen. Char.—Perianth [coloured], with a slender limb, three to five, three times as long as the limb; limb six-partite, equal, erect. [Sepals three, inserted into the tube; anthers sagittate.] Stigma slender, thick, convoluted, generally crested. Capsule under ground, or borne on a short peduncle from the root, which peduncle elongates during the decoction of the flowers, and the capsules appear above ground. (Hooker, with some additions.)
—Stigma protruded, drooping, in three deep linear dividers.
roundish; its brownish coats reticulated, separating super-
distinct parallel fibres. Leaves linear, with a white central
surrounded at their base with long membranous sheaths.
light purple, shorter than the leaves, with a two-valved mem-
bathe. Anthers pale yellow. Stigmas deep orange-coloured.
A native of Asia Minor. Now naturalized in England,
pain, and some other European countries. It is a doubtful
be Eastern parts of Europe. It is said to have been intro-
o Spain by the Arabs. It flowers in September and

ATION.—The flowers are gathered in the morning, and the
with part of the style, plucked out for use, the rest of the
ng thrown away. The stigmata are then dried on paper,
means of portable kilns over which a hair-cloth is stretched,
rom by the sun. When dried between paper under the
f a thick board and weights, the saffron is formed into cakes
ger to be met with.

TION.—Two kinds of saffron are kept in the shops, viz., hay
and cake saffron.

Saffron. (Crocus in fano.)—Consists of the stigmas with
le style, which have been very carefully dried. They are
inch to an inch and a half long, thin, brownish red; the
 tion (stigma) is expanded, notched at the extremity; the
 tion, which constitutes part of the style, is called by Th.
Finnicelle: it is narrow, capillary, yellowish. The
penetrating, aromatic, and, of large quantities, narcotic.
 is bitter, somewhat aromatic. When chewed, saffron
mouth and the saliva yellow. I find by careful exami-
at one grain of good commercial saffron contains the
styles of nine flowers; hence 4,320 flowers are required
ounce of saffron.

Saffron (Crocus anglicus) is no longer found in commerce.
Saffron (Crocus hispanicus) constitutes the best saffron of the shops.
ed from Gibraltar (principally), Cadiz, Denia, Santander, and
on the concurrent accounts of pharmacologists it would appear that
ish saffron was spoiled by being dipped in oil to preserve it. But
imported from Spain has not been subjected to this treatment.
Spanish, as well as any other kind of saffron, is oiled by the dealers
appearance of freshness, but this fraud is, I suspect, usually per-
his country.
Saffron (Crocus gallicus) is usually considered in commerce to be of
lity. It is the produce of Gaillac (Gaillais saffron) and Orleans, e
prehend part of the departments of Seine-et-Marne and Eure-et-Loire.
hole of the department of Loiret. The saffron of Angouleme is the
ch saffron is shipped for England at Calais, Boulogne, and Havre.
the preceding, several other varieties of saffron are mentioned by

* Dillon, Travels through Spain.
* Douglas, Phil. Trans. for 1725.
* Pharmacopoeia.
* Guibourt, Histoire des Drog. ii. 291.
pharmacologists, but they are not distinguished in English commerce, and I am unacquainted with them. Such are Austrian, Bavarian, Oriental, and the Sicilian saffron (C. austricius, bavarius, orientalis, and sicilienis) mentioned by Murra Geiger, and others. From the Customs report it appears that saffron is occasionally imported from Hamburg, Antwerp, Genoa, Naples, and Bombay. I am ignorant of its place of growth and quality. According to Gissone, Crocus odorus yields Sicilian saffron. Dioscorides considered the saffron Corycys (a mountain of Cilicia, in Asia Minor, now called Curco) to be the best and that of Lycia and Olympus to be of second quality; while Cyrenaic saffron, as well as that from Centuripinus (Centorbe) in Sicily, he declares to be the worst.

2. Cake Saffron. (Crocus in Placentia).—Formerly this was compressed hay saffron. But the cakes now met with in the inferior shops are composed of Safflower (Carthamus tinctorius) and gum water, made into a paste, and rolled out on a tin plate with a rolling pin into oval cakes of 11 inches long, 10 inches broad, and about one-tenth of an inch thick. These are dried on brown paper in a stove. They are shining, and of a brownish red colour. I can detect neither saffron nor marigolds (Calendula officinalis) in them. Their price is about one-fifth of that of good hay saffron. I am informed, by a maker of cake saffron, that there is only another person besides himself by whom this substance is made in London.

Adulteration.—The only adulteration practised on saffron, which has come under my notice, is that of mixing safflower with saffron, and this I have met with once only. It must have been effectual abroad, since the druggist who pointed it out to me bought the saffron in bond, and did not discover the fraud until the saffron had been in his warehouse some time. The pieces of safflower readily escape the eye of a superficial observer. If rubbed with the moistened finger on paper, they produce a slightly yellow mark only, while genuine saffron causes a very intense orange-yellow stain. The fraud may also be detected by infusing the suspected saffron in hot water when the florets of the safflower may be readily distinguished from the stigmas which constitute saffron.

I am informed that old and dry saffron is sometimes oiled, to give it the appearance of freshness. The stain communicated to the fingers, or white blotting paper, when such saffron is compressed, readily detects the fraud.

Fibres of smoked beef and the petals of the officinal marigold are said to have been used for adulterating saffron. But there is no fear of these adulterations now. Such frauds would be readily detected by the eye, especially when the suspected saffron has been infused in hot water.

Commerce.—The quantity of saffron on which duty (of 1s. per lb.) is paid is about 5,000 lbs. per annum. The places from which it is imported have been already mentioned. It is brought over in canvas barrels, and boxes.

\* Händl. de Pharm.
\* Trade List for 1837-8.
\* Lindley, Flora Medica.
\* Lib. l. cap. xxx.
THE SAFFRON CROCUS.

COMPOSITION.—Saffron was analyzed in 1811 by Vogel and Bouillon-Lagrange, and in 1818 by Aschoff.

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<tr>
<th></th>
<th>Vogel and Bouillon-Lagrange</th>
<th>Aschoff</th>
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<tbody>
<tr>
<td>Volatile oil</td>
<td>7.3</td>
<td>1.4</td>
</tr>
<tr>
<td>Wax</td>
<td>0.5</td>
<td>4.0</td>
</tr>
<tr>
<td>Polychroite</td>
<td>62.0</td>
<td>22.0</td>
</tr>
<tr>
<td>Gum</td>
<td>6.3</td>
<td>10.4</td>
</tr>
<tr>
<td>Soluble albumen</td>
<td>0.3</td>
<td>0.0</td>
</tr>
<tr>
<td>Woody fibre</td>
<td>10.0</td>
<td>19.0</td>
</tr>
<tr>
<td>Water</td>
<td>10.0</td>
<td>10.0</td>
</tr>
<tr>
<td>Balsamic matter, soluble in ether and alcohol</td>
<td>—</td>
<td>2.0</td>
</tr>
<tr>
<td>Saffron</td>
<td>100.0</td>
<td>98.8</td>
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</table>

VOLATILE OIL OF SAFFRON. (Olenum Croci.)—Obtained by distilling saffron with water. It is yellow, heavier than water, has a burning, acrid, somewhat bitter taste, and is slightly soluble in water. By keeping, it becomes white, and lighter than water. On it depends probably the medicinal properties of saffron.

COLOURING MATTER: Polychroite (so called from πολύς, many, and χρώμα, or, in consequence of its being susceptible of numerous changes of colour). By digesting the aqueous extract of saffron in alcohol, and evaporating the mixture to dryness, a substance is obtained which Bouillon-Lagrange and Vogel called polychroite, but which Henry has separated into volatile oil and a bitter substance (polychroite properly so called). Pure polychroite is pulverulent, scarlet-red, odourless, slightly soluble in cold water, much more so in hot water, readily soluble in alcohol and oils (both fixed and volatile), slightly soluble in ether. Sulphuric acid turns it blue, then lilac. Nitric acid makes it green, the colour is very fugitive. The hypochlorites destroy the yellow colour of solution of polychroite.

CHEMICAL CHARACTERISTICS.—An aqueous infusion of saffron does not indicate the addition of starch on the addition of a solution of iodine. The hypochlorites bleach it. Sulphuric and nitric acids act on it as polychroite above mentioned. Acetate of lead causes no precipitate. By evaporation, the infusion yields an extract from which alcohol removes the colouring matter and leaves a gummy substance.

PHYSIOLOGICAL EFFECTS.—Formerly saffron was considered to be medicinal, aromatic, narcotic, and emmenagogue. Some have accused it of causing laughing delirium; others have ascribed to its use at mental dejection; and several have declared that they have seen incoherent uterine hemorrhage produced by it, which, in the case referred to by Riverius, is said to have terminated fatally. But modern experience has proved that most of these statements are erroneous. Alexander swallowed four scruples of saffron without perceiving any obvious effects therefrom; and Wibmer took a drachm without observing the slightest effect.

—Bull. de Pharm., iv. 89.
—Journ. de Pharm., vii. 207.
By the long-continued use of saffron, the colouring particles become absorbed, and tinge the secretions, especially the urine and perspiration. In some instances the foetus in utero has been stained by it. The failure of Alexander to detect the yellow tinge in his secretions arose probably from the short time he had been using the medicine. Mr. Gibson gave a considerable quantity of saffron to a pigeon, which thereby had its faeces tinged, yet no perceptible alteration was produced in its bones.

Headache, prostration of strength, apoplexy, and even death, have been ascribed to the inhalation of the vapour arising from large quantities of saffron; and perhaps correctly so, for it is well known that the odours of other plants (as the rose, the pink, &c.) act on some individuals as narcotic poisons.

Uses.—Saffron is employed, especially on the continent, as a flavouring and colouring ingredient in various culinary preparations, articles of confectionery, liqueurs, &c. It was used by the ancients as a perfume as well as a seasoning agent.

In the modern practice of medicine it is used chiefly as a colouring ingredient. It is a popular remedy for assisting the eruption of exanthematous diseases; on the same principle, I suppose, that bird fanciers give it to birds when moulting. It was at one time esteemed as an antispasmodic in asthma, hysteria, and cramp of the stomach, and was formerly used as an emmenagogue, and to promote uterine contractions and the lochial discharge. Lastly, it has been employed as a stimulant to the nervous system in hypochondriasis.

Administration.—It may be given in doses of from ten grains to half a drachm in the form of powder or pill. It is popularly used in the form of infusion, or tea.

1. SYRUPUS CROCI, L. E.—(Saffron, 5x.; Boiling Water, Oij.; Sugar, lb. iij. Macerate the saffron in the water for twelve hours, in a vessel lightly covered, then strain the liquor, and add the sugar to it);—it is employed principally for its colour.

2. TINCTURA CROCI, E.; Tincture of Saffron (Saffron chopped fine, 3ij.; Proof Spirit, Oij. This tincture is to be prepared like tincture of cinchona, either by percolation or by digestion, the former method being the more convenient and expeditious.)—Used as a colouring liquid. It is also employed as a stimulant and emmenagogue in doses of from fij. to fjij.

As a colouring and flavouring ingredient, saffron is a constituent of several other preparations.

OTHER MEDICINAL IRIDACEÆ.

The ORRIS Root of the shops is the rhizome of Iris florentina, and perhaps also of I. pallida. It is imported in casks from Leghorn and Trieste.
According to Vogel*, of volatile oil, acid resin, astringent extractive, gum, and ligneous matter. Raspail† detected in it crystals of oxalate of lime. It is an acrid substance, and in full doses causes vomiting and purging, principally used on account of its violet odour. Thus hair and tooth powders, ointments, &c. are frequently scented with it. During teething, infants are permitted to rub their gums with, and bite, the rhizome; but the practice is objectionable, since it is not unfrequently attended with irritation of throat and disorder of the stomach and bowels. Furthermore, the danger of the rhizome getting into the esophagus or trachea is not to be overlooked. In cases of this kind is recorded*. Powdered oorris root is sometimes used in medicine.

FIG. XV.—TACCACEÆ, Lindley.—THE TACCA TRIBE.

Tacca, Prest.

is a small and imperfectly-known order of plants. It contains the species T. pinnatifida, Forst., a native of the Molucca Isles and of the Islands of the Pacific Ocean. The roots are tuberose, fleshy, intensely bitter and acrid. By cultivation they become larger and somewhat milder. They yield a highly nutritious fecula. At Tahiti (Otaheite) this fecula is procured by washing the tubers, scraping off their outer skin, and then reducing them to a pulp by friction on a kind of mill made by winding coarse twine (formed of the coconut fibre) regularly round a board. The pulp is washed with sea-water through a sieve, made of the fibrous web which protects the young frond of the coconut palm. The strained liquor is received in a wooden trough in which the fecula is deposited; and the supernatant liquor being poured off, the sediment is formed into balls, which are dried in the sun for 12 or 24 hours, then broken and reduced to powder, which is spread out in the sun to dry.

Taccaceae.

* Arrow-root, sometimes called Otaheite Salep§ is imported into London, and as "Arrow-root prepared by the natives at the Missionary stations in the South Sea Islands." It is a white amylaceous powder, slightly musty in odour. Examined by the microscope I find it to consist of small particles which appear circular, mullar-shaped, or polyhedral. Some of the mullar-shaped particles are slightly narrowed at the base. Moreover the base of the mullar, instead of being flat, appears to me to be hollowed out. The hilum is small and circular; it cracks in a linear or stellate manner. The rings are few and not very distinct. This fecula is used as a substitute for the West Indian Arrow-root.

In some parts of the world cakes are made of the meal of the tubers of T. pinnatifida, "which are the taccya yung of some navigators: they form an article of diet in China and Cochlin China, as also in Travancore," where, according to Lindley, they attain a large size, and are eaten by the natives with some acid sauce their acrimony.

* Journ. de Pharm., i., 481.
† Chalm. Organ.
§ Krauss, Heftablitellen, c. 3. 537.
§ Rowntree's Dictionary, art. Tacca pinnatifida.
ORDER XVI.—AMARYLLIDACEÆ, Lindl.—THE NARCI
TRIBE.

None of the plants of this order are employed in England as articles of Materia Medica. Yet many of them act powerfully on the system, and Hottentots to poison their arrow heads. The principal property of the order is acridity, which is produced principally by the bulbs, several of which (as the *Pancratium maritimum* and *Hemanthus coccineus*) are employed in medicine. The leaves and flowers of *Narcissus lutea* and *Narcissus poeticus* are enumerated among the simples of the French *Codex*. In doses of 20 or 30 grains they sometimes cause vomiting. They have been employed in spasmodic affections, (as hooping-cough), in diarrhoea and in aches. Several other species of *Narcissus*, *N. Tazetta* and *N. odoratus*, also possess emetic properties. *Narcissus Tazetta* is supposed by Dr. St. George to be the Narcissus of the poets.

ORDER XVII.—MUSACEÆ, Agardh.—THE BANANA TRIBE.

None of the Musaceæ are used in medicine. But the importance of the Musaceæ, *Musa sapientum* and *Musa Paradisiaca*, as species of food, is so great to the inhabitants of some tropical countries, that it would be inexcusable not to notice them.

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* De Candolle, *Essai sur les Propriétés Méd.*
* See also Humboldt’s *Pt. Equinoct*. 
THE ARROW-ROOT TRIBE.

bussingult * analysed the fruit of Musa paradisiaca, and found in it sugar, m, malic, gallic, and pectic acids, albumen, and lignin.

ORDER XVIII.—MARANTACEÆ, Lindl.—THE ARROW-ROOT TRIBE.

ENTIAL CHARACTERS.—Calyx superior, of three sepals, short. Corolla tubular, irregular, with the segments in two whorls; the outer three-parted, carly equal, the inner very irregular; one of the lateral segments usually showed, and formed differently from the rest; sometimes by abortion fewer an three. Stamens three, petaloid, distinct, of which one of the laterals and an intermediate one are either barren or abortive, and the other lateral one stile. Filament petaloid, either entire or two-lobed, one of the lobes bearing an anther on its edge. Anther one-celled, opening longitudinally. Pollen and (papillose in Canna coccinea, smooth in Calathea zebrina). Ovary see-celled; ovules solitary and erect, or numerous and attached to the axis of each cell; style petaloid or swollen; stigma either the mere demided apex the style, or hollow, hooded, and incurved. Fruit capsular, as in Scitamineae. Seeds round, without aril; albumen hard, somewhat floury; embryo raight, naked, its radical lying against the hilum (Lindley).

PERTIES.—The rhizomes abound in fecula.

MARANTÆA ARUNDINÁCEA, Linn. L. E.—THE WEST INDIAN ARROW-ROOT.

Sex. Syst. Monandria, Monogyonia.

(Arrow-root : Rhiizomatis fecula. Lond.—Fecula of the tubers: Arrow-root. Ed.)

HISTORY.—This plant was brought from the island of Dominica, Colonel James Walker, to Barbadoes, and there planted. From ace it was sent to Jamaica. That gentleman observed that the five Indians used the root against the poison of their arrows, by shing and applying it to the poisoned wounds x.

BOTANY. GEN. CHAR.—Corolla unequil, one of the inner segments the form of a lip. Stamens petaloid, with half an anther on its ge. Style hooded, adhering to the edge of a sterile filament. sty three-celled, smooth: ovules solitary. Fruit even, dry, one-celled. Cauliscent plants with fleshy rhizomata or tubers. Stems inched, often dichotomous. Inflorescence terminal, panicked, nined, with glumaceous, deciduous bracts. (Lindley).

SP. CHAR.—Culm branched, herbaceous. Leaves ovate, lanceolate, newhat hairy underneath. Peduncles two-flowered (Willdenow). Rhizome white, articolated, tuberous, placed horizontally in the th, and giving origin to several tuberous jointed stoles (stolones erose), similar to itself, but covered with scales. Those stoles are m more than a foot long, and curved, so that the points rise out of earth and become new plants (Nees and Ebermaier). Stem two

* Journ. de Pharm. xxii. 385.
* Sloane's Jamaica, vol. i. p. 254.
to three feet high. *Leaves* alternate, with long, leafy, hairy, sheathed *Petioles*. *Flowers* white and small.

The *Morinda indica*, Tussac's, *E.,* is characterized by its leaves being smoothened on both sides, and by its seeds; those of *M. arundinacea* being violet. But, after a careful examination, Wickström declares that Tussac's plant is identical with the *M. arundinacea*, Linné.

**Hab.**—West Indies. In Jamaica it is cultivated in gardens and provision grounds.

**Extraction of the Fecula.**—The roots (tubers), when a year old, are dug up, well washed in water, and then beaten in large, deep wooden mortars to a pulp. This is thrown into a large tub of cold water. The whole is then well stirred, and the fibrous parts are separated out by the hands and thrown away. The milky liquor being passed through a hair-sieve, or coarse cloth, is suffered to settle, and the clear water is drawn off. At the bottom of the vessel is a white mass, which is again mixed with clean water and drained; lastly, the mass is dried on sheets in the sun, and is pure starch.

**Properties.**—The *fecula* (*ficus marantae*) called in the English *West Indian arrow-root*, is white, odourless, and tasteless. It is in the form either of a light opaque white powder or of small pulverulent masses. When pressed between the fingers it feels firm, and, when rubbed, produces a slight crackling noise. When examined by the microscope it is found to consist of oblong, somewhat ovate-oblong, irregularly-shaped convex particles, with star-like mammillary processes occasionally projecting from some portion of the surface, and which are especially evident after the particles have been in water for a few minutes. The rays are very fine. The hilum is circular, and cracks in a linear or stellar manner.

*Portland Arrow-root* is obtained from *Arum maculatum* (see p. 331).

*East India Arrow-root* is the fecula procured from *Curcuma angustifolia*, and will be described hereafter (see p. 1021).

*Brazilian Arrow-root* is the fecula of *Jatropha Manihot*. It is described by M. Guibourt *vide* under the name of *Moussache* or *Cipa*, and will be noticed hereafter (vide *Euphorbiaceae*).

*Tahiti Arrow-root* is the fecula of *Tacea pinnatifida*, and has already been noticed (p. 1009).

**Composition.**—Arrow-root has been analyzed by Dr. Prout *vide* by Payen, who obtained the following results:—

---

4. Krapf has depicted the grains of the fecula of *Convoluta Batatas* for arrow-root (see p. 331).
The formula which agrees with Prout's third analysis is $C_6\,H_5\,O_5$.

Prout regards arrow-root as a low variety of starch analogous to sugar of honey; while wheat-starch he considers to be a perfect form of starch, analogous to sugar-candy (see pp. 8).

ARROW-ROOT is brought, in tin cases and in barrels, from the West India Islands (Jamaica, Barbadoes, Antigua, Dominica, Bermuda, St. Kitt's, Grenada, Demerara, and Sierra Leone). The quality of arrow-root on which duty (of one shilling per cwt.) is levied, during the last six years, is as follows:

<table>
<thead>
<tr>
<th>Cotts.</th>
<th>In 1833</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,581</td>
<td>2,380</td>
</tr>
</tbody>
</table>

**Other Dietetical Marantaceae.**

An imperfectly determined species of *Canna*, E. — Within the last four years considerable quantities of a feculent substance, called *Moils*, or *Starch of the Canna coccinea*, have been imported. It is said to be prepared, by a tedious and troublesome process, from St. Kitt's, and is said to be prepared, by a tedious and troublesome process.
some process, from the root (rhizome) of the above-mentioned plant. It ever, very doubtful whether it be really produced by the Canna cocineanists, and the Edinburgh College, therefore, properly declares Tous les to be the "secula of the root of an imperfectly determined species of Canna."

When examined by the microscope, particles are found to be different from those of all other common species by their great size, which exceeds that of every other particle which I have hitherto examined. Their shape is oval or oblong, usually more or less ovate. The hilum is usually placed at the extremity; very rarely it is double. Rings are numerous, regular, either somewhat unequally so. The and the body of the particle quently cracked. Examined naked eye, tous les sois has a satiny appearance, and is dead white or opaque, and is presented by some amylaceous substances. It approaches more nearly to potato starch than to any other with which I am acquainted; but its particles are larger than those of the potato. Like the other amylaceous substances, it forms a valuable and nutritious food for the invalid.

ORDER XIX.—ZINGIBERACEAE, Lindl.—THE GINGER TRIBE.

Drynariidae, Vent.—Scitamineae, R. Brown.

Essential Character.—_Calyx_ superior, tubular, three-lobed, short, tubular, irregular, with six segments in two whorls; the outer three nearly equal, or with the odd segment sometimes differently shaped; if sterile stamens) three-parted, with the intermediate segment (labelleum) than the rest, and often three-lobed, the lateral segments sometimes abortive. _Stamens_ three, distinct, of which the two lateral are abortive, the intermediate one fertile; this placed opposite the labelleum, and from the base of the intermediate segment of the outer series of the _Filament_ not petaloid, often extended beyond the anther in the shape of a lobed or entire appendage. _Anther_ two-celled, opening longitudinally; lobes often embracing the upper part of the style. _Pollen_ globose; _Ovary_ three-celled, sometimes imperfectly so; _ovules_ several, attached to centres in the axis; _style_ filiform; _stigma_ dilated, hollow. _Fruit_ usually botryoidal, many seeded (sometimes by abortion one-celled); occasionally berried (the sepals imbricated generally central, proceeding from the axis of the valves, at least usually separate from the latter, and of a different texture, _Seeds_ roundish or angular, with or without an aril (albumen) at the base near the hilum, _R. Br._); _embryo_ enclosed in a peculiar membrane (vitelium, _R. Br._ Prodr. membranae of the amnia, King's Voyage, 21) with which it does not cohere.—Aromatic, tropical, _oeus_ plants. _Rhizoma_ creeping, often jointed. _Stem_ formed of the bases of the leaves, never branching. _Leaves_ simple, sheathing their often separated from the sheath by a taper neck, and having a single from which very numerous, simple, crowded veins diverge at an acute _Inflorescence_ either a dense spike, or a raceme, or a sort of panicle, term
NARROW-LEAVED GINGER.

1. Flowers arising from among spathaceous membranous bracts, in they usually lie in pairs. (Lindley.)

B'BER OFFICINALE, Roscoe, L. E.—THE NARROW-LEAVED GINGER.

Anemum Zingiber, Linna. D.

Sex. Syst. Monandria, Monogynia.

(Rhizoma, L. E.—Radix, D.)

ORY. — Dioscorides, and Pliny, were acquainted with gin-

ich was called ἐγγυιβεικ by the former, zingiberi and zimpiberi

latter of these authors.

NY. Gen. Char. — Corolla with the outer limb three-parted, one-lipped. Filament lengthened beyond the anther into a incurved beak. Capsule three-celled, three-valved. Seeds us, arillate. — Rhizocarpal plants. Rhizomata tuberosous, arti-

creeping. Stems annual, enclosed in the sheaths of disti-

leaves. Leaves membranous. Spikes cone-shaped, radical or terminal, solitary, consisting of one-flowered imbricated

Blume.

lar. — Leaves sub-sessile, linear-lanceolate, smooth. Spikes cle-

diblong. Bracts acute. Lip three-lobed. (Roxburgh.)

eome biennial. Stems erect and oblique, and invested by the

sheaths of the leaves; generally three or four feet high, and

Leaf-sheaths smooth, crowned with a bifid ligula. Scapes

six to twelve inches high. Spikes the size of a man's thumb.

k purple. Ovary ovate, with numerous ovules; style filiform;

funnel-shaped, ciliate. Capsule roundish, unilocular. Seeds

us; mostly abortive.

—Cultivated in the tropical regions of Asia and America.

soil doubtful, probably Asia.

uration. — The young shoots put forth every spring by the

al rhizome, are used in the manufacture of the delicious pre-

ginger (conditum zingiberis). These shoots are carefully

washed, scalded, scraped, peeled, and then preserved in jars.

ginger-root of the shops is prepared when the stalks are wholly

ed, and the rhizomes are about a year old. In Jamaica this is

in January or February. The rhizomes are dug up, picked, de-

and scalded. Black ginger is dried, after being scalded, or

being scraped; white ginger, on the contrary, requires to be

ly peeled. Both kinds are dried in the sun in the open air.

ferences between the black and white ginger of the shops

Lib. ii. cap. 190.

Erat. Nat. lib. xii.


Roxburrgh, op. cit., and Dr. P. Browne, History of Jamaica.

Dr. P. Browne, ibid.
are ascribed, by Dr. P. Browne and others, to different methods merely of curing the rhizomes; but this is scarcely sufficient to count for them, and we cannot help suspecting the existence of a difference in the plants themselves. That this really exists is proved by the statement of Rumphius, that there are two ginger plants, white and the red. Moreover, Dr. Wright says, that two sorts cultivated in Jamaica; viz. the white and the black; and he adds, “black ginger has the most numerous and largest roots.”

When brought to this country, the common kinds of ginger bleached by washing them in a solution of chloride of lime, sometimes by exposing them to the fumes of burning sulphur. This treatment, though it may improve the colour, must injure the acid and aromatic qualities of the rhizomes.

Description.—The rhizome, called in commerce ginger-root (Zingiberis), occurs in flattish, branched or lobed, palmate pieces called races, which do not exceed four inches in length. Those scraped pieces are covered with a wrinkled epidermis; but those which have been scraped (as the Jamaica variety) are without. Ginger breaks moderately short, but the fractured surface presents numerous projecting pointed fibres, imbedded in a mealy or farinaceous tissue. A transverse section of the larger and more puffed pieces shows an outer, horny, resinous-looking zone, surrounding a farinaceous centre, which has a speckled appearance from the extremities of the fibres and ducts. The taste of ginger is aromatic, hot, and biting; the odour of a fresh broken piece is peculiarly pungent, though aromatic. In commerce several varieties, distinguished by their colour and place of growth, are met with.

A. White Ginger. (Radix Zingiberis albi.)—The finest is brought from Jamaica. Jamaica white ginger occurs in large rounder, and thinner races than the other kinds. Its epidermis has been carefully removed by scraping. Externally it is yellowish white or very pale buff; internally it has a pale buff tint; inferior kinds have an ash tint externally. It forms a beautiful bright yellow, somewhat buffy, powder. A great part of the Jamaican ginger of the shops has been washed in whiting and water (white-washed, as it is technically termed), under the pretence of preserving it from insects. The dark-coloured kinds have been bleached with chloride of lime. Barbadoes ginger is in short, flatter races of a darker colour, and covered with a corrugated epidermis. African ginger is in smallish races, which have been partially scraped, and are pale-coloured. East India ginger unscraped; its races are dark ash-coloured externally, and are larger than those of the African ginger. Tellicherry ginger is in large planer races with a remarkable reddish tint externally.

B. Black Ginger. (Radix Zingiberis nigri.)—Jamaica black ginger is not frequently found in the shops. The Malabar dark gi

---

scraped short pieces, which have a horned appearance internally, are of a dirty brown colour both internally and externally.

IMMERCHE.—Ginger is imported in bags, weighing about a hundred weight each. The quantities on which the duty of eleven shillings cwt. has been paid for the last six years, are as follows:

<table>
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<tbody>
<tr>
<td>cwt.</td>
<td>cwt.</td>
<td>cwt.</td>
<td>cwt.</td>
<td>cwt.</td>
<td>cwt.</td>
</tr>
<tr>
<td>6,456</td>
<td>667</td>
<td>7,123</td>
<td>1838</td>
<td>9,303</td>
<td>1,911</td>
</tr>
<tr>
<td>4,426</td>
<td>1,013</td>
<td>5,439</td>
<td>1839</td>
<td>6,857</td>
<td>818</td>
</tr>
<tr>
<td>9,157</td>
<td>520</td>
<td>12,677</td>
<td>1840</td>
<td>7,528</td>
<td>1,551</td>
</tr>
</tbody>
</table>

IMPOSITION.—Ginger was analyzed in 1817 by Bucholz, and by Morin.

Bucholz's Analysis.

- Glue volatile oil: 1.35
- Acrid resin: 3.60
- Vinegar soluble in alcohol: 0.65
- Extractive, insoluble: 10.50
- Colchicum: 12.05
- Analogous to bassorin: 19.75
- Ashes extracted by potash (alumina): 20.00
- Extract: 8.30
- Silica: 8.00
- Resin insoluble in ether and oils: 11.90

Morin's Analysis.

- Volatile oil: 1.92
- Acrid soft resin: 3.20
- Resin insoluble in ether and oils: 2.90
- Gum: 10.50
- Starch: 12.05
- Woody fibre: 19.75
- Vegeto-animal matter: 20.00
- Osmazone: 8.30
- Acetic acid, acetate of potash, and sulphur: 8.00
- The ashes contained carbonate and sulphate of potash, chlorid of potassium, phosphate of lime, alumina, silica, and oxides of iron and manganese: 11.90

Ginger.

VOLATILE OIL OF GINGER.—Is pale yellow, very fluid, lighter than water, that of ginger, taste at first mild, afterwards acid and hot.

SWEET RESIN.—Obtained by digesting the alcoholic extract of ginger first, then in ether, and evaporating the ethereal tincture. The residual is yellowish brown, soft, combustible, has an aromatic odour, and a balsamic taste. Is readily soluble in alcohol, ether, oil of turpentine, and almond oil.

PHYSIOLOGICAL EFFECTS.—Ginger is one of the acrid aromatics; these effects have been already noticed (vide p. 181). Its dust applied to the mucous membrane of the nostrils acts as an irritant, provokes sneezing. The rhizome chewed is a powerful salicylate. The powder mixed with hot water, and applied to the skin, causes a sensation of intense heat and tingling. When taken by the stomach it operates as a stimulant; first, to the alimentary canal, secondly, to the body generally; but especially to the organs of respiration. Like some other spices (the peppers for instance), acts as an excitant to the genital organs. Furthermore, it is said to increase the energy of the cerebral functions. It is less acrid than pepper.

Uses.—Its principal consumption is as a condiment. Its powers in this way are considerable, while its flavour is by no means disagreeable, and its acridity scarcely sufficient to enable it, when taken with food, to irritate or inflame.

2. Journ. de Pharm. ix. 255.
As a stomachic and internal stimulant it serves several important purposes. In enfeebled and relaxed habits, especially of old gouty individuals, it promotes digestion, and relieves flatulence, spasm of the stomach and bowels. It checks or prevents nausea and griping, which are apt to be produced by some drastic purgatives. It covers the nauseous flavour of many medicines, and communicates cordial and carminative qualities to tonic and other agents. As a stimulant it is sometimes chewed to relieve toothache, headache, and paralytic affections of the tongue. As a counter-irritant I have frequently known a ginger plaster (prepared by mixing together powdered ginger and boiling water, and spreading the paste on paper or cloth) relieve violent headache when applied to the forehead.

Administration.—Powdered ginger may be administered, in doses ranging from ten grains to a scruple or more, in the form of pills. Mashed into a paste with hot water it may be applied as a plaster, as already mentioned.

Preserved ginger (conditum zingiberis), though commonly used as a sweetmeat, may be taken with advantage as a medicine to stimulate the stomach. Ginger lozenges, ginger pearls (commonly termed ginger seeds) and ginger pipe, are useful articles of confection frequently of benefit in dyspepsia accompanied with flatulence.

1. Tinctura Zingiberis, L. E. D. Tincture of Ginger.—(Ginger sliced, [in coarse powder, E. D.] 3ijss.; Rectified Spirit, 0ij. [measure, D.] Macerate for fourteen [seven, D.] days, and strain. L. D. “Proceed by percolation or digestion, as directed for tincture of cinchona.” E.)—A very valuable carminative. It is commonly employed as an adjunct to tonic, stimulant, and purge mixtures. Its dose is 3fj. or 5fj. The tincture, made with proof spirit, becomes turbid by keeping in consequence of the mucilage it contains.

Essence of ginger is prepared as a tincture, except that the quantity of rhizome should be increased. Some preparers of it concentrate the tincture by distilling off part of the alcohol.

2. Syrupus Zingiberis, L. E. D. Syrup of Ginger.—(Ginger sliced, [brusied, D.] 3ijss. [3iv. D.]; Boiling water, Qij. [Oij. measure, D.]; Sugar, lb. ijss. [3xxxvij. D.] Macerate the ginger in the water for four hours, and strain; then add the sugar, and disperse it.)—Used for flavouring. It is scarcely strong enough to be of much value. An extemporaneous syrup may be prepared by adding a tincture of ginger to common syrup. The syrupus zingiberis of the United States Pharmacopoeia is made by adding 3fj. of tincture of ginger (prepared with 3viij. of ginger and Oij. wine measure of alcohol) to a gallon of syrup, and evaporating the alcohol by a warm bath.

3. Infusum Zingiberis; Infusion of Ginger; Ginger Tea. It is a very useful domestic remedy, and is prepared by digesting 3ij. to 5iv. of Ginger, in 35vj. of Boiling Water, for two hours. It is flavoured, it is employed as a carminative in flatulence, &c., in 3fl. or 5fl. of one or two table-spoonfuls.

4. Ginger Beer. For the following excellent formula for the
of this popular and agreeable beverage, I am indebted to
ock of Fenchurch Street:—"Take of White Sugar, lb. xx.;
or Lime) juice, sxxvij.; Honey, lb. j.; Ginger bruised,
Vater cong. xvij. Boil the ginger in three gallons of water
hour; then add the sugar, the juice, and the honey, with
inder of the water, and strain through a cloth. When cold,
White of one Egg and f3ss. of Essence of Lemon: after
four days, bottle." This yields a very superior beverage,
which will keep for many months. Lemon juice may be
for sixpence a pint in Butolph Lane, Thames Street. A
the preparation of Ginger Beer Powders has already
(see p. 550).

URCU' MA LON'GA, Linn. L. E. D.—THE LONG-ROOTED
TURMERIC.

Sex. Sper. Monandria, Monogynia.
(Rhizoma, L. E.—Radix, D.)

iv. — Turmeric is probably the Κύπερος Ἰνίκας, (Cyperus
of Dioscorides). Both Dioscorides and Pliny* state that
an Cyperus has the form of ginger, and that, when chewed,
the saliva yellow like saffron. The word Curcuma is de-
Kurkum, the Persian name for saffron†.

v. Gen. Char.—Tube of the Corolla gradually enlarged up-
timb two-lipped, each three-parted. Filament broad. An-
nbent, with two spurs at the base. Style capillary. Cap-
celled. Seeds numerous, arillate.—Stemless plants, with
uberosous roots. Leaves with sheathing petioles, bifarious,
. Scape simple, lateral or central. Spike simple, erect,
ewhat imbricated at the base with bracts or saccate
owers dull yellow, three to five together, surrounded by
'

—Bulbs small, and with the numerous, long, palmate tubers,
of a deep orange yellow. Leaves long-petioled, broad-
of a uniform green (Roxburgh).
uch cultivated about Calcutta, and in all parts of Bengal,
ina and Cochin-China. One acre yields about 2000lbs. of
oot.

PTION.—The tubers, called in the shops turmeric (radix
seo terra merita), are distinguished by their place of growth
a, Bengal, and Java turneries; the first being the best and
able. From their shape they are sometimes divided into
and long. The first (curcuma rotunda) is round, oval, or
ut two inches long, and one inch in diameter, pointed at
marked externally with numerous annular wrinkles. The

---
* Lib. i. cap. iv.
* Blume, op. cit.
second (curcuma longa) is cylindrical, not exceeding the thickness of the little finger; two or three inches long, somewhat contorted, and calculated. Both kinds are greyish-yellow externally, internally or less orange-yellow passing into brown. The fractured surface has a waxy appearance. The odour is aromatic, somewhat analogous to that of ginger, but peculiar: the taste is aromatic. When chewed it turns the saliva yellow. Its powder is orange-yellow. The tubers are frequently worm-eaten.

Composition.—Two analyses of turmeric have been made by John*, and a second by MM. Vogel and Pelletier**.

<table>
<thead>
<tr>
<th>John's Analysis</th>
<th>Vogel and Pelletier's Analysis</th>
</tr>
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<tbody>
<tr>
<td>Yellow volatile oil</td>
<td>Acrid volatile oil.</td>
</tr>
<tr>
<td>Curcumin</td>
<td>Curcumin.</td>
</tr>
<tr>
<td>Yellow extractive</td>
<td>Brown colouring matter.</td>
</tr>
<tr>
<td>Gum</td>
<td>Gum (a little).</td>
</tr>
<tr>
<td>Woody fibre</td>
<td>Starch.</td>
</tr>
<tr>
<td>Water and loss</td>
<td>Woody fibre.</td>
</tr>
<tr>
<td></td>
<td>Chloride of calcium.</td>
</tr>
<tr>
<td>Turmeric</td>
<td>Turmeric.</td>
</tr>
</tbody>
</table>

**Curcumin. Yellow Colouring Matter.—Is obtained, mixed with some volatile oil and chloride of calcium, by digesting the alcoholic extract of turmeric, and evaporating the ethereal tincture to dryness. In the mass, curcumin is brownish-yellow, but when powdered it becomes full yellow. It is tasteless, odourless, almost insoluble in water, but readily soluble in alcohol and ether. These properties shew that it is of a resinous nature. The alkaloids of curcumin are reddish-brown, and readily dissolve it. The alcoholic solution, evaporated to dryness, becomes red. Hydrochloric acid also reddens it. The aqueous solution of curcumin produces coloured precipitates with several salts, as well as of lead and nitrate of silver.

**Chemical Characteristics.—The alkaloids change an infusion of curcumin, or turmeric paper, to reddish-brown. A similar alteration of colour occurs when turmeric paper is exposed to the vapour of hydrochloric acid gas, or is touched with oil of vitriol. If, to this infusion, boric acid be added, and the mixture be evaporated to dryness, an orange-red residue is obtained, whereas, without the boric acid, the residue is yellow. Sulphate of copper causes a yellowish precipitate with an infusion of curcumin. A similar effect is produced by the sesquichloride of iron.

**Physiological Effects.—Are those of a mild aromatic, vide p. 1014. The colouring matter becomes absorbed, and communicates a yellow tint to the urine*. According to Mr. Gibson†, the colouring matter of turmeric is somewhat changed by the digestive organs; for the stools of animals fed with this root were green, whilst either logwood or madder exhibited its respective hues after passing through the intestines.

**Uses.—Employed as a condiment, colouring ingredient, and

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* Gmelin's Handb. d. Chem.
† Journ. de Pharm. i. 236. 1816.
§ Mem. of the Lit. and Phil. Soc. of Manchester, vol. i. Sec. Sec. p. 148.
THE NARROW-LEAVED TURMERIC.

constituent of the well-known curry powder and curry paste, any other articles of Indian cookery. Formerly it had some in hepatic and other visceral diseases, and especially in

As a test it is used to detect the presence of free alkalis,"ange its yellow colour to a reddish-brown. But some acids, al salts, produce the same effect on it.

CUMA; Chara exploratoria flav; Turmeric Paper.— Repaired with white, bibulous, or unsized paper, which is to be covered with, or soaked in, a tincture of turmeric (prepared by one part of bruised Turmeric in six parts of Proof Spirit), and in the air, the access of alkaline and acid fumes being . Mr. Faraday directs it to be prepared with a decoction (prepared by boiling one ounce of the coarsely-powdered tubers in ten or twelve ounces of Water, straining through a cloth, and the fluid to settle for a minute or two). Turmeric paper was as a test for alkalis, which render it reddish or brownish.

CUMA ANGUSTIFO'RIA, Roxburgh.—THE NARROW-LEAVED TURMERIC.

(Pecula tubers. East Indian Arrow-root, Opic.)

This plant was found by H. T. Colebrook, Esq. in the Bengal garden at Calcutta.

Gen. Char.—Vide Curcuma longa.

Bulb oblong, with pale, oblong, pendulous tubers only. Alked, narrow lanceolate. Flowers longer than the bracts.

East Indies: from the banks of the Sona to Nagpore. The tubers sold in the markets of Benares, and by the natives. Grows also in abundance on the Malabar coast, especially at Travanore, large quantities of pecula are from the tubers.

SECTION.—Under the name of East Indian Arrow-root I have commerce two kinds of pecula, both of which are imported utta.

The East Indian Arrow-root.—A fine white powder, readily hable, both by the eye and the touch, from West Indian. To the eye it somewhat resembles a finely-powdered carbonate of soda or Rochelle salt. When pinched or to the fingers, it wants the firmness so characteristic of West Arrow-root, and it does not crepitate to the same extent when tween the fingers.

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1 Chemical Manipulation.
2 Roxburgh, Flora Indica.
3 Roxburgh, op. cit.
4 Ainslie, Med. Indica, i. 19.
Examined by the microscope it is found to consist of ovate, or oblong-ovate, flattened particles, often with a very short neck, or nipple-like projection. On account of their shape, they have but little lateral shading, except when viewed edgewise. The hilum is placed at the narrow extremity; it is circular, very small, and not very distinct. The rings are seen both on the flat surface and on the edges: they are numerous, close, and very fine.

**Particles of White East Indian Arrow-root.**

β. **Pale Buff-coloured East Indian Arrow-root.**—In the form of powder, or of pulverized masses, which are dirty or buffy white. Partial husks, woody fibre, and various impurities, are intermixed.

To the microscope both kinds present the same appearance, the white arrow-root being obtained from the same plant, with unequal degrees of care. However, this is somewhat doubted, as Dr. Roxburgh\(^4\) says that a fuscata, like arrow-root, is procured from several species of Curcuma, (as C. rubescens and C. leucorrhiza; the fuscata of the latter is called Tikor). The particles of East Indian arrow-root are very unequal in size, but on the average are less than those of West Indian arrow-root.

**Composition.**—Not ascertained, but doubtless analogous to the West Indian arrow-root.

**Effects and Uses.**—Analogous to those of the West Indian species. Its commercial value, however, is much below that of the latter.

4. **AMO'MUM CARDAM'O'MUM, Linn. D.—THE CLUSTER OR ROUND CARDAMOM.**

*Fructus Cardamomum rotundum, Offic.*

**History.**—The fruit of this plant is the "*Amomum* of Dioscorides, the Anomi *uva* of Pliny.\(^5\)

**Botany.**  

**Herbaceous perennials,** with articulated creeping rhizomes. *Leaves* in two rows, membranous, with their sheaths split. *Inflorescence* spiked, loosely imbricated, radical (Blume).\(^6\)

**Sp. Char.**—*Leaves* with short petioles, lanceolate. *Spikes* half immersed in the earth, loosely imbricated with villous, lanceolate, one-flowered *bracts*. *Lip,* with the anterior margin, three-lobed. *Crest* three-lobed. (Roxburgh.)

**Hab.**—Sumatra, Java, and other islands eastward to the Bay of Bengal.

**Description.**—The fruit of this plant is the *round cardamom* (Cardamomum rotundum) of the shops. It varies in size from that  

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*Fl. Indica,* vol. i. p. 126.  
*Lib. i. cap. 14.*  
black currant to that of a cherry. It is roundish, or roundish-ovate, with three convex, rounded sides or lobes, more or less striated longitudinally, yellowish or brownish-white, sometimes with a red tint, and when examined by a pocket lens shows the remains of hairs, the greater part of which have been probably rubbed off. The seeds are brown, angular, cuneiform, shrivelled, with an aromatic, camphoraceous flavour. The fruits in their native clusters or spikes (constituting the Amomum racemosum) are rarely met with; a fine sample is in the Sloanian collection of the British Museum.

Composition.—It has not been analysed. Its constituents are probably analogous to those of the Malabar cardamom, (Elettaria Cardamomum.)

Effects and Uses.—Similar to those of the Malabar cardamom. Round cardamom are rarely employed in this country. They are official in the French Codex, and are principally consumed in the northern parts of Europe. The seeds are directed to be used by the Dublin Pharmacopoeia, but I presume those of the Elettaria Cardamomum are meant.


History.—Azfelius\(^1\) refers the seeds called, in the shops, grains of paradise, and which, he says, are the true Malaguetta pepper, to his Amomum Granum Paradisi.\(^1\) Roscoe,\(^2\) on the other hand, asserts positively, that Malaguetta pepper is the produce of his Amomum Melegueta, which he considers to differ from any previously-described plant. I strongly suspect the seeds of at least two species have been confounded in commerce, under the names of grains of paradise, or Malaguetta pepper. Azfelius\(^1\) states that there are or sorts of Malaguetta pepper, viz. Mabooobo, Massa abba, Massa auma, and Tossun, the last being the native and true one; but Sir E. Smith\(^3\) has shown that the two first of these are distinct species; Mabooobo being A. macrosperrnum, Smith, and Massa abba being A. tobilacium, Smith.


Species.—1. A. GRANA-PARADISI, Smith.

Rhizome perennial, woody, creeping horizontally. Stems erect, simple, slender, three feet high, leafy, but destitute of flowers. Leaves numerous, crowded, twined, alternate, a span long and an inch broad, lanceolate, or slightly ovate, a long taper point, entire, smooth, single-ribbed, striated with innumerable fine veins. Their flavour is slightly aromatic, after having been dried 20 or 20.

Post-stalks sheathing, linear, very long, smooth, striated. Flower-stalks terminal, solitary, an inch or two in length, ascending, clothed with numerous, sheathing bracts, all abrupt, ribbed, somewhat hairy and fringed; the
lower ones very short; the upper gradually much larger. Of the parts of the flower nothing could be made out in Sir J. Smith’s specimens. [Aframia declares them to be formed like those of A. escocum, Sims.] *Capsule* an inch or a half long, half an inch in diameter, oblong, bluntly triangular, scarcely over beaked, of a dark reddish-brown, ribbed, coriaceous, rough, with minute deciduous bristly hairs. When broken it is very powerfully aromatic, even after being kept twenty years, with a peculiar pepper-like flavour, rather too strong to be agreeable. *Seeds* numerous, enveloped in membranes formed of the dry pulp, roundish or somewhat angular, of a shining golden brown, minutely nerved or granulated, extremely hot and acid (Smith).—Native of Guinea, also Sierra Leone.


*Stem* erect, six feet high. *Leaves* two-ranked, subessile, narrow-lanceolate, *Scapes* radical, covered at the base with about seven imbricated, ovate, concave, pointed, and somewhat cuspidate bracts. *Calyx* cylindrical, of one leaf, green, spotted with red. *Flowers* cylindrical, expanding in a double border; outer border in three sections, the middle section largest, ovate, the two others linear or opposite; inner lip very large, broad-ovate, crenate, pale-yellow at the base, crimson at the margin. *Filaments* strong, erect, clavate, terminating in the lobes, middle lobe erect and bifid, the other two pointed and recurved; a pair of hornets on the filament, near the base of the lip. *Anther* in two lobes, seated a front of the filament, a little below the apex, bright yellow. *Style* erect, tubular, expanding into a dilated *stigma* or cup, supported at the base by two linear processes, about an inch in length, and one-eighth of an inch in breadth. *Capsule* cylindrical, coriaceous, six inches long, yellow, spotted with orange, supported at the base by the large ovate, concave, cuspidate bracts, and containing columnella or receptacle about four inches long, covered with seeds beautiful arranged, arilled, and imbedded in a tomentose substance. *Seeds* angular, light brown, with a highly aromatic and grateful flavour (Roscoe).—Cultivated in Demerara; probably from Africa.

**Description.**—In the Sloanian Collection of the British Museum are several capsules of Malaguetta pepper, one of which is labelled *Melegetta, a pod from Guinea.* (Fig. 193 is taken from one of these). They are two and a half inches long, and one inch in diameter, ovate or oval-oblong, coriaceous, wrinkled if shrivelled, yellowish-brown. The seeds are identical with those called, in the shop of one of the Guinea grains, or grains of paradise. Are these capsules the fruit of *A. Melegueta*, Roscoe?

In Dr. Burgess’s collection of Materia Medica, in the College of Physicians, is a capsule smaller than the preceding, oval or oval-oblong, somewhat reddish-brown, wrinkled longitudinally. (Fig. 194 is taken from it.) The seeds very close.
AMOMUM MELEGUETA.

... if they be not identical with, the grains of paradise of the ... They have also the same vehemently hot taste. This cap- ... seeds, called in the shops grains of paradise (grana paradisi), ... see grains, are roundish or ovate, frequently bluntly angular, ... mewhat cuneiform; shining golden brown; minutely rough, ... salt warts and wrinkles; internally white. Their taste is ar- ... nd vehemently hot or peppery: when crushed and rubbed be- ... he fingers their odor is feebly aromatic. Their greatest dia- ... rately exceeds 1½ lines. The acrid taste resides in the seed

BERKE.—Grains of paradise are imported in casks, barrels, and ... ms, from the coast of Guinea. The quantities on which duty ... lings per lb.) has been paid during the last six years, is as ... (Trade List):—

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1827</td>
<td>16,500 lbs</td>
</tr>
<tr>
<td>1828</td>
<td>17,124 lbs</td>
</tr>
<tr>
<td>1829</td>
<td>18,324 lbs</td>
</tr>
<tr>
<td>1830</td>
<td>16,109 lbs</td>
</tr>
<tr>
<td>1832</td>
<td>18,086 lbs</td>
</tr>
</tbody>
</table>

"rect or preparation of Guinea grains" is mentioned by ... in his table of Imports, as paying a duty of two shillings ... heavy duty imposed on grains of paradise is intended to act as ... ition of their use.

OSITION.—Grains of paradise were analyzed in 1811 by ... who obtained the following results:—Volatile oil 0.52, ... in 3:40, extractive 1:27, tragacanthin and woody fibre 82:8: ... and loss 12:01].

VOLATILE OIL has a light yellow colour, a camphoraceous smell, and a ... rating taste.

RESIN is brown, soft, odourless, and has an acrid, burning taste.

BIOLOGICAL EFFECTS.—Analogous to those of pepper. A very ... notion prevails that these seeds are highly injurious.

—Rarely employed as an aromatic. Esteemed in Africa as ... wholesome of spices, and generally used by the natives to their food.

Principal consumption is in veterinary medicine, and to give an ... strength to spirits, wine, beer, and vinegar. By 56 Geo. III. ... brewer or dealer in beer shall have in his possession or use ... paradise, under a penalty of £200 for each offence: and no ... shall sell it to a brewer, under a penalty of £500 for each

—*Digested Abridgm. of the Laws of the Customs*, 1819.
—*Trommeroff’s Journ. xx. 81, 2, 1811.
—*Boscoe, op. cit.*
7. AMOMUM ANGUSTIFO'LIUM, Sonnerat.—THE GREATEST OR MADAGASCAR CARDAMOM.

Amomum madagascariense, Lamark.

This species is a native of Madagascar, growing in marshy ground and was first described by Sonnerat. Its fruit is the cardamomum majus of Matthioli, Geoffroy, Smith, and Geiger. In Dr. Burgess’s Collection of Materia Medica at the College of Physicians, there are several fine specimens (from one of which the accompanying figure was taken), made "Cardamomum maximum Matthioli."

The capsule is ovate, pointed, flattened on one side, striated, with a broad, circular umbilicus or scar at the bottom, an area which is elevated, notched, and corrugated margin. Some authors, who have not taken the base of the capsule for its summit, have compared the shape to that of a fig.

The seeds are rather larger than grains of paradise, roundish or somewhat angular, abrupt at the base, olive-brown, with an aromatic flavour analogous to that of the Madagascan cardamom, but totally devoid of the somewhat hot acrid taste of the grains of paradise.

8. AMOMUM CLUSII, Smith.—LONG-SEEDED AMOMUM.

I have received from a druggist a capsule (fig. 196), which agrees with one noticed in the figure of Clusius. Another specimen is described by Sir J. E. Smith. This capsule may be confounded neither with that of the Madagascan cardamom, nor with that of the grains of paradise. It is ovate, pointed, slightly angular, cartilaginous, striated, smooth, yellowish-red [reddish, Smith] brown. The seeds distinguish it from all other species: they are oblong-ovate, inclining to cylindrical, dark-brown, highly polished, as if varnished; with a pale yellowish brown, corrugated, and notched margin surrounding the scar. They are very slightly aromatic.

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* Voyage aux Iles, t. ii. p. 242.
* Comment. in vi. sb. Diosc. Venet. 1583.
* Mat. Med. ii. 365.
* Reeve Cyclop. art. Melgeetia.
* Handb. d. Pharm, Bd. i.
* Krothorum, pp. 37, 38.
GREAT-WINGED AMOMUM

GUM MACBOSPER'MUM, Smith. LARGE-SEEDED GUINEA AMOMUM.


7. This was mistaken by Gartner for Malaguetta pepper. The capsule is ovate, pointed, somewhat striated, about two inches long, and six lines broad, with a corrugated beak. Seeds ovate, or nearly globular, or somewhat oblong, scarcely larger than grains of paradise, smooth, polished, greenish-grey, or lead-coloured, with a strong umbilicated scar at their base, with a whitish or pale-yellow margin; flavour slightly aromatic. A native of Sierra Leone. (Fig. 197 is from a specimen in the Sloanian Collection of the British Museum).

10'UM MAX'ITUM, Roxburgh.—THE GREAT-WINGED AMOMUM.

(Fructus: Java Cardamom, offic.)

v.—This plant was first described by Roxburgh *. That it Java cardamom of commerce I entertain but little doubt; latter agrees precisely with the characters assigned by Rox-Blume b to the fruit of this plant, the seeds of which, the botanists says, "are aromatic, and pass for a sort of c". Moreover, Amomum maximum, being a native of plants for its fruit being called in commerce the Java cardamum, no other plant noticed in the works of Roxburgh and ree precisely in the characters of its fruit with the carda-

*mum medium, Roxburgh, which I at one time d, with some fancied might be the parent plant, disagrees in several respects: size of its fruit, the inequality of its wings, and the qualities of, are the most essential points of disagreement. The fruit of Amo-

icum (Dr. Roxburgh's drawing of which was kindly shewn me by) has no resemblance to the Java cardamom. Lastly, I have exa-

* Afitic Researches, xi. p. 344.
* Enum. Pl. Java.
* Fl. Indica, vol. 1, p. 41. 1832.
men of the latter in the British Museum is erroneously marked A. maxima. The collections of the Linnean Society and the British Museum, and none of them are the Java cardamom.

** BOTANY. **

** Gen. Char. — Vide Anomum Cardamomum. **

** Sp. Char. — Leaves stalked, lanceolate, villous underneath. Oval, even with the earth. Bracts lanceolate. Lip elliptical, of one semilunar lobe. Capsules round, nine-winged. (Roxburgh.) **

The capsule is "...almost globular, size of a gooseberry, three three-valved, ornamented with nine [seven to thirteen, Blume] short, ragged (when old and dry), membranaceous wings. They possess a warm, pungent, aromatic taste, not unlike that of cardamoms, but by no means so grateful" (Roxburgh.) The **Nepal cardamom**, described by Dr. Hamilton, appears to be identical with Java cardamom. Dr. Hamilton says, the plant yielding it species of Anomum, as that genus is defined by Dr. Roxburgh, differs very much from the cardamom of Malabar."

** Hab. — The Malay Islands (Roxburgh); Java (Blume). **

** Culti** in the mountainous parts of Nepal, where it is propagated by cuttings of the root [rhizome]; the plants yield in three years, and after give an annual crop (Hamilton).

** Description. — Greater Java cardamoms (cardamomi major var. vanenses, Th. Martius; Java cardamoms, offic.; Nepal cardamoms, elachi [i.e. country cardamoms] of Hindustan, Hamilton; the elachee [i.e. great cardamoms] of Saharanpore.—the Bengal cardamoms of the Calcutta market, Royle; cardamome, maniguette, Guibourt) are oval or oval-oblong, frequently somewhat ovate, three-valved, from fifteen lines long, and from four to eight lines. Usually flattened on one side, convex on the other; occasionally curved, sometimes imperfectly three-lobed, resembling in their form the pericarp of the cocoy. Their color is dirty greyish-brown. They are coarse, fibrous, aged appearance, are strongly and when soaked in hot water become almost gla and present from nine to thirteen ragged, membranous wings, which occupy the upper half or fourths of the capsule, and are scarcely perceptible in the dried state of the pericarp. By the position of wings, these cardamoms are distinguished from all others of commerce, and hence are called the winged cardamoms. Occasionally the footstalk is attached to the capsule are frequently the fibrous remains of the calyx. It is somewhat larger than grains of paradise, dull, dirty brown, shallow groove on one side, internally white; taste and feebly aromatic. One hundred parts of the fruit consist, ac...
OFFICINAL CARDAMOMUM.

1029

b. Martius', of seventy parts seeds, and thirty parts pericarpial s. They are imported from Calcutta in bags.

Composition.—Analogous probably to that of the Malabar cardamom, except in the quantity of volatile oil which it yields; for ours procured only four scruples of it from a pound of the fruit. Oil obtained was white and thickish.

Facts and Uses.—Java cardamoms are not used here. They are inferior quality, and when brought to this country are usually brought for continental use. In 1839 a quantity of them was at seven-pence per lb.

LETTARIA CARDAMOMUM, Maton.—THE TRUE OR OFFICINAL CARDAMOM.

a Cardamomum, Ranb. L.—Renalmia Cardamomum, Ed.—Amomum Cardamomum, D. 

Sect. Syst. Mosandria, Monogynia.

(Gemina, L. D.—The fruit; Cardamoms, Ed.)

STORY.—A medicine, called Cardamom (Κάρδαμος), is mentioned by Hippocrates, Theophrastus, and Dioscorides, the first of whom employed it in medicine. But it is now scarcely possible to determine what substance they referred to, as their notices of it are imperfect, though I believe it to have been one of the species to which we call cardamoms. Pliny speaks of four kinds of cardamoms, but it is almost impossible to ascertain with any certainty which species he refers to.

TAX. Gen. Char.—The same as that of Amomum, but the tube more or less closed, and the anther naked (Blume).

Char.—Leaves lanceolate, acuminate, pubescent above, silky below. Spikes lax. Scape elongated, horizontal. Lip indistinctly three-lobed (Blume).

Corolla with numerous fleshy fibres. Stems perennial, erect, jointed, enveloped in the spongy sheaths of the leaves; six to nine feet high. Leaves subsessile on their sheaths, six to twelve feet long. Sheaths slightly villous, with a fleshy ligula rising above the mouth. Scapes several (three or four) the base of the stems, flexuose, jointed, branched, one to two cm. Branches or racemes alternate, one from each joint of the suberect, two or three inches long. Bracts solitary, oblong, membranaceous, striated, sheathing, one at each joint of the . Flowers alternate, short-stalked, solitary at each joint of the flower, opening in succession as the racemes lengthen. Calyx-shaped, three-toothed at the mouth, about three-quarters of an inch long, finely striated, permanent. Tube of corolla slender, as long as the calyx; limb double, exterior of three, oblong, concave,
ELY, equal, pale greenish white divisions; inner lip obovate, much larger than the exterior divisions, somewhat curled at the margin; the apex slightly three-lobed, marked chiefly in the centre with violet stripes. Filament short erect: anther double emarginated. Ovary oval, smooth; style slender; stigma funnel-shaped. Fruit oval, somewhat three-sided, size of a small nutmeg, one-celled, three-valved. Seeds many, angular (Roxburgh).

Mountainous part of the coast of Malabar.

Description.—Cardamoms are produced naturally or by cultivation. Between Travancore and Madura they grow without culture, and also at certain places in the hills which form the lower part of the Ghauts in Caduti nanda and other northern districts of Malabar. The cardamoms of the Wynaad, which are esteemed first, are cultivated: the spots chosen for the cardamom farms are generally called Ela-Kandy, and are either level or gently-sloping surfaces, on the higher range of the Ghauts after passing the first declivity for about a month's time.

The quantities of cardamoms brought for sale at Malabar is about 120; or, according to another account, only 100 candies, from the various places.

<table>
<thead>
<tr>
<th>Candies of 120 lbs.</th>
<th>Candies of 100 lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coorg</td>
<td>40</td>
</tr>
<tr>
<td>Wynaad</td>
<td>57</td>
</tr>
<tr>
<td>Tamarakchery</td>
<td>20</td>
</tr>
<tr>
<td>Caduti nanda</td>
<td>3</td>
</tr>
<tr>
<td>Carti nanda</td>
<td>2</td>
</tr>
</tbody>
</table>

The cardamoms of the Wynaad are shorter, fuller of seed, and of better quality, than those of Malabar, and sell for 100 rupees a candy more. Cardamoms of Coorg have fewer fine grains, but they have also few dark or light ones. The cardamoms of Sersi (western part of Malabar) are inferior to those of Coorg.

Description.—The fruit of the Elettaria Cardamomum consists of the small, officinale, Malabar cardamom (cardamoms, El. Cardamonum minus, Clusius, Matthiolus, Bonitus, Geoffroy, Daller, Th. Martius, and Guibourt; cardamomum malabarense).

A ovate-oblong, obtusely triangular capsule, from three to four long, rarely exceeding three lines in breadth; coriaceous, ribbed, or brownish yellow. It contains many, angular, blackish seeds.
OFFICINAL CARDAMOMUM.

Fish brown, rugose seeds (cardamomum, L.; cardamomum excorti-um, Offic.) which are white internally, have a pleasant aromatic
r., and a warm, aromatic, agreeable taste. 100 parts of the
yield 74 parts of seeds and 26 parts of pericarpial coats.

See varieties of Malabar cardamoms are distinguished in com-
viz. shorts, short-long, and long-long.

Fig. 199.

A. SHORTS: Malabar cardamoms properly so called: Petit cardamome (Guib.); ? Wynaad card-
amom (Hamilton); ?? Prima species Eleltari plané rotunda et albicans.*—From three to six
lines long, and from two to three lines broad; more coarsely ribbed, and of a browner colour,
than the other varieties. This is the most
esteemed variety.

B. SHORT-LONGS: ? Secunda species Eleltari oblongior sed eiior (Rheede).—Differs from the
third variety in being somewhat shorter and
less acuminate.

C. LONG-LONGS: Moyen cardamome (Guib.);
?? Tertia species Eleltari vilissima et plané acu-
minata (Rheede).—From seven lines to an inch
long, and from two to three lines broad; elon-
gated, somewhat acuminate. This, as well as
variety, is paler and more finely ribbed than var. a. shorts. The seeds
frequently paler (in some cases resembling those of the Ceylon carda-
and more shrivelled.

POSITION.—The small cardamom was analyzed by Tromms-
dom in 1834. He obtained the following results:—Essential oil
red oil 10.4, a salt of potash (malate ?) combined with a colour-
water 2.5, sorted 3.0, nitrogenous mucilage with phosphate of
8, yellow colouring matter 0.4, and woody fibre 77.3.

VOLATILE OR ESSENTIAL OIL OF CARDAMOM.—Is obtained from the seeds by
g them with water. 501bs. of good short Malabar cardamoms yielded
operation, about 3 viss. of oil for every lb. of fruit. It is colourless,
agreeable odour, and a strong, aromatic, burning taste. Its sp. gr. is
It is very soluble in alcohol, ether, oils (both fixed and volatile),
sic acid. It is insoluble in potash-lye. By keeping, it becomes yellow,
and loses its peculiar taste and smell. It then detonates with iodine, and
re when placed in contact with concentrated nitric acid. On this oil de-
be odour, flavour, and aromatic qualities of the seeds. Its composition is
us to that of oil of turpentine, being C10 H8.

RED OIL OF CARDAMOM.—Is soluble in alcohol, ether, and the oils, both
and volatile. Nitric acid, assisted by heat, reddens it. It has some ana-
castor oil.

BIOLOGICAL EFFECTS.—The effects of cardamoms are those of
agreable and grateful aromatic, devoid of all acridity. (See
sects of the Spices, p. 181.)
USES. — Cardamoms are employed partly on account of the flavour, and partly for their cordial and stimulant properties. They are rarely administered alone, but generally either as adjuvants or rectives of other medicines, especially of stimulants, tonics, and purgatives.

ADMINISTRATION. — Though cardamoms enter into a considerable number of pharmaceutical compounds, only two preparations derive their names from these seeds. They are the following:

1. TINCTURA CARDAMOMI, L. E. Tincture of Cardamom. (Cardamom seeds, bruised, 3ijiss. [3ivss. Ed.]; Proof Spirit, 4v.) Macerate for fourteen [seven, Ed.] days, and strain. "This tincture may be better prepared by the process of percolation, in the same way with the tincture of capsicum, the seeds being first ground in a coffee-mill," E. — This compound is agreeably aromatic. It is used as an adjunct to cordial, tonic, and purgative mixtures. — Dose, 3ij to 5ij.

2. TINCTURA CARDAMOMI COMPOSITA, L. E. D. Compound Tincture of Cardamom. — (Cardamom seeds, bruised; Caraway seeds, bruised, of each 3ijiss. [3ij. D.]; Cochineal, powdered, 3ij.; Camomile, bruised, 3v. [3ss. D.]; Raisins [stoned], 3v.; Proof Spirit, [wine-measure, D.] Macerate for fourteen [seven, Ed.] days, filter. "This tincture may also be prepared by the method of percolation, if the solid materials be first beaten together, moistened with a little spirit, and left thus for twelve hours before being put into the percolator," Ed. The Dublin College omits the cochineal and raisins. — This tincture is used for the same purposes and the same dose as the former preparation, over which it has the advantage of a more agreeable flavour. Moreover, its colour often renders it useful in inscribing.

2. ELETTARIA MAJOR, Smith. — THE GREATER OR CEYLON ELETTARIA.

Alpina Granum paradisi, Moon. (Fructus; Ceylon Cardamom, Offic.)

HISTORY. — The fruit of this plant was known to Clusius, and has noticed and figured it under the name of the Cardamomum vulgare.

BOTANY. — The flower has not yet been described, but the other parts of the plant are so similar to the corresponding parts of Elelta Cardamomum, that I have felt no difficulty in referring this plant to the genus Elelta. Sir James Edward Smith, who —

* Exoticorum, lib. i. p. 186, 187.
CEYLON ELETTARIA.

with the fruit only, observes, “we are persuaded they must the same genus as the Malabar Cardamom.”

—See Elettaria Cardamomum, p. 1029.

—Capsule lanceolate-oblong, acutely triangular, with flatly three lobed. (Smith.)

with numerous fibres. Stem erect, smooth, enveloped by leaf sheaths, e on their sheaths, silky beneath, acuminate; the shorter ones lancelolate, the larger ones oblong-lanceolate: breadth 2 to 3 inches, length not exceeding 15½ inches. Sheaths about half the length of the leaves, with a roundish ligula. Scape from the upper part of the rhizome, flexuose, jointed, nine inches long, branched; the branches alternate, one from each joint of the scape, suberect, half an inch long, supporting two or three pedicels of about 3-10ths of an inch. Bracts solitary, sheathing at each joint of the scape, withered; partial ones, solitary, ovate, acute. Flowers not present. Capsules one or two on each branch of the scape, with the permanent calyx attached to them: their characters are described in the text.

The plant from which the above description has been drawn, formed part of a collection made for me in Ceylon by my much lamented friend and pupil, the late Mr. Fred. Samer, Assistant-Surgeon in her Majesty's 61st regiment. He received it from Mr. Lear, Acting Superintendent of the Royal Botanic Gardens in Ceylon, whose letter, describing it as "Alpinia [Amomum] Gramum paradisi," I have in my possession. I presume, therefore, that it is the plant which Mr. Moon¹, the former superintendent of the Gardens, has described under the same name. The following facts favour this conclusion:

on states that its Singhalese name is Ensai, a term which both nd Burmann¹ gave as the native name for Cardamom.

on states that it is cultivated at Candy. If the real grain of paradise cultivated in Ceylon, it would be somewhat remarkable that its er exported. Now I have carefully examined the list of exports nd for several years, but the word grain of paradise never once occurs; eds imported into England under that name, I find, by the Custom, come from the western coast of Africa. On the other hand, the mom comes, as its name indicates, from that island.

le, I think, that the plant which yields the grains of paradise of mmerce does not grow in the East; and that writers who have use have confounded it with the plant yielding Ceylon Cardamom. "grains of paradise" is so truly oriental in its character, that I first applied to Ceylon Cardamoms, a supposition rendered pro-

¹ The Indigeneous and Exotic Plants growing in Ceylon. Colombo, 1894.


¹ Burmann, p. 54. Amstelod. 1737.
bible by the much more agreeable flavour of the latter seeds, as well as the observation of Dale, that grains of paradise were often substituted for Cardamom.

Hab.—Cultivated at Candy.

Commerce.—Bertolaccini says that the Ceylon cardamom is chiefly in the Ceylon territory, and that he was informed by the Dutch. The quantity exported from 1806 to 1813 inclusive varied from 4½ to 16 annually. Percival states that Cardamom grow in the south part of Ceylon, particularly in the neighbourhood of Matura, and that occasionally Ceylon cardamoms come from Q.

Description.—The Ceylon cardamom, or, as it is sometimes called in English commerce, the Wild Cardamom (Cardamomum zeylanicum, Matth. and Geofr.; Cardamomum majus; and Dale; Cardamomum majus officinale, Cardomonum majus officinarum, C. Bauhinii, Cardamomum longum, Th. Martius and Geiger) is a lanceolate-oblong, acutely triangular, more or less curved, with ribbed sides, about an inch and a half long, a third of an inch broad. At one extremity find the long, cylindrical, permanently lobed calyx; at the other, the fruit stalk, sometimes branched. The pericarp is tough, brownish, or yellowish ash-coloured. The seeds are angular, rugose, lowish red tinge, a fragrant and aromatic balsamic odour, and a spicy flavour. The long of the vitellus is parallel to that of the embryo. Th. Martius says that 100 parts of these fruit stalks of seeds, and 29 parts of pericarpial membranes of Cardamom are medicinal.

Composition, Effects, and Uses.—Ceylon cardamoms have been used in medicine, especially as a stimulant to the digestive organs. The effects are doubtless analogous to those of the Malabar cardamom. The commercial value is about one-third that of the latter.

OTHER MEDICINAL ZINGIBERACEAE.

a. Cardamoms.

Besides the Cardamoms already mentioned there are several other kinds I have met with, and which I notice in order to make the account as complete as possible.

* It would appear, however, that the term Grain of Paradise is also applied in Ceylon to Cardamom. (See Darm's Theorians, p. 54; and Sir J. E. Smith, in Rees's Cyclopaedia, art. Alpinia.)
* Account of Ceylon, 1805.
* Pharmacognosy.
CARADAMOMS.


CHINA CARDAMOMS, Guibourt.—"The Musee d'Histoire Naturelle contains on the varieties of this fruit mixed together. The seeds, merely united and coherent masses, are marked Cao-Ken; and the entire fruits are Cardamom.

ROUND CHINA CARDAMOM, Guibourt (MS.)—Probably the fruit of *Cymbopogon*, Guibourt. The accompanying drawing (fig. 203) was made from specimens kindly lent me for that purpose by Professor Guibourt. Capsule thin, round or oval. Seeds in globular masses, marked, on the surface opposed to the pericarp, by a linear depression or groove. I have observed specimens in the Slovanian Collection, as also in a collection of Chinese medicines at the College of Physicians. On comparing Professor Guibourt's specimen with the fruit of *Alpinia* nutans in Dr. Wallich's Collection, in the possession of the Linnean Society, the two are scarcely distinguishable externally. The seeds, however, are quite dissimilar.

ROUND CHINA CARDAMOM, Guibourt (MS.)—I am indebted to Guibourt for my specimens of this fruit. Capsule ovate, oblong, obtusely triangular. Seeds have no linear depression or groove as those of the larger variety, and by the absence of this they may be readily distinguished from the preceding; coherent in masses, which are three-lobed, not quite globular. In my specimens the epicarp is eroded. The flavour of the seeds is aromatic and terebinthinate, but not powerful.
3. Black Cardamoms, Gartner.—For specimens of these I am also indebted to Professor Guibourt. It is unknown from what plant it is obtained, but larger than the short Malabar cardamoms, acuminate at the extremities, and formed, as it were, of two obtusely pyramidal pericarps joined base to base. Pericarp ash-brown but less so than the seeds (Guibourt). Seeds angularly oval, slightly aromatic, but devoid of the terebinthinate.

Fig. 205.

Black Cardamon.

4. Cardamomum majus, Burgess.—In Dr. Burgess’s collection at t the Royal Institution is a capsule (in a bad state of preservation) marked “Cardamomum Majus.” Its size and shape are analogous to the grain-of-paradise pod. It has a fibrous tuft (remains of calyx?) at one extremity, and is much like the other. The seeds are angular, oblong, larger than those of Malabar cardamoms, shining brownish yellow, and have a large concave depression at one extremity. They have a warm aromatic flavour and agree somewhat analogous to that of the oil of lemon-grass.

β. Aromatic Rhizomes.

5. Alpinia Galanga, Roxburgh.—The rhizome of this plant consists of Galangal Root (Radix Galangae) of English druggists. It occurs in pieces as thick as the finger, seldom exceeding three inches in length, cylindrical, somewhat tuberous, often forked, sometimes slightly striated longitudinally with white circular rings. Externally its colour is reddish-brown, internally pale, reddish-white. Its odour is agreeably aromatic; its pungency and aromatic properties are due to the presence of Alpinia Galanga, Roxb., as analyzed by Bucholz, and by Morin. The former obtained Volatile Oil 4.9%, Extractive 9.7%, Gum 8.2%, Balsam 41.5%, Woody Resin 12.3%, Loss 13%. Its effects, uses, and doses, are analogous to ginger.

6. Curcuma Zedoaria, Roxburgh.—The sliced tuber of this plant Zedoary Root (Radix Zedoriae) of English druggists, which appears to agree with Professor Guibourt’s description of Round Zedoary (Zedoaria). It occurs in segments (halves, quarters, or flat sections) of a roundish tuber. The external portion of the tuber is marked by the remains of the outer skin and fibres, and is of a pale brownish-grey or whitish appearance. When dry it presents a yellowish-brown appearance, not very dissimilar to the cut rhubarb. It has a warm, aromatic, bitter taste, and an aromatic odour. It has been analyzed by Bucholz, and by Morin. Its constituents, according to the latter chemist, are—Volatile oil, Resin, Gum, Starch, Woody fibre, Vegetable Matter (?), Osmazone (?), free Acetic Acid, Acetate of potash, Sulphur, ashes Carbonate and Sulphate of potash, Chloride of potassium, Phosphate of Alumina, Silica, Oxides of Iron and Manganese. It possesses aromatic properties. It is less heating than ginger and galangal, and is more agreeable to turmeric.

7. Zingiber Cassamunar, Roxburgh.—This perhaps is the plant from which Cassamunar is obtained.
THE ORCHIS TRIBE.

The root known by English druggists as Caecontinar Root, and which I am identical with Zerumbet Root. It appears to me to be the Tur- red Zedoary of Ainslie. It occurs in segments (halves orquarters) of iber (which in the dried state must have been about the size of a y), the external surface of which is marked with circular rings and the root-fibres, and is of a dirty turmeric-yellow colour. Internally h-brown, and has some resemblance, in its colour and pellucidity, to tured surface of Socotrine aloes. Its flavour is warm and aromatic; aromatic. It has not been analyzed. Its effects must be similar to inger. It was at one time used in convulsive and other cerebral

**Zerumbet, Roxburgh.**—This I suspect to be the origin of the root given me by Dr. Royle. It is very similar in shape to a curved piece of long turmeric. Its colour is yellowish-grey.

X.—**ORCHIDEÆ, R. Brown.**—THE ORCHIS TRIBE.

**Orchides, Jussieu. Orchidaceæ and Vanillaceæ, Lindley.**

A remarkable order of gynandrous monocotyledons is, in reference to its medicinal properties, of little importance.

Rous or palmate roots abound in gummy and, at certain times, in fariters, which render them nutritive, emollient, and demulcent. Salep red and dried roots of several orchidaceous plants, and is sometimes state of powder. Indigenous Salep is procured from Orchis mascula, and other native plants of this order. Oriental Salep is procured Orchideæ. Professor Royle states that the salep of Cachmere is oba species of Bulophilia. The notion of the aphrodisiac properties of to be founded on the doctrine of signatures.

**Fig. 206.**

The Vanilla of the shops is the fruit of Vanillia aromatica, Sw., a native of Peru, Mexico, Jamaica, and Cuba. Schiede⁸ mentions three other Mexican species (V. sativa, V. sylvestris, and V. Pompona) which yield vanilla. Notwithstanding the strong odour of this fruit, no volatile oil can be obtained by distillation.⁹ The white acicular crystals found on the fruit are a kind of solid volatile oil. Vanilla is employed in this country for flavouring chocolate, ice-creams, &c. But on the continent it is used as a medicinal agent. It is an aromatic stimulant; has an exhilarating effect on the mental functions, prevents sleep, increases the energy of the muscular system, and excites the sexual feelings.¹⁰ It has been administered in asthenic fevers, rheumatism, hysteria, impotence of the male, melancholy, &c. The dose of it is from 8 to 12 grains.

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vate information; also Gray, *Pharmacology.*
steria Indica*, vol. i, p. 490.
Percival, *On the Preparation, Culture, and Use of the Orchis Root.* 1773.
Bucholz's analysis in Buchner's *Repert.* ii. 233.
delir. *Heilmitteltehre,* ii. 203, 3ª Auff.
*Pharmak.* ii. 600, 3ª Auff.
3. EXOGENÆ, De Cand.—EXOGENS.

DICOTYLEDONES, Justus.

FIG. 207.

Exogens, or Dicotyledons.

1. Transverse section of a dicotyledonal stem, showing medullary rays, and the distinction of bark, wood, and pith.
2. Stem and leaves of a dicotyledon, the articulation and the annato of the leaves.
3. Embryo with two cotyledons.
4. Embryo with four cotyledons.

Essential Characters.—Trunk, consisting of bark, wood, and pith, within the other; the pith being innermost. Bark, composed of younger and inner being called liber, increasing by the deposit of new matter on its inner side. Wood, consisting of ligneous strata, the outer side (exogenous growth): the older and inner strata are called or perfect wood; the younger and outer strata are termed alburnum wood. Leaves articulated with the stems; their veins branching a mosaic (angulineered, reticulated). Flowers, if with a distinct calyx, having a quinary arrangement. Embryo with two or more (dicotyledonal); if two, they are opposite; if more than two, they ciliate: radicle naked; i.e., elongating, without penetrating any exocarp (exorrhizous).

ORDER XXI.—CYCADACEÆ, Lindl.—THE CYCAS

CYCADÉS, Richard and R. Brown.

FIG. 208.

I notice this order for the stating, that a feculent matter tained from the soft center species of Cycas (as C. cir revoluta, C. inermis). The (Japan sago) is quite unknown and I doubt whether it even this country.

Cycas revoluta, or the Japan Sago-tree.

* Consult on this subject Schenk's Naturgeschichte der verfügbaren Handelstoffen 2°, S. 189, Taf. xlvi.
ORDER XXII.—CONIFERÆ, Jussieu.—THE FIR TRIBE.

**Coniferæ of Pinaceæ, Lind.**

**Essential Characters.**—*Flowers* monoecious or dioecious. **Males** monandrous or monadelphous; each flower consisting of a single *stamen*, or of a few united, collected in a deciduous amonstum, about a common rachis; **anthers** two-lobed or many-lobed, bursting outwardly; often terminated by a crest, which is an unconverted portion of the scale out of which each stamen is formed; *pollen* large, usually compound. **Females** in cones. *Ovary* spread open, and having the appearance of a flat scale destitute of style or stigma, and arising from the axil of a membranous bract. *Ovule* naked; in pairs on the face of the ovary, having an inverted position, and consisting of one or two membranes, open at the apex, and of a nucleus. **Fruit** consisting of a cone formed of the scale-shaped ovaries, become enlarged and indurated, and occasionally of the bracts also, which are sometimes obliterated, and sometimes extend beyond the scales in the form of a lobed appendage. *Seed* with a hard crustaceous integument. *Embryo* in the midst of fleshy oily albumen, with two or many opposite *cotyledons*; the *radicle* next the apex of the seed, and having an organic connexion with the albumen. **Trees** or *shrubs*, with a branched trunk abounding in resin. *Wood*, with the ligneous tissue marked with circular disks. *Leaves* linear, acerose or lanceolate, entire at the margins; sometimes fascicled in consequence of the non-development of the bracts to which they belong; when fascicled, the primordial leaf to which they are then axillary is membranous, and enwraps them like a sheath. (Lindley.)

**Properties.**—Every part of coniferous plants contains an oleo-resinous juice, which yields by distillation a volatile oil, differing often in odour but agreeing in composition in each species. This juice is a local irritant, and acts as a powerful stimulant to the vascular system and the organs of secretion (especially the kidneys and the mucous membranes). Moreover, it appears to possess a specific influence over the nervous system: for oil of turpentine, in large doses, has operated as an inebriant and soporific; savin is said by Orfila to act on the nervous system; and the leaves of the yew are narcotic.

1. **PINUS, De Candolle.—THE PINE.**

   *Pinus sylvestris*, L. D.—Various species, E.

   *Sex.* Syst. Monocot., Monadelphus.

   (Terebinthus vulgaris, L. D.; Olea Terebinthinæ, L. E. D.; Resina, L. E. D.; Pin x liquida, L. E. D.; Pin nigra, L.; Pin arida, E.)

**Botany.** **Gen. Char.**—*Flowers* monoecious. **Males**—*catkins* racemose, compact and terminal; squamose; the *scales* staminières at the apex. **Stamens** two; the **anthers** one-celled. **Females**—*catkins* or *cones* simple, imbricated with acuminate scales. **Ovaries** two. **Stigma** glandular. Scales of the *cone* oblong, club-shaped, woody; umbilicate-angular at the apex. **Seeds** [nuts, *De C.*] in pairs, covered with a sharp-pointed membrane. **Cotyledons** digitato-pariite. **Leaves** two or many, in the same sheath (De Candolle and Dubuy, *Bot. Gall.)*—Hardy, evergreen trees.

**Species.** 1. **PINUS SYLVESTRIS**, Linn. L. D.; *Wild Pine* or *Scotch Fir.*—**Leaves** in pairs, rigid. **Cones** ovato-conical, acute; young ones stalked, recurved, as long as the leaves; generally in pairs. Crest of the **anthers** very small. **Embryo** five-lobed. (*Bot. Gall.*)—Highlands of Scotland, Denmark, Norway, and other northern
countries of Europe. Flowers in May and June. A tall, straight, hardy, long-lived tree, determinately branched. Its wood is the red yellow deal. It yields common turpentine, tar, and pitch.

2. *Pinus Pinaster*, Aiton; *P. maritima*, De Cand. *The Pinaster or Cluster Pine.*—Leaves twin, very long, rigid, pungent, furnished at the base of a reflexed scale. Cones oblong conical, obtuse, very smooth, bright, shorter than the leaves. So bristly (*Bot. Gall.*)—Southern maritime parts of Europe. Very abundant in the neighbourhood of Bordeaux, and between this city and Bayon.

![Fig. 209. Pinus sylvestris.](image)

![Fig. 210. Branch and cones of ditto.](image)

![Fig. 211. Branch and cones of Pinus Pinaster.](image)

![Fig. 212. Flowering branch and cones of Pinus Pinea.](image)

It is a much larger tree than the Scotch fir. Flowers in May. yields *Bordeaux turpentine, galipot, tar, and pitch.*

3. *Pinus palustris*, Lambert; *the Swamp Pine.*—Leaves very long. Cones subcylindrical, armed with sharp prickles. *Pules* pinnatifid, ragged, persistent (Lambert).—A very large tree growing in dry sandy soils, from the southern parts of Virginia to the Gulf of Mexico. "Its mean elevation is 60 or 70 feet, and the diameter of its trunk about 15 or 18 inches for two-thirds of this height. The leaves are about a foot in length, of a brilliant green color, and united in bunches at the ends of the branches." The names by which the tree is known in the Southern States are *long-leaved pine, yellow pine, and pitch pine*; but the first is the most appropriate, the last two are applied also to other species. This tree furnishes by far the greater proportion of *turpentine, tar, &c.* consumed in the United States, or sent from this to other countries *w.*"

*United States Dispensatory.*
4. *Pinus Têda*, Lambert; the Frankincense Pine.—Abundant in Virginia. Yields common turpentine, but of a less fluid quality than that which flows from the preceding species.

5. *Pinus Pinéa*, Lambert, De Candolle; the Stone Pine.—Grows in the south of Europe and northern part of Africa. Yields the cones called, in the shops, *pignoli pines*, the seeds of which, termed *pine nuts* (πιγνιλός, Dioscor. *pityida*, Pliny; *nuclei pinæ*, *pinoli*) are used as a dessert.

6. *Pinus Pumilío*, Lambert; the Mugho or Mountain Pine.—A native of the mountains of the south of Europe. An oleo-resin, called *Hungarian balsam* (*balsamum hungaricum*), exudes spontaneously from the extremities of the branches and from other parts of the tree. By distillation of the young branches with water, there is obtained in Hungary an essential oil, called *Krummholzöl*, or *Oleum Tumplinum*.

7. *Pinus Cem'bra*, Lambert; De Candolle; the Siberian Stone Pine.—The seeds, like those of Pinus Pinéa, are eaten. By distillation the young shoots yield *Carpathian Balsam* (*Balsamum Carpathicum*; B. Libani).

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**Abies, De Candolle.—The Fir.**

*Pinus Abies* and *P. balsamea, L. D.*—Abies excelsa and A. balsamea, *E.*

See *Syst.* Monocéa, Monadelphi.

*Géne resina, L.*; *Thys, D.*; *Píx Abietina, L.*; *Píx Burgundica, B. D.*; *Terébinthina Canadensis, L.*

*Balsamum Canadense, B. D.)*

**Botany. Gen. Char.**—Flowers monoecious. **Males**—catkins solitary, not racemose; the scales staminiferous at the apex. **Stamens** two; the *anthers* one-celled. **Females**—catkins simple. **Ovaries** two. **Stigmas** glandular. Scales of the **cone** imbricated; thin at the apex, rounded (neither thickened, angular, nor umblicated on the back). **Cotyledons** digitato-partite. **Leaves** solitary in each sheath (Bot. Gall).

**Species.**—1. *Abies excelsa*, De Cand. E.; *Pinus Abies*, Linn. L.D.; the *Norway Spruce Fir.*—Leaves tetragonal. Cones cylindrical; the scales rhomboid, flattened, jagged, and bent backwards at the margin (Bot. Gall.).—A native of Germany, Russia, Norway, and other parts of Europe; also of the northern parts of Asia. Commonly cultivated in England. Flowers in May and June. A very lofty tree, growing sometimes to the height of 150 feet. It yields, by spontaneous, exudation *Common Frankincense* (*Abietis resina, L.*; *Thys, D.*), from which is prepared *Burgundy Pitch* (*Píx Abietina, L., Píx Burgundica, E. D.*)

2. *Abies Balsamea*, Lindley, E.; *Pinus balsamea*, Linn. Lambert, L.D.; the *Canadian Balsam Fir*: *Balm of Gilead* *Fir.*—Leaves solitary, flat, emarginate, subpectinate, suberect above. Scales of the flowering **cone** acuminate, reflexed. An elegant **tree**, seldom rising more than 40 feet. Inhabits Canada, Nova Scotia, Maine,
Abies excelsa.


3. Abies canadensis, Lindley; Pinus canadensis, Linnbert; the Hemlock Spruce Fir.—Said to yield an oleo-resin analogous to Canada balsam.

4. Abies Picea, Lindley; Abies pectinata, De Candolle; Picea, Linnæns; the Silver Fir.—Mountains of Siberia, Ger, and Switzerland. Yields Strasburgh Turpentine.

5. Abies nigra, Michaux; Pinus nigra, Lambert; the Spruce Fir.—The concentrated aqueous decoction of the branches is Essence of Spruce, used in the preparation of A. Beer.

3. Larix Europæa, De Candolle.—The Common Larch

Abies Larix, Lami. E.; Pinus Larix, Linn. D.

Sæc. Syst. Monocoa, Monadelphia.

(Terebinthina Veneta, L. D.)

Botany. Gen. Char.—Flowers monoecious. Character as in A.
but the Cotyledons are simple, and never lobed. Cones lateral. Leaves, when first expanding, in tufted fascicles, becoming somewhat solitary by the elongation of the new branch (Bot. Gall.)


Hab.—Alps of Italy, Switzerland, Germany, Siberia, &c. Cultivated in woods.

Products.—This species yields Larch or Venice turpentine. When the larch forests of Russia take fire, a gum issues forth from the medullary part of the trunks, during combustion, which is called Orenburg gum (gummi orenburgense). A saccharine matter exudes from the larch, about June, which is called Manna of the Larch, or Manna de Briançon. Lastly, a fungus, called Polyporus Laricis, is nourished on this tree.

Medicinal Substances obtained from the preceding Coniferous Plants.

The term Turpentine (Terebinthina) is ordinarily applied to a liquid or soft solid oleo-resinous juice of certain coniferous plants, as well as of the Pistacia Terebinthus, a plant of the order Terebinthae, Juss. Indeed this last-mentioned plant, Pistacia Terebinthus, is probably the true Terebinthus of the ancients (Terebinthus, Theoph. and Dioscorides). When submitted to distillation, these juices are resolved into a Volatile Oil (Oleum Terebinthae) and a Resinous Residuum. The roots and other hard parts of coniferous trees yield, by a kind of distillatio per descensum, the thick liquid called Tar, from which Pitch is procured. Hence it will be convenient to speak of the coniferous terebinthines under four heads:—1st, the oleo-resinous juices; 2dly, the volatile oil obtained therefrom by distillation; 3dly, the resinous residuum; 4thly, tar and pitch.

1. Oleo-Resinous Terebinthine.—Terebinthinate Oleo-Resins.

Preparation; Properties; and Composition.—At first these oleo-resins are liquid, but by age and exposure to the air they become, more or less speedily in the different varieties, solid, partly by the volatilization, partly by the resinification, of the volatile oil. They have a certain general similarity in taste and odour. They soften and become very fluid by heat, readily take fire in the air, and burn with a white flame, and, if the supply of air be limited, with the copious deposition of finely-divided carbon (lamp black). They are almost completely soluble in alcohol and ether; and yield, by distillation, a volatile oil, which passes over (usually with a small quantity of succinic acid?), and a resinsous residuum. Water acquires a terebinthinate flavour when digested with them; and by the aid of the yolk or the white of an egg, or still better by that of vegetable mucilage, forms an emulsion with them.

* Vide p. 86.
1. **Common Turpentine** (Terebinthina vulgaris, L. D.)—Under this name we find oleo-resins brought from various parts of the world, obtained from different species of *Pinus*, and, though agreeing in main in their properties, possessing certain distinctive characters. In the present time the London market is almost exclusively supplied from New York, a small quantity only being imported from Bordeaux. In the years 1830 and 1831, the quantities of turpentine (at a greater value than 12s. per cwt.) which were imported from United States and France, were as follows:—

<table>
<thead>
<tr>
<th></th>
<th>1830</th>
<th>1831</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>cwt.</td>
<td>qrs.</td>
</tr>
<tr>
<td>From France</td>
<td>43</td>
<td>1</td>
</tr>
<tr>
<td>United States of America</td>
<td>234,747</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>234,790</td>
<td>1</td>
</tr>
</tbody>
</table>

a. **American or White Turpentine** (the Térébenthine de Bost in the French) “is procured chiefly from the *Pinus palustris*, perhaps also from the *Pinus Taeda*, and perhaps some other species inhabiting the Southern States. In former times large quantities were collected in New England; but the turpentine trees of that section of the Union are said to be nearly exhausted; and our commerce is all exclusively supplied from North Carolina and the south-eastern part of Virginia.”

The method of procuring this turpentine is as follows:—A hole is cut in the tree, a few inches from the ground, and the bark removed for the space of about 18 inches above it. The turpentine runs from this excavation from about March to October; more rapidly in winter. During the warmer months. It is transferred from these hollows into casks. It is imported from New York in casks; 1 cwt. from North Carolina holding 2 cwt., while those from South Carolina contain 2½ cwt. It is yellowish-white, with an aromatic smell, a warm, pungent, bitterish taste. It is translucent or opaque. Its consistence varies, being semifluid, or, in cold weather, that of a solid. It contains various impurities (leaves, twigs, chips, &c.) got from the first tappings is the best, and is called **Virgin Turpentine**. Recent American turpentine is said to yield 17 per cent. of essential oil.

β. **Bordeaux Turpentine** is obtained by making incisions in *Pinus Pinaster*, Lambert (*P. maritima*, De Candolle), and collecting the turpentine in hollows at the foot of the tree. Each month these hollows are emptied, and the oleo-resin conveyed in pails to a reservoir. In this state it is called **soft gum (goût molle)**. It is purified either by heating it in large boilers, filtering through straw (térébenthine galipot), or by exposing it in a barrel, the bottom of which is perforated by holes, to sun; the liquid which drains through is called **térébenthine**.

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*United States Dispensatory.*


*United States Dispensatory.*
TURPENTINE: 1045

The last method yields the best product, since less volatile dissipated by it. The turpentine which flows during the year is called gaiopot in Provence, barras in Guienne. It is in the of semi-opaque, solid, dry crusts of a yellowish-white colour, a inthanate odour, and a bitter taste.

Bordeaux turpentine is whitish, thickish, and turbid. It has a receable odour, and an acrid, bitter, nauseous taste. On standing it separates into two parts: one thinner, yellow, and almost trans- another thicker, whitish, and of the consistence of thick y, having a granular consistence. Bordeaux turpentine readily nes hard and dry by exposure to the air. It enjoys, with balsam paiva, the property of solidifying with magnesia, and in this act is distinguished from Strasburgh turpentine.

Common turpentine has been analyzed by MM. Moringlane, michel, and Bonastre, and by Unverdorben. The last-men d chemist found it to consist of two Volatile Oils (oil of turpen- Pinic acid, a little Sylvic acid, a trace of an Indifferent Resin soluble in oil of petroleum, and a small quantity of Bitter Ex- ise. The quantity of volatile oil varies from 3 to 25 per cent. weight of the turpentine.

LARCH OR VENICE TURPENTINE (Terebinthina veneta, E. D. nithina laricea).—Obtained from Larix europaea, De Cand. by g the trunks of the trees, and adapting to each hole a wooden r, which conveys the juice into a tub or trough, from which it is yards withdrawn for filtration.

through the kindness of Professor Guibourt I have received anemic sample of larch turpentine. It was collected in the wood Bishop of Maurienne, in Savoy, by order of the bishop, and at urgent solicitation of M. Bonjean, Pharmacien, naturalist of ubery. The same kind of turpentine, collected in Switzerland turpentine) is sold in Paris as Strasburgh turpentine (Téré- de Strasbourg), and was formerly called Venice turpentine. thick and consistent fluid, flowing with difficulty, is sometimes parent, but more frequently cloudy, has a yellow or greenish- tint, an odour which is peculiar, not very agreeable, weaker that of either Strasburgh or common turpentine, but less dis- able than the latter, and an acrid, very bitter taste. It has or no tendency to concrete by keeping—a property known to and which distinguishes it from common turpentine.

factitious substance (Terebinthina veneta factitia) is sold by on druggists for Venice turpentine. It is prepared by mixing oil of turpentine with lb. j. of black rosin. A similar prepa-
RATION is found in the shops of the United States of America, and probably identical with that imported from America under the name of Venice turpentine. It is, in fact, absurd in the Dublin and Edinburgh Colleges to retain Venice turpentine in their pharmacopoeia, seeing that not a grain of that oleo-resin has been imported (commercially) for many years past.

Berzelius and Unverdorben have submitted Venice turpentine to examination, and with the following results:

<table>
<thead>
<tr>
<th>Berzelius's Analysis</th>
<th>Unverdorben's Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Oil of turpentine, probably composed of two oils</td>
<td></td>
</tr>
<tr>
<td>2. Resin insoluble in cold oil of petroleum</td>
<td></td>
</tr>
<tr>
<td>3. Resin soluble in cold oil of petroleum</td>
<td></td>
</tr>
<tr>
<td>1. Volatile oil, which readily distills</td>
<td></td>
</tr>
<tr>
<td>2. Volatile oil, which distills less readily, and a tendency to resinify</td>
<td></td>
</tr>
<tr>
<td>3. Succinic acid (small quantity)</td>
<td></td>
</tr>
<tr>
<td>4. Much Pinic acid</td>
<td></td>
</tr>
<tr>
<td>5. A little Syviric acid</td>
<td></td>
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<tr>
<td>6. Indifferent resin, insoluble in oil of petroleum</td>
<td></td>
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<tr>
<td>7. Bitter Extractive</td>
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</tbody>
</table>

Old Venice Turpentine.  

Fresh Venice Turpentine.

Larch resin yields from 18 to 25 per cent. of volatile oil.

3. **STRASBURGH TURPENTINE** (*Terebinthina argenteoratensis*; *Terebenthine au citron*, ou *Térébenthine d’Alsace*, Guib.) — This is obtained from *Abies Picea*. The peasantry, in the vicinity of the Alps, collect it by puncturing the vesicles adhering to the bark with sharp-pointed hooks, and receiving the juice in a bottle. It is afterwards filtered through a rude kind of bark funnel.

Strasburgh turpentine is very fluid, transparent, of a yellowish colour, has a very agreeable odour of citron, and a taste moderately acid and bitter. It consists, according to Caillot, of Volatile Oil 38·5, Resin insoluble in alcohol 6·20, Abietin (a crystallizable resin) 10·85, Abietic acid (?) Pinic and Sylvic acids 46·39, Extractive and Succinic acid 0·85, Loss (principally volatile oil) 2·21.

4. **CANADIAN TURPENTINE** or Canada Balsam (*Terebinthina canadensis*, L. *Balsamum canadense*, E. D.) is obtained from *Abies balsamea* in Canada and the state of Maine. Between the bark and the wood of the trunks and branches of these trees are vesicles containing this oleo-resin, which exudes when they are broken, and is received in a bottle. It is imported in casks containing each about one cwt. In 1838 the quantity imported was 7259 lbs. When fresh it has the consistence of thin honey, but by age gradually solidifies; it is yellow, transparent, very tenacious, of a peculiar and agreeable terebinthinate odour, and of a slightly bitter, somewhat acid, taste.

Canada balsam has been analyzed by Bonastre, who obtained the following results: — Volatile oil 18·6, Resin easily soluble in alcohol 5·5.
Resin difficult soluble 33.4, Fibrous Caucho, like Sub-

Acetic acid traces, Bitter Extractive and Salts 4.0.

Common Frankincense (Abietis resina, L. Thos. D.) This

spontaneous exudation of Abies communis. It concretes

drop, or tears, which are compact, opaque, of a

low colour. What is found in the shops of London is a soft-

ing considerable resemblance to the dried opaque portion

on turpentine. The turpentine (?) of the Abies com-

was been analyzed by Caillot," who obtained the following

Volatile Oil 32.00, Resin insoluble in alcohol 7.40, Abietin-

izable resin 11.47, Abietic acid (?Pine and Sylvic acids)

tractive and Succinic acid 1.22, Loss (principally volatile

ological Effects.—The effects of terebinthinate substances

before noticed (p. 182). Locally they operate as irritants.

to the skin they cause rubefaction, and sometimes a vesicular

Swallowed they give rise to a sensation of warmth at the

large doses occasion sickness, and promote the peristaltic

t of the intestines. After their absorption they operate on

al system as stimulants, and excite the vascular system,

of the abdominal and pelvic visceera. Their influence is

directed to the secreting organs, more especially to the

embranes and the urinary apparatus. They act as diuretics,

unicate a violet odour to the urine. This odour depends

of the oil having undergone a slight change in its nature

passage through the system. Part of the oil, however, is

unchanged; for Moirond* has observed, that at the same

the terepines cause a violet odour, they flow in part

"I have verified," says he, "this double phe-

many horses, to whom turpentine has been given, for some

the enormous dose of ten or twelve ounces." But the kidneys

are the only parts engaged in getting rid of the absorbed tur-

the secreting organs, but more especially the bronchial

and the skin, are occupied in the same way. By these the

aled apparently unchanged, or at least with its usual odour.

The circulation of the terebinthinate particles in the system,

crease a local influence over the capillaries and secreting

the vital activity of which they effect a change. In certain

conditions, this change is of a most salutary nature. In

affections of the mucous membranes the secreting vessels

constricted under the use of terebinthnates, and the discharge

sequence, checked.

Most important, because by far the most active, constituent of

bine resin is volatile oil. Hence their effects are

identical with those of the latter. Some slight differences,

are to be noticed. They are less rapidly absorbed, are more

* Journ. de Pharm. t. xvi. p. 435.
* Pharmacol.-Veterin. p. 312.
* Vide Oelum Terebinthinae, p. 1050.
permanent in their operation, confine their influence principally to the apparatus of organic life, not affecting, at least to the same extent, the brain, and act less powerfully on the cutaneous system.

We have few data on which to rely in judging of the comparative influence of the different terebinthnates; but as their most active constituent is volatile oil, we may fairly infer that those which possess the greatest liquidity, and which, in consequence, contain the largest quantity of oil, are the most powerful preparations. Venice and Strasburgh Turpentines stand in this respect pre-eminent. Cana Balsam is valuable on account of its purity and agreeable flavor. In activity, purity, and flavor, Common Turpentine holds the lowest rank.

Uses.—The terebinthinate oleo-resins are, with some exception, applicable for the same purposes as the volatile oil. The following are the principal cases in which they are employed:

1. In mucous discharges from the urinary-genital organs; as gonorrhœa, gleet, leucorrhœa, and chronic cystorrhœa.
2. In chronic catarrh, both mucous and pituitous, occurring in persons of a lax fibre and lymphatic temperament.
3. In chronic mucous diarrhoea, especially when accompanied with ulceration of the mucous follicles.
4. In colic and other cases of obstinate constipation, Cullen recommended a turpentine emulsion used as a clyster “one of the most certain laxatives.”
5. In chronic rheumatism, especially sciatica and lumbago, the turpentines are occasionally used.
6. As detergents and digestives they have been sometimes applied to indolent and ill-conditioned ulcers.

Administration.—The dose of the terebinthinate oleo-resins, from a scruple to a drachm. They are given in the form of pill, emulsion, or electuary. To give the softer kinds a consistence fit for making pills, liquorice powder may be added to them. Borneo turpentine, mixed with about one-twenty-eighth part of its weight of calcined magnesia, solidifies in about twelve hours: the acid rest of this turpentine combine with the magnesia, and form solid resins, which absorb the volatile oil. A turpentine emulsion, made with the yolk of egg, or mucilage of gum Arabic, sugar, or some aromatic water. To form an electuary the turpentine is mixed with sugar or honey. An emulsion, containing from half an ounce to an ounce of turpentine, may be used as a clyster, in obstinate constipation, ascariasis, &c.

The terebinthinate oleo-resins yield several official substances and enter into several preparations:

2. Terebinthina veneta, E. D. is a constituent of Emplastraum Casti compositum, E. and Unguentum Infusi Cantharidis, E.
OIL OF TURPENTINE.

PIS RESINA, L. THUS, D. yields Piz Abietina, L. (Piz Burgundica, E.; and enters into the composition of Emplastrum Galbani, L., Em.


2. Oleum Terebinthinæ, L. B. D.—Oil of Turpentine.

Essential oil is frequently, though erroneously, called Spirits tine.

Ration.—It is obtained by submitting to distillation a mix-

American turpentine (which has been melted and strained)

or in due proportions, in the ordinary copper still, with a

The distilled product is found to consist of oil of turpen-
nomining on water; the residue in the still is resin. If no

employed a much higher temperature is required to effect

ation, and danger is thereby incurred of causing empyreuma.

on, a large distiller of turpentine in this metropolis, informs

be average quantity of oil yielded by American turpentine is

0 16 per cent. He also tells me that Bordeaux turpentine

oil having a more disagreeable odour, and a resin of inferior

The College directs oil of turpentine to be prepared as follows:—Take

Turpentine, by weight, lbv.; Water, Oiv. [wine measure]. Distil the

copper alembic; yellow resin will remain after the distillation.

bridge it of all traces of resinous and acid matters, oil of

should be re-distilled from a solution of caustic potash, as

actually done, as Mr. Flockton informs me. The British

however, direct it to be purified by distillation with water

tions given by the British Colleges for the preparation of Rectified

turpentine (Oleum Terebinthinæ purissimum, L. E. Oleum Terebinthinæ

D.) are as follows:—

Oil of Turpentine, Oj. [Oj. wine measure, D.]; Water, Oiv. [wine

| Let the oil cautiously distil.—The Dublin College directs a pint

only of the oil to be distilled.

TIES.—Pure oil of turpentine is a colourless, limpid, very

e fluid. It has a peculiar, and, to most persons, disagreeable

and a hot taste. When pure it is neutral to test paper. is

0'86 at about 70° F. It boils at about 314° F.; the

its vapour is 4'76 (Dumas). When moist and cooled

4 F. it deposits, after a considerable time, a crystallized

mpound of C^10 H^8 + 2 Aq. It is very slightly soluble in

alcohol. Exposed to the air, it absorbs oxygen, becomes

and somewhat denser, owing to the formation of resin (pinic

acids). Crystals (hexahydrate of oil of turpentine) some-
in old hydrous oil of turpentine. By submitting to dis-
mixture of water and old oil, an aqueous liquid is obtained,

ds more or less of the same crystals. Nitric acid re-
of turpentine: the resin, by long boiling with nitric acid, d

into crystals of Turpentinic Acid C^14 H^9 O^7 + Aq.
Oil of turpentine is composed of

<table>
<thead>
<tr>
<th>Atoms</th>
<th>Eq. Wt.</th>
<th>Per Cent.</th>
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<tbody>
<tr>
<td>Carbon</td>
<td>10</td>
<td>60</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Oil of Turpentine</td>
<td>1</td>
<td>68</td>
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</table>

It yields two or more distinct, but probably isomeric oils. One of these (Dadyl, Terebene; Camphiline) forms with hydrochloric acid a crystalline compound (Artificial Camphor; Hydrochlorate of Oil of Turpentine), whose formula is C_{20}H_{32}Cl; another (Peucyl or Peucene) forms with the same acid a liquid compound. But as the boiling points of the two oils, called by Blanchet and Sell, dadyl and peucyl, are higher than the boiling point of the oil of turpentine, these substances ought rather to be regarded as products than endogenous.

Physiological Effects. a. On Vegetables.—Plants exposed to the vapour of this oil are rapidly destroyed.

β. On Animals.—On both vertebrated and invertebrated animals it operates as a poison. Injected into the veins of horses and dogs it excites pneumonia. Two drachms thrown into the veins of horse, caused trembling, reeling, falling, inclination to pass urine and stools, and frequent micturition. Inflammatory fever, with cough continued to the 8th day; then putrid fever appeared. On the 9th day death took place. The body presented all the signs of putrid fever and pneumonia (Hertwich). Schubarth* found that two drachms of the rectified oil, given to a dog, caused tetanus, failure of the pulse and breathing, and death in three minutes. The skin of the horse was very sensible to the influence of oil of turpentine, which produced acute pain. "It is a remarkable circumstance," says Moiroux, "that this pain is not accompanied with any considerable hyperaemia. It is quickly produced, but is of short duration." Oil of turpentine is sometimes employed by veterinarians as a blister, but it is inferior to cantharides, and, if frequently applied, is apt to blemish (i.e. cause the hair of the part to fall off). In doses of three ounces it is a most valuable antispasmodic in the colic of horses. In small doses it acts as a diuretic. Tiedemann and Gmelin detected oil of turpentine in the chyle of a dog and a horse, to whom this agent had been given.

γ. On Man.—In small doses (as six or eight drops to f śl.) it creates a sensation of warmth in the stomach and bowels, becomes absorbed and circulates with the blood, and in this way affects the capillary vessels and is thrown off by the system by the different excretories, on the secreting vessels of which it acts in its passage through them. The exhalations of the skin and bronchial membranes acquire a mark of terebinthinate odour, while the urine obtains the smell of violets.

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7 De Candolle, Phys. Vég., p. 1347.
9 Wirmer, op. cit.
11 Youatt, The Horse, in Lib. of Useful Knowledge.
OIL OF TURPENTINE.

Sulphuric acid, when injected into the blood, acts on the renal vessels it proves diuretic. By the same kind of influence on the cutaneous vessels it proves sudorific. It is to have a constricting effect on the capillary vessels of the skin, membranes, for, under its use, catarrhal affections of, and eruptions from, these parts are frequently checked, and often are directly stopped. Its continued use sometimes brings on irritation of the urinary organs, or when this state pre-existed, it is often aggravated by the use of turpentine.

A medium dose (½ to ⅔ j.) its effects are not constant. Dr. Percival saw two drachms given without any unpleasant effect produced either on the digestive or urinary organs; they acted as an agreeable stomachic, and promoted the catamenia. Mr. Steed saw, on the other hand, has seen this dose produce strangury, bloody urine, suppression of this secretion, fever, thirst, and vomiting. These cases, however, may be regarded as the opposite extremes; and, generally, we may expect, from a medium dose, a feeling of heat in the stomach and bowels, accelerated peristaltic motion, increased frequency of pulse, diaphoresis, diuresis, and sometimes of the urinary organs. Occasionally it provokes the catamenia.

A large or maximum dose (2 to 3 j.) its effects are not constant. It usually causes a sensation of abdominal heat, sometimes nausea and in general operates as a tolerably active purgative, not causing any unpleasant effects. I have given from one to four ounces in a considerable number of cases of tape-worm, and saw any ill consequences therefrom. “It has been given,” says Duncan, “even to the extent of four ounces in one dose, without perceptible bad effects, and scarcely more inconvenience than I follow from an equal quantity of gin.” Cases are reported, however, in which it has failed to produce purging, and in such it has most violently on the system, accelerating the pulse, depressing the vascular power, and giving rise to a disordered state of the intellectual functions, which several persons have compared to intoxication.

A remarkable and well-detailed instance of this occurred in the case of Dr. Copland, who refers the disorder of the cerebral functions in his case, to diminished circulation of blood in the brain; the gastric heat, &c. he ascribes to increased vascular activity in the abdominal region. The oil passed off most rapidly by the lungs (principally by the latter), and the air of the apartment became strongly impregnated with its effluvia. In some cases caused sleepiness. Purkinje experienced this effect from one ounce of the oil. Dr. Duncan has sometimes seen it produce a kind of a mixture of sensations, lasting twenty-four hours, without, however, any subsequent effect. The same writer adds, “the largest dose I have given has been three ounces, and without injury.” A scarlet

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*Edinb. Dispens.*
*Quoted by Wibmer, Werk. d. Arz."
eruption is mentioned by Wibmer as being produced in one case by an ounce of the oil.

Uses.—The following are the principal uses of the oil of turpentine:

1. *As an anthelmintic.*—It is the most effectual remedy for tapeworm we possess. It both causes the death of, and expels the parasite from the body. To adults it should be given in doses of an ounce at least. I have frequently administered an ounce and a half and sometimes two ounces. In no instance have I ever seen any effects arise from its use. Yet occasionally, as in Dr. Copland’s case, it fails to purge, but becoming absorbed, operates most severely on the system, causing disorder of the cerebral functions. It is said to be more apt to act thus in persons of a full and plethoric habit. I prevent these ill consequences of an oleaginous purgative should it be conjoined with it, or given at an interval of four or five hours after it. An excellent and safe method of employing it is to combine it with a castor-oil emulsion. Chabert’s empyreumatic oil (described at p. 428) used by Bremser against tape-worm, consists principal of oil of turpentine. A very effectual remedy for the small threes worm (*Ascaris vermicularis*) is the turpentine enema.

2. *In Blennorrhoea.*—Oil of turpentine sometimes checks or stops profuse chronic discharges from the mucous membranes. It appears to effect this by a topical influence over the capillary and secretory vessels, in its passage through them out of the system. In many cases it would appear to confine its operation to the production of increase of tonic in the vessels which pour out mucus; but other instances, especially in blennorrhoea of the urinary apparatus, it seems to set up a new kind of irritation in the affected membrane which supersedes the previously existing disease. Hence its use is not admissible in acute or recent affections of these tissues. In gonorrhoea and gleet I have frequently employed it as a substitute for balsam of copaiva with success. In leukorrhoea it has occasionally proved serviceable. In catarrhus vesicae cystorrhoea it now acts beneficially, but it requires to be used in small doses with great caution. In chronic pulmonary catarrh, either mucous or purulent, it is said to have been employed with advantage. In chronic diarrhoea and dysentery it has proved advantageous: in the cases it has a direct local action on the affected part, besides exerting its influence over this in common with other mucous membranes and its absorption.

3: *In Hemorrhages.*—In sanguineous exhalations, called hemor rhages, from the mucous surfaces, oil of turpentine may, under some circumstances, act efficaciously. On the same principle that checks excessive secretion of mucus in catarrhal conditions of the tissues, so we can readily conceive it may stop the exhalation of blood. But it is only admissible in cases of a passive or atomic character, the absence of phlethora and a phlogistic diathesis. In purpu
Oil of Turpentine.

It has been recommended as a purgative, by Dr. bitlock Nichol, Dr. Magee, and others. I have seen it act injuriously in this disease, while blood-letting has seemed to relieve.

4. In Puerperal Fever.—The use of the oil of turpentine as a stimulant in this disease was introduced by Dr. Brenan, of Dublin; and strong testimonies were subsequently borne to its efficacy by several highly respectable practitioners. Dr. Brenan gave one or two table-spoonfuls of the oil, every three or four hours, in warm water, sweetened; and applied flannel soaked in the oil to the abdomen. But the apparent improbability of a stimulant like turpentine curing an inflammatory disease, has prevented many practitioners placing any faith in it, or even giving it a trial. In other instances the unconquerable aversion which patients have manifested to it, has precluded its repetition. Lastly, it has failed, in the hands of some of our most accurate observers, to produce the good effects which Dr. Brenan and others have ascribed to it, and in some instances has appeared to aggravate the malady. These reasons have been conclusive against its employment, at least in the way advised by Brenan. But there are two valuable uses which may be made of turpentine, in puerperal fever: it may be given in the form of a purgative, to relieve a tympanitic condition of the intestines, and for that purpose no remedy perhaps is superior to it; secondly, flannel being soak ed in the hot oil may be applied to the abdomen, to cause heation, as a substitute for a blister, to the employment of which there are objections.

5. In Ordinary Fever.—As a powerful stimulant in some forms of fever, oil of turpentine has been well spoken of by Dr. Holst, Chapman, Dr. Douglas, and more recently by Dr. Wood. If the skin is dry, the bowels flatulent, and ulceration of the mucous membrane suspected, it often proves most serviceable.

6. In Rheumatism.—In chronic rheumatism oil of turpentine has been celebrated. Its beneficial influence depends on its stimulant and diaphoretic operation, and is more likely to be evinced in debilitated persons. I have found medium doses occasionally succeed when small ones had failed. But for the most part I have not met with that success with it in chronic rheumatism, to place much confidence in it. In the form of liniment it has often proved serviceable.

7. In Sciatica and other Neuralgic affections.—Oil of turpentine was not introduced as a remedy for sciatica by Drs. Pitcairn and G. Cheyne. Its efficacy was subsequently confirmed by Dr. Home. More recently it has been extensively employed, and with great success, in

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2 Ibid. vol. xxiv. p. 827.
3 Thoughts on Puerperal Fever, and its Cure by Spirits of Turpentine: Lond. 1814.
4 Vide Bayle, Bibl. Thérap. t. iv.
5 Hufeland’s Journ. Ed. 20, St. 3, 8. 146.
6 Elem. of Therap. vol. ii. p. 120, 4th ed.
9 Clio. Experiments.
France, in sciatica as well as in various other neuralgias. But it is proved more successful in those which affect the lower extremity. My own experience does not lead me to speak very favourably of it. In a disease the pathology of which is so imperfectly understood is that of neuralgia, it is in vain to attempt any explanation of the methodus medendi of an occasional remedy for it. I have known oil of turpentine now and then act most beneficially in sciatica, without giving rise to any remarkable evacuation by the bowels, skin, kidneys, so that the relief could not be ascribed to a cathartic, diaphoretic, or a diuretic operation.

8. In Suppression of Urine.—I have seen oil of turpentine succeed in reproducing the urinary secretions when other powerful diuretics had failed.

9. In Infantile Diabetes.—Dr. Dewees* has cured three cases of diabetes [?] in infants under fifteen months old, "by keeping the bowels freely open, and putting a quantity of the spirits of turpentine upon the clothes of the children, so as to keep them in a tepid bithinathine atmosphere."

10. In Nephritic Diseases.—In some diseases of the kidneys, ulceration, the use of oil of turpentine has been much extolled. It has proved successful in renal hydatids.

11. In Ddropsy.—Oil of turpentine has occasionally proved serviceable in the chronic forms of this disease. Its efficacy depends in part, on its derivative operation as a stimulating diuretic; in part, as I conceive, on its powerful influence over the expulsive and secreting vessels, by which it exercises a direct power of checking effusion. It is inadmissible, or is contraindicated, with suppurating organs, or with irritation of the urinary organs. When the effusion depends on obstruction to the return of venous blood, caused by the pressure of enlarged or indurated viscera, tumors, &c., turpentine can be of avail. But in the atonic forms of dropsy, especially in leucoplastic subjects, attended with deficient secretion of the skin and kidneys, this oil is calculated to be of benefit. Dr. Copland* has used it in the stage of turgescence, or invasion of acute hydrophalus, as a drastic and derivative.

12. In Spasmodic Diseases.—Oil of turpentine has been employed successfully in the treatment of epilepsy, by Drs. Latham, Young, Ed. Percival, Lithgow, Copland, and Prichard. No benefit can be expected from this or any other medicine, when the disease depends on organic lesion within the osseous envelopes of the nervous centre. But when the disease is what Dr. Marshall Hall terms centripetal, eccentric, (as the convulsion of infants frequently is), that is, takes origin in parts distant from the cerebro-spinal axis, which becomes

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* Treatise on the Phys. and Moral Treat. of Children.
* Bayle, op. cit.
OIL OF TURPENTINE.

only through the incident or excitor nerves, we can easily
and their benefit may be obtained by the use of agents like
ich, while it stimulates the abdominal viscera, operates as a
c and anthelmintic, and produces a derivative action on the
A more extended experience of its use in chorea, hysteria,
its, is requisite to enable us to speak with confidence of its
in these diseases, though a few successful cases have been

Inflammation of the Eye.—Mr. Guthrie has employed oil
uine in inflammation of the iris and choroid coat, on the
ommended by Mr. Hugh Carmichael. In some cases, es-
those of an arthritic nature, it succeeded admirably, in others
of little or no service. It was given in doses of a drachm
es a day.

Tymanites.—To relieve flatulent distension of the stomach
vels, and the colic thereby induced, both in infants and
oil of turpentine is a most valuable remedy. It should be
full doses, so as to act as a purgative; or when, from any
ance, it cannot be exhibited by the mouth, it may be em-
in the form of clyster. Dr. Ramsbotham speaks in the
ers of the efficacy of the oil of turpentine in the acute
es of the puerperal state, and thinks that most of the cases
-called puerperal fever, which yielded to this oil, were in
of acute tymanites; and in this opinion he is supported
arshall Hall.

Obstinate Constipation.—Dr. Kinglake, in a case of obsti-
ation, with a tymanitic condition of the intestines, 1 of
a successful cathartic, after the ordinary
 treating these cases had been assiduously tried in vain. Dr.
also speaks highly of it in obstinate constipation depending
ions of the brain.

Assist the Passage of Biliary Calculi.—A mixture of three
phric ether and two parts oil of turpentine has been recom-
as a solvent for biliary calculi. But there is no foundation
position that the relief which may be obtained by the use
ixture in icterus and during the passage of a biliary calcu-
ds on the dissolution of the latter.

an External Remedy.—Oil of turpentine is employed ex-
as a rubefacient, in numerous diseases, on the principle of
uration, before explained (p. 145). Thus, in the form of
it is used, either hot or cold, in chronic rheumatism, sprains,
at, neuralgic affections of the extremities, &c. In the form

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*flaque.

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Observe sur l’Efficacité du Mélange d’Ether sulph. et d’Huile volatile de Téréb. dans
s. produites par des Pierres Biliares. 1790.
of fomentation the hot oil is applied to produce redness of the skin in puerperal peritonitis, as I have already mentioned. As a powerful local stimulant, it was recommended by Dr. Kentish \(^1\) as an application to burns and scalds, his object being to restore the parts gradually, not suddenly, to its natural state, as in the treatment of a case of frost-bite. The practice is most successful when the local injure is accompanied with great constitutional depression. I can bear testimony to its efficacy in such cases, having employed it in several most severe and dangerous burns with the happiest results. In the form of gangrene which is not preceded by inflammation, and is called dry or chronic, oil of turpentine may occasionally prove serviceable especially when the disease affects the toes and feet of old persons. There are many other topical uses to which it has been applied; but as they are for the most part obsolete, at least in this country, I can any further mention of them. They are fully noticed in the works of Voigtels \(^4\) and Richter \(^5\). Oil of turpentine is the principal ingredient in Whitehead’s Essence of Mustard, which contains also camphor and a portion of the spirits of rosemary. St. John Long’s liniment consisted of oil of turpentine and acetic acid, held in suspension by the yolk of egg \(^8\).

**Administration.**—When given as a diuretic, and to affect the capillary and secreting vessels (in catarrhal affections of the mucous membranes, dropsy, suppression of urine, hemorrhage, &c.) the dose is from six or eight minims to \(\frac{1}{3}\); as a general stimulant (in chronic rheumatism, chorea, &c.) or to produce a change in the condition of the intestinal coats (in chronic dysentery), from \(\frac{2}{3}\) to \(\frac{1}{3}\); as an anthelmintic (in tape-worm) or as a revulsive (in apoplexy, in epilepsy previous to an expected paroxysm, &c.) from \(\frac{1}{3}\) to \(\frac{1}{3}\). It may be taken floating on some aromatic water, to which some hot aromatic tincture, as tinctura capsici, has been added; or it may be diffused through water by the aid of mucilage or an emulsion; or it may be made into a liniment with honey or some aromatic syrup.

1. **Enema Terebinthinæ.** L. E. D.; Clyster of Turpentine.—[\(\frac{1}{3}\) of turpentine, \(\frac{1}{3}\).] Yolk of Egg, q. s. “Rub them together, and add Decoction of Barley, \(\frac{1}{3}\) xix. L.—The Edinburgh College substitutes plain Water for Barley Water.—The Dublin College directs \(\frac{1}{3}\) a Common Turpentine to be rubbed with the Yolk of one Egg, and \(\frac{1}{3}\) Ounces of Water, of a temperature not exceeding 100° F., to be added.)—Used as an anthelmintic in ascarides; as an antispasmodic and purgative in colic, obstinate constipation, and tympanites. J. Montgomery \(^{11}\) says, “it is much used in cases of peritoneal inflammation.”

2. **Linium Terebinthinæ.** L. D.; Liniment Terebinthinatum E.; Turpentine Liniment (Soft Soap, \(\frac{1}{3}\); Camphor, \(\frac{1}{3}\); Oil of T

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\(^1\) Essay on Burns.  
\(^2\) Argonauta, Bd. ii. S. 260.  
\(^3\) Ibid. Bd. ii. S. 74.  
\(^5\) Observ. on the Dublin Pharmacopeia.
flame inflammation, excited by the fire, has subsided, milder
ions are then to be resorted to. This liniment may also be
any other cases requiring the employment of a more stimulant
ion than the ordinary soap liniment.

3. Resinae Terebinthinae.—Terebinthinate Resins.

1. Resina, L. E. D.—Rosin or Common Resin.

paration.—This is the residue of the process for obtaining oil
ine. It is run, while liquid, into metallic receivers coated
it to prevent adhesion, and from these is ladled into
oulds or casks. When the distillation is not carried too
product contains a little water, and is termed Yellow Rosin
ava). A more continued heat expels the water and produces
ent Rosin; and if the process be pushed as far as it can be,
producing a complete alteration of properties, the residue ac-
depth colour, and is termed Brown or Black Rosin or Cal-
resa nigra seu Colophonium). If melted rosin be run into
er contained in shallow tanks, and a supply of cold water be
until the rosin has solidified, a pale yellow product is ob-
called Flockton’s Patent Rosin.

erties.—Rosin is compact, solid, brittle, almost odourless,
less, with a smooth shining fracture, becomes electric by
is fusible at a moderate heat, decomposable at a higher tem-
yielding among other products a volatile oil (Luscombe’s
), and an inflammable gas (Daniell’s rosin gas), and burning
ir with a yellow smoky flame. It is insoluble in water, but
in alcohol, ether, and the volatile oils. With wax and the
es it unites by fusion; with the caustic alkalis it unites to

(Continued on the following page.)
cipally) colophonic acid (variable in quantity), sylvic acid (a small quantity), and traces of an indifferent resin. m.

1. Pinic Acid.—May be regarded as an oxide of oil of turpentine. It is soluble in cold alcohol of sp. gr. 0.883. The solution forms a precipitate (pine tar-copper) on the addition of an alcoholic solution of acetate of copper. Pinae magnesia dissolves with difficulty in water. The ultimate composition of pinae acid (the essential constituent of rosin) is as follows:

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon</td>
<td>20</td>
<td>120</td>
<td>78.9</td>
<td>20</td>
<td>120</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>16</td>
<td>16</td>
<td>10.5</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Oxygen</td>
<td>2</td>
<td>2</td>
<td>10.5</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Pinic Acid</td>
<td>1</td>
<td>152</td>
<td>99.9</td>
<td>1</td>
<td>11</td>
</tr>
</tbody>
</table>

2. Colophonic Acid. (Colopheric Acid.)—Formed by the action of heat on pinic acid, and, therefore, the quantity of it contained in rosin varies according to the heat employed. Rosin owes its brown color to it. It is distinguishable from pinic acid by its greater affinity for salisifiable bases, and its slight solubility in alcohol. n.

3. Sylvic Acid.—Is distinguished from Pinic Acid by its insolubility in an alcohol of sp. gr. 0.883. Dumas regards it as isomeric with Pinic acid. Its formula according to Trommsdorff is $C_{18}H_{22}O_5$, and according to Rose $C_{20}H_{24}O_5$.

4. Indifferent Resin.—Is soluble in cold alcohol, oil of petroleum, and oil of turpentine. It forms with magnesia a compound readily soluble in water.

Physiological Effects.—Not being used internally, its effect when swallowed are scarcely known. It is probable, however, that they are of the same kind as those of common turpentine, though not considerably slighter. In the horse it acts as a useful diuretic, in doses of five or six drachms. Its local influence is mild. "It may be considered," says Dr. Maton, "as possessing astringency without pungency."

Use.—Powdered rosin has been applied to wounds to check hemorrhage, and is occasionally used for this purpose in veterinary practice. But the principal value of rosin is in the formation of plasters and ointments, to which it communicates great adhesiveness and some slightly-stimulant properties.

1. Ceratun Resine, L., Unguentum Resinosum, E.; Unguent. Resine alba, D., Yellow Basilicon or Basilicon Ointment, offic. (Resin; Wax, of each, lb. j.; Olive Oil, 33v.) Melt the Resin and the Wax together with a slow fire; then add the Oil, and press Cerate, while hot, through a linen cloth, L.—The Edinburgh College orders of Resin, 5v., Axunge, 5vij., Bees' wax, 5ij. Melt them together with a gentle heat, and then stir the mixture briskly until it cools and concretes.—The Dublin College directs of Yellow Wax, lb. j., White Resin, lb. ij., prepared Hogs' Lard, lb. iv. Make an ointment, which, while hot, should be strained through a sieve.

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Youatt, The Horse, in the Libr. of Useful Knowl.

Lambert's Pinnas.
Frankincense (Abietis resina, L., Thus, D.) in hot water, and through a coarse cloth. By this process part of the volatile impurities are got rid of. The substance sold as Bur­ditch in the shops is rarely prepared in this way, but is fictitious. Its principal constituent is rosin, rendered opaque by the action of water, and coloured by palm oil. One maker of it told me that he prepared it from old and concrete American pine.

Ovaries.—Genuine Burgundy pitch is hard, brittle when cold, being taken in the form of the vessel in which it is kept. It is yellowish white; its odour is not disagreeable; its taste bitter. Fictitious Burgundy pitch is usually of a fuller yellow than the genuine, and has a somewhat less agreeable odour.

Position.—Consists of resin principally, and a small quantity of oil.

Biological Effects.—Its effects are similar to those of the resin balsams. In activity it holds an intermediate station between turpentine and rosin, being considerably less active than the first, and somewhat more so than the last of these substances. Its local action is that of a mild irritant. In some persons it causes vesiculo-pustular inflammation.

It is employed as an external agent only, spread on leather, the well-known Burgundy pitch plaster (emplastrum picis dice), which is applied to the chest in chronic pulmonary affections, to the loins in lumbago, to the joints in chronic articular affections, and to other parts to relieve local pains of a rheumatic nature. It acts as a counter-irritant or revulsive.

Emplastrum Picis, L. E.: Plaster of Pitch.—(Burgundy Pitch, Pain in the Spine, Etc.) Thwad the resin; Wax of pitch, Nin
add to the other articles; mix them well together, and boil till the mixture acquires a proper consistence).—Stimulant and rubefacient, used in the same cases as the simple Burgundy Pitch.

4. Ρίξ λίκβα and Pίξ σόλνδα—Tar and Pitch.

1. Ρίξ Λίκβαδα, L. E. D.—Vegetable Tar.

**History.**—This is the πίξσα of Theophrastus, the πίξσα (liquid pitch), or κωπός, of Dioscorides, and the πίξ λίκβα of Pliny.

**Preparation.**—The process now followed seems to be identical with that practised by the Macedonians, as described by Theophrastus. It is a kind of distillatio per descensum of the roots and other woody parts of old pines. As now carried on in Bothnia, thus described by Dr. Clarke:—"The situation most favourable is in a forest near to a marsh or bog, because the roots of the fir, from which tar is principally extracted, are always productive in such places. A conical cavity is then made in the ground (generally in the side of a bank or sloping hill); and the roots of the fir, together with logs and billets of the same, are neatly trussed in a stack of the same conical shape, are let into the cavity. The whole is then covered with turf, to prevent the vol

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Fig. 215.

Preparation of Tar.

* Hist. Plant. lib. ix. cap. ii. and iii.
* Travels in Scandinavia, part 3, p. 251.—See also Duhamel, Troité des Arbres.
in being dissipated, which, by means of a heavy wooden and wooden stamper, worked separately by two men, is beaten and rendered as firm as possible about the wood. The stack is then kindled, and a slow combustion of the fir takes shout flame, as in working charcoal. During this combustor exudes, and a cast-iron pan being at the bottom of the spout which projects through the side of the bank, placed beneath this spout to collect the fluid as it comes as fast as the barrels are filled, they are bunged, and ready to exportation.”

Tar—Tar is brought to this country in barrels, each holding twelve barrels constitute a last. The quantities in the years 1830 and 1831, were as follows:

<table>
<thead>
<tr>
<th>Countries from whence Imported</th>
<th>1830</th>
<th>1831</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lasts</td>
<td>Barrels</td>
<td>Lasts</td>
</tr>
<tr>
<td>-------</td>
<td>---------</td>
<td>-------</td>
</tr>
<tr>
<td>France</td>
<td>9,675</td>
<td>6</td>
</tr>
<tr>
<td>Russia</td>
<td>990</td>
<td>8</td>
</tr>
<tr>
<td>Spain</td>
<td>88</td>
<td>7</td>
</tr>
<tr>
<td>Portugal</td>
<td>397</td>
<td>7</td>
</tr>
<tr>
<td>States of America</td>
<td>37</td>
<td>6</td>
</tr>
<tr>
<td>Guernsey, Jersey, Alderney, and Man (Foreign)</td>
<td>1,241</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>12,206</td>
<td>1</td>
</tr>
</tbody>
</table>

It is a dark brown, viscid, semi-liquid substance, serves during a long period its softness. It is soluble in ether, and the oils both fixed and volatile. Submitted to fire, it yields an acid liquor (pyrohneous acid), and a volatile (tar); the residue in the still is pitch. Oil of tar is brownish, consists of oil of turpentine, impregnated with pyrogenous oil

Vegetable tar consists of several pyrogenous resins, with acetic acid, of colophony, oil of turpentine, and pyro-

The liquidity of tar is owing to the two last-mentioned facts, which hold the resins in solution.

Theological Effects—The effects of tar are analogous to turpentine, but modified by the presence of acetic acid and numerous products. Locally it acts as a stimulant, and, when chronic skin diseases and indolent ulcers, it frequently inductary changes in the action of the capillary and secering inced by the improved quality of the secretions, and the ting of the sores. In such cases it is termed detergent, or cicatrisant. Swallowed, it acts as a local irritant and, becomes absorbed, and stimulates the secreting organs, the kidneys, on which it operates as a diuretic. Slight at a sailor swallowed a considerable quantity of liquid tar,
which caused vomiting, great lassitude, and violent pain in bowels and kidneys. The urine was red, and, as well as the other evacuations, had the odour of tar. The head and the pulse were unaffected. The vapour of tar, inhaled, acts as a stimulant and irritant to the bronchial membrane, the secretion of which it promotes.

Uses.—Tar is rarely employed internally. It has, however, been administered in chronic bronchial affections, and in obstinate skin diseases.

The inhalation of tar vapour was recommended by Sir Alexander Crichton\(^1\) in phthisis; but at best it proves only a palliative, and frequently, perhaps generally, fails to act even thus, and in some cases occasions a temporary increase of cough and irritation. In chronic laryngeal and bronchial affections, it has more chance of doing good\(^2\). The mode of using tar fumigation I have before described (p. 151).

Applied externally tar is used in various forms of obstinate diseases, especially those which affect the scalp, lepra, &c.

Administration.—Internally, tar is administered in the form of pills made up with wheat flour, or in that of electuary, with sugar. It may be taken to the extent of several drachms daily.

1. **AQUA PICIS LIQUIDÆ, D., Tar Water.**—(T'ar, Oil; Water, Cong. [wine-measure].) Mix, stirring with a stick for a quarter of an hour, as soon as the tar subsides, strain the liquor, and keep it in unstoppeded jars).—Tar water has the colour of Madeira wine, and a sharp empyreumatic taste. It consists of water holding in solution acetic acid, and pyrogenous oil and resin. Notwithstanding the high eulogies passed on it by Bishop Berkeley\(^3\), tar water is rarely employed. It is occasionally administered in chronic catarrhal and nephritic complaints, to the extent of one or two jugs daily. As a wash in chronic skin diseases, especially those affecting the scalps of children, I have frequently seen it used, and sometimes with apparent benefit.

2. **UNG UENTUM PICIS LIQUIDÆ, L. E. D.; Tar Ointment.**—(Tar, Oil.) Melt together, and press through a linen cloth [a sieve, D.] Mutton Suet, of each, lb. ½. The Edinburgh College takes of Tar, and Bees' Wax 5i.; melt the wax with a gentle heat, add the oil, and stir the mixture briskly, while it concretizes on cooling).—Principal use is as an application to ring-worm of the scalp and scaly head; in which it sometimes succeeds, but more frequently fails. It is now and then applied to foul ulcers.

3. **OLEUM PICIS LIQUIDÆ; Oleum Pini rubrum; Oil of Tar.**—This is obtained by distillation from tar. It is a reddish, limpid fluid, having the odour of tar. By re-distillation it may be rendered colourless.

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2. Dr. Forbes, Transal. of Launuc's Treat. on Diseases of Chest, p. 365.
3. Trouseau and Pidoux, Traité de Thérap. t. i. p. 459.
1. Then becomes very similar to oil of turpentine. It is occasionally used as an application to ringworm of the scalp and scalded skin when swallowed in a large dose it has proved fatal.


(Pis arida, K.)

**BY.—** This is the *πίσσα ἐπιά* (dry pitch) of Dioscorides, some call *παλίππος* (pitch boiled again).

**FORMATION.—** When vegetable tar is submitted to distillation, an acrid (pyroligneous acid) and a volatile oil (oil of tar) pass over; the residuum in the still is pitch (*pis nigra*, L.)

**USES.—** At ordinary temperatures it is a black solid, having a brittle fracture. It softens at 90°F. and melts in boiling water in alcohol and in solutions of the alkalis and of the alkaline earths.

**PREPARATION.—** Pitch is composed of pyrogenous resin and colophony principally of pyretine.

**PHARMACOLOGICAL EFFECTS.—** Made into pills with flour or any other substance, pitch may be taken to a great extent, not only without injury, but with advantage to the general health. It affords the most effectual means of controlling the languid circulation, the inert and arid condition of the skin. As a local remedy it has great adhesiveness, and when applied to wounds and ulcers is stimulant and digestive.

—Bateman speaks favourably of the internal use of pitch, saying it has been employed also in other obstinate skin diseases. But the principal use of pitch is in the form of ointment, application to cutaneous affections of the scalp.

**ADMINISTRATION.—** Dose from grs. x. to 5j. made into pills with the unpleasant pitchy flavour of the pills is materially diminished by keeping them for some time.

*Unguentum Picis Nigri*, L.; *Unguentum Basilicum nigrum vel aneracum.*—(Black Pitch, Wax, Resin, of each 3ix.; Olive Oil 4 j. Melt them together, and press through a linen cloth). Mixture is antiseptic and digestive; used in the obstinate cutaneous eruptions of the scalp.

*IPERUS COMMUNIS, Linn. L. E. D.—Common Juniper.*

(Sex. Syst. Dioica, Monadelphia.

Fructa; Fructus, L. Cacumina; Oleum, E. Cacumina; Bacca, D.)

**SYN.—** It is very questionable whether this shrub is mentioned in the Old Testament, though its name occurs in several places (M将自己的文档转换为自然语言的文本)
places 1. The fruit, called by the Greeks δακτυλικός, and used by Hippocrates in some disorders of females, was the produce of a species Juniperus: either J. communis, which Dr. Sibthorp 2 found growing on Olympus and Athos; or J. phoenicia, which is very common in Greece and the islands of the Archipelago, and whose fruit is yellowish, but has the size, form, and powers of that of the common juniper.

**Botany. Gen. Char.**—**Diecious, rarely monoecious. Males:** Ovular scales ovate; the scales verticillate, peltato-pedicellate. **Anthers** from six to eight, unilocular. **Females:** Catkin globose; the three cones of scales united. **Stigma** gaping. **Gynoblasium**, composed of the united and fleshy scales, and containing three triquetrous, osseous seeds.

**Sp. Char.**—**Leaves** three in a whorl, mucronate, spreading or imbricated, longer than the gynoblasium.

A bushy shrub. **Leaves** evergreen, numerous, linear, pungent, glaucous on the upper side, dark green beneath. **Flowers** axillary, sessile, small; the **males**, discharging a copious cloud of yellow pollen; **females** green, on scaly stalks. **Fruit** commonly called **berry**, but is in reality that kind of cone called by botanists a **gynoblasium**, which has fleshy, coalescent carpella, whose heads are much enlarged. It requires two seasons to arrive at maturity.

Two varieties (some botanists consider them to be distinct species) described.

- **J. communis**, Smith.—**Stem** erect. **Leaves** spreading. **Fruit** scarcely more than half the length of the leaves.
- **J. nana**, Smith.—**Stem** procumbent. **Leaves** imbricated. **Fruit** nearly long as the leaves.

**Hab.**—North of Europe. Indigenous, growing on hills and heaths, especially where the soil is chalky. It flowers in May.

**Description.**—In this country the **fruit** and **tops**, on the continue the **wood** also are officinal.

**Juniper berries** (baccae juniperi), as the dried fruit of the shops, commonly termed, are about the size of a pea, of a blackish-purplish colour, covered by a glaucous bloom. They are marked—superior with a triradiate groove, indicating the adhesion of the succulent carpella—inferiorly with the bracteal scales, which assume a stellar form. They contain three seeds. Their taste is sweetish, with a terebinthinate flavour; their odour is agreeable and balsamic.

**Juniper tops** (cacumina seu summitates juniperi) have a bitter, terebinthinate flavour, and a balsamic odour.

**Juniper wood** (lignum juniperi) is obtained either from the stem or root; it evolves a balsamic odour in burning, and, and by distillation with water, yields volatile oil. On old stems there is sometimes found a resinous substance (resina juniperi; sandaraca germanica).

**Commerce.**—Juniper berries are imported in bags and barrels from Rotterdam, Hamburg, Leghorn, Trieste, and other European ports. In 1838, duty (2s. per cwt.) was paid on 5896 cwt.

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1 Job, ch. xxxv. v. 4; 2 Kings; ch. xix. v. 4, in our translation.

2 Prod. Fl. Greece.
COMMON JUNIPER.

POSITION.—Juniper berries were analyzed in 1822 by Trommsdorff and in 1831 by Nicolet. Trommsdorff obtained volatile oil 4.0, resin 10.0, a peculiar species of sugar with acetate and of lime 33.8, gum with salts of potash and lime 7.0, lignin water 12.9 (excess 37).

OF JUNIPER (see below).

HAB.—Is green, according to Trommsdorff. Nicolet obtained it in the crystals, and found it to consist of C8 H8 O4.

X.—Is brittle. Consists, according to Nicolet, of C12 H8 O4.

MAR.—Is crystallizable, and analogous to grape sugar, according to Loth. But Nicolet describes it as being like molasses.

PHYSICAL PROPERTIES.—Juniper berries and tops are analogous to the terebinthinate substances. Three ounces of these act on the larger herbivorous animals as a diuretic. On so, these fruits operate on the urinary organs, promoting the passage of urine, to which they communicate a violet odour. In cases they occasion irritation of the bladder, and heat in the passages. Piso says, their continued use causes bloody urine. They promote sweat, relieve flatulence, and provoke the bowels. Their activity is principally dependent on the volatile substance they contain; and which, according to Mr. Alexander's analysis, is, in doses of four drops, the most powerful of all the volatile substances.

—Juniper berries or oil are but little used in medicine. They are employed either alone or as adjuncts to other diuretics, in cases of dropsical disorders indicating the employment of renal stimulants. Van Swieten speaks favourably of their use in mild cases of the urinary and anal diseases. In some affections of the urino-genital glands, juniper may be employed with advantage. Thus, in discharges (as gonorrhœa, gleet, leucorrhœa, and cystorrhœa), it is used under the same regulations that govern the employment of Copaiba and the terebinthines. Hecker praised it in the treatment of gonorrhœa.

Mr. Alexander has been advised in some other diseases; but I do not pretend to enumerate them.

DISTILLATION.—The dose of the berries is one or two drachms, and with sugar. The infusion (prepared with an ounce of the berries and a pint of boiling water) is a more convenient mode of administration: the dose is three times every four hours.

JUNIPER OIL, L. E. D.; OIL OF JUNIPER.—It is obtained by distilling the fruit, tops, or wood, to distillation with water. The volatile oil of juniper contains:

<table>
<thead>
<tr>
<th>Compound</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volatile oil</td>
<td>4.0</td>
</tr>
<tr>
<td>Resin</td>
<td>10.0</td>
</tr>
<tr>
<td>Sugar with acetate and lime</td>
<td>33.8</td>
</tr>
<tr>
<td>Gum with salts of potash and lime</td>
<td>7.0</td>
</tr>
<tr>
<td>Lignin water</td>
<td>12.9</td>
</tr>
</tbody>
</table>

Table, at p. 94.


[Table: 12% volatile oil, 10% resin, 33% sugar with acetate and lime, 7% gum with salts of potash and lime, 12% lignin water.]

On this subject, Vogt, Lehmb. d. Pharmacodynam.; Richter, Arzneimittel; and Sundelin, Arzneimittel.
full-grown, green fruit yields more than the ripe fruit; for, in the case of ripening, a portion of the oil becomes converted into resin. It is limpid, transparent, nearly colourless, and lighter than water. It has the odour of the fruit, and an aromatic, balsamic taste. It dissolves with difficulty in alcohol. According to Blanchet, it consists of two isomeric oils: one colourless, and more volatile; a second colourless and less volatile. Both, when agitated with a solution of salt, form crystalline hydrates. The composition of oil of juniper is analogous to that of oil of turpentine, being $C_{10}H_{8}$.

The oil is, perhaps, the best form for exhibiting juniper. The dose is two to six drops, either in the form of pill, or diffused through water by the aid of sugar and mucilage.

2. SPIRITUS JUNIPERI COMPOSITUS, L. E. D.; Compound Spirit, Juniper.—(Juniper berries, bruised, 5xv. [lb. j. E. D.]; Caraway, bruised; Fennel, bruised, of each, 3ij. [iiss. E. D.]; Proof Spirit, Cong. j. [Ovij. E.]; Water, Oij. [as much as may be convenient]. Mix; then, with a slow fire, let a gallon distil, L.—The Edinburgh and Dublin Colleges order the fruit to be macerated in the spirit [2 days, E.]; for twenty-four hours, D.; the water then added, 4 [seven pints, E., a gallon, D. of] the spirit distilled).—This preparation, when sweetened, may be regarded as an official substitute; genuine Hollands and English Gin (see p. 364), both of which compounds are flavoured with juniper. It is used as an adjunct in diuretic mixtures. The dose is 35j. to 35iv.

5. JUNIP’ERUS SABI’NA, Linn. L. E. D.—COMMON SAVIN.

Sex. Syst. Dioscia, Moundelphia.

(Cacumina recentia et exsiccata, L.; Tops, E.; Folia, D.)

History.—This is the βάτραχος of Dioscorides, the sabina of Pliny. Both these writers notice the two varieties of this plant.


Sp. Char.—Leaves ovate, convex, densely imbricated, erect, decurrent, opposite; the oppositions pyxidiate (Bot. Gall.)

A small, bushy shrub. Branches closely inverted by the very small glandular leaves. Galbulus round, purple, somewhat smaller than that of Juniper communis.

Two varieties are distinguished:—

a. J. Sabina cupressina.—Leaves acute, more spreading, three lines long.

b. J. Sabina tamariscifolia.—Leaves shorter, almost pressed and obtuse.

Hab.—Midland and southern parts of Europe; Asiatic Russia. Cultivated in gardens in this country. Flowers in April.

Description.—The official parts of the plant are the tops (cucumina; summitates), which consist of the young branches with the attached leaves. They have, in the fresh state (cacumina recent
COMMON SAVIN.

ng, peculiar, heavy odour, especially when rubbed; and a nau-
as, resinous, bitter taste. The dried tops (cuminum exsiccatum) are
owish green, and less odorous than the fresh ones.

COMPOSITION.—Some experiments on the composition of savin
made by Berlinsky. In 1837 an analysis of this plant was made
a young chemist of the name of Gardes. The constituents are,
atile oil, Resin, Gallic acid, Chlorophylle, Extractive, Lignin, and
es of Lime.

ML OF SAVIN (see p. 1067).

CHEMICAL CHARACTERISTICS.—An aqueous infusion of savin is
owish, has the odour and bitter taste of the herb, and forms a
able green compound (gallate? of iron) on the addition of sesqui-
ride of iron, but is unchanged by a solution of gelatin. Oxalate
monia causes, in the infusion, a white precipitate (oxalate of
). Alcohol acquires a green colour when digested with the tops;
the addition of water to the alcoholic tincture some resin is
rated. By distillation with water, both the fresh and dried tops
t especially the first) yield volatile oil.

PHYSIOLOGICAL EFFECTS. a. On Animals.—Savin acts on animals
an acrid poison. Orfila applied two drachms of the powder to an
sed wound in the leg of a dog; inflammation and infiltration of
limb took place, and death occurred in about thirty-six hours.
Drachms introduced into the stomach of a dog, and the esophagus
, caused death in thirteen hours; the stomach was bright red,
rectum a little inflamed. Orfila infers that its effects depend
icably on its absorption, and its action on the nervous system,
rectum, and the stomach. A drachm of oil of savin was given by
lefield to a cat. It caused a flow of saliva, anxiety, frequent
charge of urine, dulness, trembling, and, in an hour and a quarter,
yd urine. The animal having been strangled, the bladder was
tracted, with some coagulated blood contained in its cavity.

b. On Man.—Oil of savin, the active principle of the herb, is a
erful local irritant. When applied to the skin, it acts as a rub-
ent and vesicant. On wounds and ulcers, its operation is that of
acid (not chemical) caustic. Swallowed in large doses, it occa-
s vomiting, purging, and other symptoms of gastro-intestinal
mation. In its operation on the system generally, it is powerfully
ulant. "Savin," says Sundelin, "operates not merely as irritants
ally do, as a stimulant to the arterial system, but it also emi-
heightens the vitality of the venous system, the circulation in
it quickens. It next powerfully stimulates the absorbing
els and glands, the serous, the fibrous, and the mucous membranes,
the skin. It operates as a specific excitant and irritant on the
ys, and yet more obviously on the uterus. The increased
secretion of bile and the augmented volume of the liver, both of which conditions have sometimes been observed after the copious and continued use of savin, appear to be connected with its action on the venous system.” Mohrenheim mentions the case of a woman, 30 years of age, who swallowed an infusion of savin to occasion abortion. Violent and incessant vomiting was induced. After some days she experienced excruciating pains, which were followed by a dreadful hemorrhage from the uterus, and death. On examination, the gall-bladder was found ruptured, the bile effused in the abdomen and the intestines inflamed. The popular notion of its tendency to cause abortion, leads, on many occasions, to the improper use of savin, and the above is not a solitary instance of the fatal consequences thereof. A fatal case of its use as an emmenagogue is recorded by Dr. Dewees. That it may frequently fail to provoke premature labour is shown by the case, related by Fodéré, of a woman in order to produce abortion, took every morning for twenty-one hundred drops of this oil, and yet went her full time, and brought forth a living child. It ought to be well known that in those cases in which it may succeed in causing miscarriage, it can only do so with the risk of the woman’s life. Vogel says that it has a tendency to produce an apoplectic state in the fetus. The emmenagogue properties of savin are fully established. Perhaps the observations of Homer, the most satisfactory of any on this subject, confirmed as they are by the reports of many other accurate observers.

Uses.—Savin is not much used internally; but, in cases of amenorrhea and chlorosis, depending on or accompanied by a torpidity of the uterine vessels, it may be given as a powerful uterine stimulant. In such cases it proves a most efficacious remedy. According to my own observation, it is the most convenient and powerful emmenagogue of the whole materia medica. My experience of it, therefore, confirms the statements of Homer. That I have employed it in numerous cases, I never saw any ill result from its administration. Of course its use is contra-indicated in cases of irritation of the uterus, or indeed of any of the pelvic viscera.

In chronic rheumatism, with a languid circulation in the extremities, Savin is spoken of in very high terms of it. It has been employed as an anthelmintic.

As a topical agent, Savin is frequently employed, mostly in the form of the cerate, to make perpetual blisters. Equal parts of Savin and verdigris, in powder, form one of the most efficacious applications for the removal of venereal warts. The powder, an infusion, or the expressed juice of the plant, is occasionally applied to old and indolent ulcers, and in cases of psora and tinea.

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5 Compend. Syst. of Midwifery, pp. 133-4.
6 Med. Leg.
7 Pharmacogn.
8 Clinical Experiments, p. 419.
9 Ibid.
10 Elem. of Therap.
OTHER MEDICINAL PRODUCTS OF CONIFERÆ.

Deministration.—By drying, savin loses part of its volatile oil, hence the powder is not the best preparation of it. It is, however, sometimes given in doses of from five to fifteen grains. Action and extract are also objectionable preparations, on account of the heat employed in making them. An infusion may be prepared by digesting 3ti. of the fresh herb in f3viii. of boiling water: dose is one or two table-spoonfuls. The oil is by far the most venent and certain preparation of savin, and is the one which I usually employ. A conserve of the fresh leaves is sometimes used.

OLEUM SABINÆ, E. D.; Oil of Savin.—This is obtained by sitting the fresh tops to distillation with water. It is a limpid, clear colourless liquid, having the unpleasant odour of the plant, a bitter, acrid taste. Its sp. gr. is 0.915. Its composition is analogous to that of oil of turpentine, being C10 H16. Its one on menagogue, is from two to six drops, diffused in a mucilaginous baginous mixture.

CERATUM SABINÆ, L. E.; Unguentum Sabinæ, D.; Savin Ointment.—(Savin [fresh, E.; the leaves stripped from their stalks, D.], sed, lb. i. [lb. ss., D.]; Wax, lb. ss.; Lard, lbs. ii. Mix the 1 in the lard and wax melted together, then press through a linen 1. The Edinburgh and Dublin colleges boil them [in the lard, D.] together, until the leaves are crisp).—The boiling is considered objectionable on account of the loss of a portion of the oil. Colour of this cerate should be fine green, and its odour that of plant. Savin cerate is used as a dressing to blistered surfaces, to face what is termed a perpetual blister. It is preferred to the 1um cantharidis as being less acrid, and not liable to cause agury. It is sometimes applied to seton tapes, to increase the charge from setons.

Antidotes.—In a case of poisoning by savin herb or its oil, the indication is to remove the poison from the stomach and bowels, atries and demulcent drinks should then be given. The warm bath be advantageously employed. Blood-letting should be resorted to if the inflammatory symptoms indicate, and the condition of use permit, it.

OTHER MEDICINAL PRODUCTS OF CONIFERÆ.

GEMMÆ SEU TURIONES ABIETIS.—The leaf-buds of the Norway Spruce Fir (Picea excelsa), as well as of the Silver Fir (Abies Picea), are used on the continent, in the form of decoction or beer; or, with the woods of guaiacum and uras, and juniper berries, in the form of tincture (tinctura pini composita, Ph. C.) They are employed in scorbutic, rheumatic, and gouty complaints.

Essentia Abietis.—Essence of Spruce is prepared by boiling the young of some coniferous plant (in America, those of Abies nigra or Black Spruce, subsp) in water, and concentrating the decoction by evaporation. "It is a
thick liquid, having the colour and consistence of molasses, with a bitter
acrid, astringent taste." It is used in the preparation of spruce beer.

3. Cerevisia Abietis.—Spruce Beer is thus prepared:—Take of Essence
Spruce, half a pint; Pimento, bruised; Ginger, bruised; Hops, of each, fo
ounces; Water, three gallons. Boil for five or ten minutes; then strain, and ad
of warm water, eleven gallons; Yeast, a pint; Molasses, six pints. Mix, and allo
the mixture to ferment for twenty hours 1." It is sometimes taken as an agree
able and wholesome drink in summer. It is diuretic and anti-scorbutic, as is,
in consequence, employed in long sea-voyages as a preventive of scurvy.

4. Juniperus Virginiana, Linn., the Red Cedar (the wood of which is used in
blacklead pencils) is used in the United States as a substitute for savin.

5. Sandarach or Juniper Resin.—The resin called sandarach (sanderax
or gum juniper, gummi juniperi), is imported from Mogador. It is the resin
of Calitris quadricavata, Vent. (Thuja articulata, Desf.) Though sold by ch
mists and apothecaries, it is not employed in medicine. It is used in the manu
facture of varnishes. Its powder is pounce.

6. The fruit of the Common Yew, Taxus baccata, is poisonous. In one in
(that of a child) it caused vomiting, convulsions, purple lips, dilated pupil, and
death in less than four hours 2.

ORDER XXIII.—BALSAMACEÆ, Lindley.—THE
LIQUIDAMBAR TRIBE.

Balsamiflorae, Blume.

Though this order yields no official substance contained in the British pharma
ceuticals, yet the two balsamic oleo-resins, liquidambar and liquid storax (es,pe
cially the latter) are frequently met with in the shops, and, therefore, require
be noticed.

1. Balsam of Liquidambar (Balsamum Liquidambar, T. W. C. Maria
Liquidambar, Guibourt; Copalm balsam).—This is procured in Mexico or
Louisiana by making incisions into the stem of Liquidambar Styraciflua. The
liquid balsam (fluid liquidambar, or oil of liquidambar, Guib.) is transparent,
ber-yellow, has the the consistence of a thick oil, a balsamic odour, and an ex
mastic, acrid, bitter taste. The solid balsam (soft or white liquidambar, Guibou
white balsam of Peru, Auctor.) is a soft, almost opaque, solid, very similar in
appearance to concrete turpentine. Its odour is similar to, though weaker than
the liquid balsam. Its taste is balsamic and sweetish. Bonati analyzed a very fluid sample, recently received from America, and found it
consist of—Volatile oil 70; semi-concrete matter 111; benzoic acid 10; crystals
mater soluble in water and alcohol 55, yellow colouring matter 205, oleo-resin 5
styrac 24; 0, loss 055. The volatile oil consists, according to Henry,
C10H17. Styracin is a fusible, crystalline substance, soluble in boiling a
and composed, according to Henry, of C11H15O4. The effects and uses of liq
ambar are similar to those of other balsamic substances (videlicet p. 74). The ra
of it is from ten to twenty grains.

2. Liquid Balsam of Storax (Styrax liquidus, officin.).—This is said to
procured from the Liquidambar Altingia, Blume, (Altingia excelsa, Noronha),
native of Java, where it is called Ras-sana-la (Rasamalla or Rosa-mallus, Auct.
But on referring to the books of a wholesale druggist, I find that all the storax (liquid and solid), which has been imported into this country during the last
seven years, came from Trieste; and from this circumstance Dr. Lindley ex
pects that the liquid storax of the shops is the produce of Liquidambar orientis
a native of Cyprus, and other parts of the east of Europe; but there is no rea
believe that liquid storax is obtained in Europe. Petrèr 3 says, that the storax
which yields it is the Rosa mallus, and grows in Cobross, an island at the
end of the Red Sea, near Cadess, which is three days' journey from Suez.

1 First United States Dispensatory.
2 Ibid.
3 Lancet, Dec. 10, 1836.
Willow.

A pellucid liquid, having the consistence and tenacity of Venice turpentine, a brownish yellow colour, a sweetish storax-like odour, different to that of liquidambar. A few particles of bran or saw-dust are intermixed with it. It was sold to me as balsam or balsam storax, and I was informed that it had been imported in jars, each holding 4 lbs. It agrees with the pure or fine liquid storax of Hill, the styrax liquida finissima of Alston. Professor Guibourt, to whom I sent a sample, regards it as a balsam of liquidambar, somewhat thickened by age.

The second kind is the common liquid storax of the shops; the impure or coarse liquid storax of Hill; and doubtless is the variety referred to by Petiver. It is imported in casks, holding about 4 cwt. each. It is opaque, of a grey colour, has the consistence of birchwood, and the odour of storax, but frequently intermixed with an odour of naphtha. The substance met with in the shops and sold to perfumers under the name Strained Storax (Styrax colatus) is prepared from this variety of liquid storax, by heating it until the water is evaporated, and then straining it. During the process it evolves a very fragrant odour. The impurities are stones, sand, &c. No complete analysis of liquid storax has been made. The following substances, however, are contained in it:—Volatile oil, erucic acid, resin, styracins, matter soluble in boiling alcohol (wax?), fragments of bark, and earthy matter. Oil of Storax consists of C34 H64 O2. The effects and uses of liquid storax are similar to those of other balsamic substances (vide p. 183). Its dose is from 3i. to 3i.

Order XXIV.—Salicaceæ, Lindley.—The Willow Tribe.

Essential Character.—Flowers unisexual, either monoeious or dioecious, amethystous. Stamens distinct or monadelphous; anthers two-celled. Ovary superior, one or two-celled; ovules numerous, erect, at the base of the cell, or adhering to the lower part of the sides; style one or none; stigmas two. Fruit coriaceous, one or two-celled, two-valved, many-seeded. Seeds either adhering to the lower part of the axis of each valve, or to the base of the cell, reniform; albumen none; embryo erect; radicle inferior.—Trees or shrubs. Leaves alternate, simple, with deliquescent primary veins, and frequently with gland; stipules deciduous or persistent (Lindley).

Properties.—The astringency possessed by most willow barks is referable to tannic acid. The bitterness and tonic properties depend on salicine, populin, or some uncrystallizable principle.

Salix, Linn.—Willow.


(cortex e speciebus salis diversis : cortex salici, offic.)

History.—Dioscorides speaks of the astringent qualities of the tree, of Willow (? Salix alba), which was employed in medicine by the ancients. For a long series of years it fell into disuse, but was again brought into notice in 1763 by the Rev. Mr. Stone, who pub-
lished a paper on the efficacy of the bark of *Salix alba*, as a remedy for agues.

**Botany. Gen. Char.** — *Flowers* dioecious, or rarely monoecious; *scales* imbricated; a *gland* surrounding the stamens of the ovary. **Males:** — *Stamens* two to five, usually two, sometimes the two united into one, and then the anther is four-celled. **Females:** — *Seeds* comose; the *radicle* inferior (*Bot. Gall.*).

**Species.** — Sir J. E. Smith mentions sixty-four indigenous species of *Salix*; but pharmacological and botanical writers are not agreed as to which species possesses the most medicinal power. The best practical rule to follow is this: — Select those whose barks possess great bitterness, combined with astringency. The following are those which are in the greatest repute:—

1. *Salix Russelliana*, Smith; *the Bedford Willow.* — Leaves lanceolate, tapering at each end, serrated throughout, very smooth. *Footstalks* glandular or leafy. *Germen* tapering, stalked, longer than the scales. *Style* as long as the stigmas (Smith). — A tree in marshy woods, wet meadows, &c., in various parts of Britain. Flowers in April and May. Its bark abounds in tannic acid. On account of its astringency, Sir J. E. Smith regards it as the most valuable officinal species; and he observes, that if it has occasionally disappointed medical practitioners, they probably chanced in such cases to give the *S. fragilis*.

2. *Salix alba*, Linn., D.; *the Common White Willow.* — Leaves elliptic-lanceolate, pointed, serrated, silky on both sides; the lower serratures glandular. *Stamens* hairy. *Germen* smooth, almost silky. *Stigmas* deeply cloven. *Scales* rounded (Smith). — A tall tree, on river-sides, moist woods, &c., in various parts of Britain. Flowers in May. Its bark, called *cortex salignum*, or *cortex anglicanum*, is astringent, but less so than that of the preceding species.

![Fig. 216.](image1)

![Fig. 217.](image2)

*Salix Russelliana.*

*Salix alba.*
'Alis Ca'prea, Linn. E. D.; Great Round-leaved Willow.—
rect. Leaves roundish-ovate, pointed, serrated, waved; pale
whiny beneath. Stipules somewhat crescent-shaped. Calkins
Germens stalked, ovate, silky. Stigmas nearly sessile, undi-
Capsules swelling (Smith).—A tree. Indigenous, very com-
growing in woods and hedges. Flowers in April.
'Alis Fragitis, Linn. D.; the Crack Willow.—Leaves ovate-
late, pointed, serrated throughout, very smooth. Footstalks
lar. Germens ovate, abrupt, nearly sessile, smooth. Scales
, about equal to the stamens and pistils. Stigmas cloven,
than the style (Smith).—A tree. Indigenous: about the banks
s. Flowers in April and May.
'Alis Pentandra, Linn.; Sweet Bay-leaved Willow.—This
is official in the Prussian Pharmacopoeia, and is preferred
as Von Eisenbeck to all other species. Its bark is the cortex
taurae of some pharmacologists.
'Alis Purpur'ea, Linn.; Bitter Purple Willow.—This species
notice on account of the intense bitterness of its bark.
cription.—Willow bark (cortex salicia) varies, in its appear-
qualities, according to the species and the age of the tree
ich it is procured. In the dried state, it is usually quilled
ourless. It should have a bitter and astringent taste.
osition.—The bark of Salix alba was analyzed by MM. Pel-
and Caventou, who obtained the following results:—Bitter
colouring matter, green fatty matter, similar to that found in
a, tannin, resinosous extract, gum, wax, woody fibre, and a mag-
salt, containing an organic acid.
 celebrated chemists failed to isolate salicin, which must have
ontained in their bitter yellow colouring matter, either mixed
ined with some other matter. Their resinosous extract is pro-
dentical with what Braconnet calls corticin.
Nnic Acid.—This is the astringent principle of willow bark. Sir H.
ives the following as the quantities of tannin [impure tannic acid], in
of two willows:

<table>
<thead>
<tr>
<th></th>
<th>lbs. of tannin.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leicestershire Willow [Salix Russelliana] large size</td>
<td>33</td>
</tr>
<tr>
<td>Common Willow ... [Salix ...] ... large</td>
<td>11</td>
</tr>
</tbody>
</table>

licin.—See p. 1074.

chemical characteristics.—A decoction of the bark, made with
water, is coloured dark green (tannate of iron) by ses-
ride of iron; but, made with spring water, dark purple.
f of gelatin produces a precipitate (tannate of gelatin) in the
ion; but tincture of nutgalls causes no turbidity. A strong
ion of willow bark, containing much salicin, is reddened by
rated sulphuric acid.

iological Effects.—Willow bark possesses both bitterness

1 Journ. de Pharm. t. vii. p. 123.
and astringency. It belongs, therefore, to the astringent tonics, whose effects have been already noticed (p. 189). It is less apt to disturb the stomach than cinchona, but its tonic and febrifuge powers are less than the latter. Vogt ascribes to it balsamic properties.

Uses.—It has been employed as an indigenous substitute for cinchona. The indications for its use, therefore, are the same as those for the latter. It is given in intermittent, dyspeptic complaints accompanied with, or dependent on, a debilitated condition of the digestive organs, passive hemorrhages, chronic mucous discharges, in the stage of convalescence after fever, and as an anthelmintic. As a local astringent, the powder or infusion is sometimes employed; but there are many more efficient remedies of this kind.

Administration.—The dose of the powder is 5 ss. to 5. The infusion or decoction (prepared with 5 j. of the bark, and 0 j. of water may be given in doses of from 3 5 j. to 5 1 j."

Salicin.—Discovered by Buchner in 1828. Has been found about fourteen species of Salix and eight species of Populus. It has been detected in the bark, leaves, and flowers. Herberger obtained 23 grs., Merck 251 grs., from 16 ounces of the bark and young twigs of Salix Helix. Erdmann, however, procured, by another process, 36 grs. from the bark of Salix pentandra. Merck’s process for obtaining it, as stated by Liebig, is as follows:

“Dried or fresh willow bark is cut small, and exhausted by repeated boiling with water. The decoctions are concentrated, and while boiling treated with latharle till the liquor appears nearly colourless. The dissolved oxide of lead, removed, first by sulphuric acid, afterwards by sulphuric acid of barium, and, after the separation of sulphuric acid of lead, evaporated, when salicin crystallizes; and purified by repeated solution and crystallization (Merek). From willow bark which is fresh and rich in salicin, it may be obtained by cautious evaporation of the cold aqueous infusion (Merek). The oxide of lead removes from the solution gum, tannin, and extractive matter, which would impede the crystallization of the salicin. It also combines with the salicin, forming a kind of salt, which is decomposed by the sulphuric acid and sulphate of barium. If the latter is carefully added, neither sulphuric acid nor baryta remain in the solution; as the sulphuret of lead, which separates, acts as a decolorizing agent.”

Salicin crystallizes in silky needles and laminae. It is white, very bitter, inodorous, neutral to vegetable colours, fusible at 230° F., and combustible at a higher temperature. It is much more soluble in boiling than in cold water; it is also soluble in alcohol, but not so in ether or the volatile oils. It is not precipitated by any agent. If oil of vitriol be added to it, it becomes blood-red (owing to the formation of rufin, C\(^{14}\) H\(^{14}\) O\(^{8}\)) and dissolves in the acid. Hydrochloric acid and dilute sulphuric acid convert it into grape sugar and a white tasteless powder (saliuretine, C\(^{30}\) H\(^{16}\) O\(^{8}\) = C\(^{30}\) H\(^{15}\) O\(^{7}\) + Aq.) Chlorine gas...
renders an aqueous solution of salicin turbid, and causes the deposition of a yellow crystalline powder (composed of C\(_{14}\) H\(_{2}\)O\(_{3}\)). By submitting a mixture of salicin, bichromate of potash, oil of winter, and water, to distillation, we obtain saliculose acid (also called salicin, hydroxyl of salicinum, hydrate of spiroyle, or oil of agave), the formula of which is C\(_{14}\) H\(_{5}\)O\(_{3}\) + Aq.

Salicin has been repeatedly subjected to analysis.

<table>
<thead>
<tr>
<th>Element</th>
<th>Atoms</th>
<th>Eq. Wt.</th>
<th>Per Ct.</th>
<th>Mulder(^a)</th>
<th>Paria(^b)</th>
<th>Erdmann and Marchand(^c)</th>
<th>Pelouze and Gay-Lussac(^d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon</td>
<td>42</td>
<td>252</td>
<td>35:14</td>
<td>35:13</td>
<td>35:04</td>
<td>35:00</td>
<td>35:09</td>
</tr>
<tr>
<td>Oxygen</td>
<td>17</td>
<td>21</td>
<td>58:51</td>
<td>58:68</td>
<td>58:37</td>
<td>58:59</td>
<td>58:13</td>
</tr>
<tr>
<td>Sulphur</td>
<td>1</td>
<td>457</td>
<td>100:00</td>
<td>100:00</td>
<td>100:00</td>
<td>100:00</td>
<td>100:00</td>
</tr>
</tbody>
</table>

Salicin possesses tonic properties analogous to disulphate of quina, than which it is less liable to irritate the stomach. It may be employed in dyspepsia, intermittents, and other diseases for which cinchona and disulphate of quina are usually exhibited. In the event of the latter becoming scarce, salicin would prove an exceedingly valuable substitute. The dose of it is from 10 to 30 grains. It may be given in powder mixed with sugar or dissolved in some aromatic water. Its quickest action in intermittents is said to be obtained when it is given in powder.

ORDER XXV.—CUPULIFERÆ, Richard.—THE OAK TRIBE.

CORVILACES, Mirbel.

ESSENTIAL CHARACTER.—Flowers unisexual: males, amentaceous; females aggregate or amentaceous. Males.—Stamens five to twenty, inserted into the base of the scales, or of a membranous calyx, generally distinct. Females.—Ovaries crowned by the rudiments of a superior calyx, seated with a coriaceous involucral (cupule) of various figure, and with several cells and several ovules, the greatest part of which are abortive; ovules twin or solitary, pendulous; stigmas several, subsessile, distinct. Fruit a bony or coriaceous, one-celled nut, more or less inclosed in the involucre. Seeds solitary, one, two, or three, pendulous: embryo large, with plano-convex, fleshy cotyledons, and a minute superior radicle.—Trees or shrubs. Leaves with stipules, alternate, simple, often with veins proceeding straight from the midrib to the margin (Lindley).

PROPERTIES.—The prevailing quality of this order is astringency, owing to the presence of tannic acid.

1. QUER'CUS PEDUNCULATA, Wildl. L. E.—THE COMMON BRITISH OAK.

Quercus Robur, Linn. D.

Sect. Syst. Monoeia, Polyandria.
(Cortex, L. D. The Bark, K.)

HISTORY.—The oaks (Quercus of botanists) were held sacred by the Greeks, Romans, Gauls, and Britons. They are mentioned in the
Old Testament. Both Dioscorides and Galen were acquainted with the astringent qualities of the oak. "Every part of the oak," says Irides, "but especially the liber, possesses an astringent proper...

**Botany.**

**Gen. Char.** Monocoeous. Male flowers:—Cylindrical and pendulous. Perianth lacerated. Stamen five to ten. Female flowers:—Involucre scale-like; numerous, imbricated; combined with a corymb, hemispherical cup. Perianth six-lobed, to the ovary. Ovary three-celled; two of the abortive. Stigma three. Nut (galls or acorns) well-celled, one-seeded, surrounded at the base by the pulpy (acorn-cup). (Bot. Gall.)

**Sp. Char.**—Leaves deciduous, shortly-stalked, obovate, deeply sinuate; their sinuses rather acute. Lobes obtuse. Fruits two or three upon a long pendulous (Hooker).

A large and handsome tree, remarkable for its longevity. Round, smooth, grayish-brown. Leaves bright green, furnished with a single midrib sending off veins into the lobes. Male flowers yellowish; females greenish, tinged with brown.

**Hab.**—Indigenous, growing in woods and hedges. Flowers April. It is found in most European countries.

**Barking.**—In the spring, the barks of trees contain more systemic matter, and are more readily separated from the wood. The usual time for barking the oak is from the beginning of May to the middle of July. The barkers make a longitudinal incision with a sharp edge, and a circular incision by the use of a barking bill. The bark is then removed by the peeling of the tree, the separation being promoted, when necessary, by beating the trunk with the square end of the mallet. It is then carefully dried in the open air, by setting it on what are called lofts or ranges, and is afterwards stacked.

**Description.**—Oak bark (cortex quercus) consists of piecemeal strips, varying from one to two feet long, which vary in their appearance according to the age of the stem or branch from which they have been obtained. The bark of young stems is thin, moderately smooth, covered with a silvery or ash-gray cuticle, and is frequently beset with lichens. Internally it is, in the fresh state, whitish; but, when dried, red, and fibrous. The bark of old stems is thick and rough externally, cracked, wrinkled, and is of inferior quality.

**Composition.**—According to Braconnier, oak bark contains tannic acid, tannates of lime, magnesia, potash, &c., gallic acid, a crystallizable sugar, pectin, and lignin.

1. **Tannic Acid.**—The quantity of tannin (impure tannic acid) obtained from oak bark is as follows:

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\[\text{References:} \\
\text{Irenæus, ch. i. v. 29, 30.} \\
\text{Lib. i. cap. 142.} \\
\text{Loudon's Encyclop. of Agricult., 3rd ed. p. 658-9.} \\
\text{Ann. de Chim. et de Phys. t. 50, p. 381.} \\
\text{Elem. of Agricult. Chem. p. 83, 4th ed.} \]
THE COMMON BRITISH OAK.

**Tannin afforded.**

<table>
<thead>
<tr>
<th>480 lbs of</th>
<th>39 lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entire bark of middle-sized oak, cut in spring</td>
<td></td>
</tr>
<tr>
<td>= coppice oak</td>
<td>32 lbs</td>
</tr>
<tr>
<td>= oak cut in autumn</td>
<td>51 lbs</td>
</tr>
<tr>
<td>White interior cortical layers of oak bark</td>
<td>73 lbs</td>
</tr>
</tbody>
</table>

Grimes obtained 30 parts of tannin from the bark of an oak felled in winter, the same weight of the bark of an oak felled in spring yielded him 108.

**Gallic Acid.**—This contributes to the astringency of oak bark. It is red probably by the action of the air on the tannic acid.

**Chemical Characteristics.**—Decoction of oak bark reddens us, and becomes dark blue or purple (tannate of iron) on the admixture of sesquichloride of iron. A solution of gelatin causes a precipitate (tannate of gelatin) with it. It is somewhat remarkable, however, that a solution of emetic tartar causes no precipitate with decoction. [If alcohol be added to the decoction, concentrated by distillation, it causes the precipitation of pectin.]

**Physiological Effects.**—The effects of oak bark are similar to those of other vegetable astringents containing tannic acid, and have already described (pp. 188 and 189).

**Use.**—The principal value of oak bark, in medicine, arises from itsstringent property. Thus we employ a decoction of it as a wash in relaxed conditions of the uvula, and in chronic inflammations of the throat; as a wash, in flabby, ill-conditioned, bleeding ulcers; as an injection in leucorrhoea, in piles, and in incontinence of the uterus or rectum; as an internal astringent in old rheumatism, in the last stage of dysentery, in alvine hemorrhages, &c.

Tices made of powdered oak bark have been applied with benefit in the cure of reducible hernia by bathing the groin; hernia having been previously reduced) three or four times daily in a warm inspissated decoction of oak bark, and then applying a wet cloth. The practice, however, is not a new one.

The inhalation of finely-powdered oak bark is said to have proved beneficial in supposed cases of pulmonary consumption. I have already noticed (p. 151) the inspiration of impalpable powders as a remedy for phthisis. Connected with this, popular opinion of the exemption of operative tanners from this pulmonalis deserves to be mentioned. Dr. Dods, who has some attention to this subject, concludes, that the popular notion is correct; and he ascribes the exemption to the inhalation of that notion aroma, or volatile matter, which is constantly arising from pits during the process of tanning with bark.” Hitherto, how-

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5. See the references in Prouquet’s Literature Medica, t. ii. p. 297.
ever, no sufficient evidence has been advanced to prove that they are exempt from the disease.

As a tonic, oak bark has been employed in medicine, but it is inferior to the cinchona. Baths made of a decoction of the bark have been used by Dr. Eberle in the intermittent fevers of young children with benefit; and Dr. Fletcher (of Virginia) recommended the same remedy in tabes mesenterica. The decoction, powder, and extract, have been taken internally in doses, but they are very apt to irritate the stomach. Dr. Cullen say both by itself and joined with chamomile flowers, he has seen the paroxysms of intermitting.

ADMINISTRATION.—Dose of the powder from half a drachm or two drachms.

1. DECOCTUM QUERCUS, L. E. D.; Decoction of Oak Bark. Bark, bruised, 3x. [3] D.; Water [distilled, L.] Oj. [wine measures]. Boil down to a pint, and strain.—Used as a local astrigent for various purposes, in the form of gargle, injection, or lotion. Administered internally in doses of 3m to 15vi. Sometimes employed as a bath, especially for children.

2. EXTRACTUM QUERCUS, D.; Extract of Oak Bark.—(Obtained by evaporating a decoction).—Rarely employed in medicine. May be administered internally as an astrigent, in the dose of ten grains to a dram.

2. QUERCUS INFECTORIA, Olivier, L. E. D.—THE GALL OR GALL OF THE OAK.

Sax. Syst. Monocica, Polyandra.

(Galle; Gemmæ morbide, L. Galle; Excrecences, E. Galle, E.)

HISTORY.—Hippocrates employed the nutgall (cnic) as an astrigent, both internally and externally. Dioscorides describes the fruit of the oak; and the same error is found in the works of comparatively recent writers, as of Pomet. Mr. Lambert of the celebrated Mad Apples (Mala insana seu Poma Sodomica) calls the Quercus infectoria; but he is certainly in error when he says they “are identical with those of commerce.” His own observation disproves this statement.

BOTANY. Gen. Char.—Vide Quercus pedunculata.

Sp. Char.—Leaves ovate-oblong, sinuate-dentate, very smooth duous. Fruit sessile, very long.

Small tree or shrub, from four to six feet high. Stem and Leaves on short petioles, with a few short mucronate teeth on side. Acorn two or three times as long as the cupules.

* Lib. I. cap. 146.
* Hist. of Drugs, Engl. Transl. 1712.
* Olivier, Voy. dans l’Empire Ottoman. I. ii. p. 64.
ia Minor, from the Bosphorus to Syria, and from the Archi-

e frontier of Persia.

Nutgalls.—The Hymenopterous insects of the
Gallicole, or Diploleparia 

means of which they are enabled to perforate the foliaceous
arts of plants for the purpose of depositing their eggs,
in an acid liquor, in the wound thus made. The irritation
duced gives rise to an influx of the juices of the plant to

part, and an excrescence is formed, which is termed

Here the insect undergoes its transformations: the egg
larva (or maggot), which feeds on the juices of the plant,
ged into the pupa. This afterwards becomes the perfect

and, perforating the gall, escapes from its prison-

form and appearance of these productions are very
en formed by the same insect, on the same part of the
but the galls of different species of vegetables, as well as
same species, produced by a different insect, vary con-
There is reason for believing that the form and appear-
gall is determined more by the insect than by the plant;
times have on the same oak two kinds of galls, of very
pearance, produced by different insects.

instances of galls, I may mention, first, the red car-
buncular protuberances in the leaves of Salix Helix.
The gall of the Sweet Briar or Egliantine (Rosa
rubiginosa) is called Bedeguar, or the Sweet Briar
Sponge, and will be noticed hereafter. Another well-
known indigenous gall is the Oak Apple, produced
on Quercus pedunculata. It is usually sphericoidal,
but of variable size; commonly, however, not ex-
ceeding one or two inches

of the Quercus infectoria is the nutgall of the shops. It is

the Cynips Gallae tinctoriae. Olivier 

says, that this

of the Quercus infectoria only.

of the branches and shoots of this

made a puncture and deposits her egg. An excres-

formed, within which the larva is developed, which is

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* Cuvier, Regne Animal, t. v. p. 290.
changed first into the pupa, and then into the imago. As soon as perfect insect is produced, it eats its way out. If we examine the galls from which the animal has escaped, we observe external circular hole, of about a line in diameter, leading to a canal of 2½ to 3½ lines long, which passes to the centre of the gall. But those galls in which the insect has not put off its pupa state, we neither an external hole nor an internal canal. Those galls in which the insect has escaped are commonly longer, lighter color and less astringent; they are termed white galls.

Commerces.—Nutgalls are imported principally from Turkestan, and hence their name of Turkey Galls (Gallæ turcica). They usually come from Constantinople, but sometimes from Smyrna. The galls brought from Aleppo are the produce of Mosul (Aleppo or Mosul Gall), and are the best. Smyrna Galls are not so heavy, are lighter color and contain a larger admixture of white galls than those brought from Aleppo. East India Galls are brought from Bombay. And it is generally thought, that the greater part of the galls found in Indian bazaars galls in Persia, and are brought to the peninsula by Arab merchants.

Description.—In commerce three kinds of galls are distinguished, viz. black or blue, green, and white. But there is no essential distinction between the two first.

1. Black or Blue Nutgalls (Gallæ nigra seu caerulea): Green galls (Gallæ virides).—These are gathered before the insect has escaped, and are called by the natives Yerli. They vary from the size of a pea to that of a hazel-nut, and have a grayish colour. The smaller have a blackish-blue tint, and are distinguished by the term of black or blue galls, while the larger and greener varieties are called green galls. Externally they are frequently tuberculated, but the surface of the tubercles and of the intervening spaces is usually smooth. Their texture is compact, but fragile. They have no or a very slight, but a styptic and powerfully astringent taste.

2. White Galls (Gallæ albae).—These are for the most part galls after the insect has escaped, and hence they are perforated with a circular hole. They are larger, lighter colored (being yellowish whitish), less compact, less heavy, and less astringent. They are inferior in value.

Composition.—Nutgalls were analyzed by Sir H. Davy, who obtained the following results:

<table>
<thead>
<tr>
<th>Component</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tannin</td>
<td>37%</td>
</tr>
<tr>
<td>Gallic acid, with a little extractive</td>
<td></td>
</tr>
<tr>
<td>Muclage and matters rendered insoluble by evaporation</td>
<td></td>
</tr>
<tr>
<td>Carbonate of lime and saline matter</td>
<td></td>
</tr>
</tbody>
</table>

Good Aleppo Nutgalls.

1. Tannic Acid (Acisum Tannicum; Acisum Quercitannicum).—The subject formerly described in chemical works by the name of tannin, is tannic acid, with some foreign matters, from which it is very difficult to free it.

When extracted from nutgalls by ether, in the percolation or displacement apparatus, (see p. 566) as recommended by Pelouze, this acid presents itself as

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*Mat. Indica*, vol. 1, p. 145.
*Phil. Trans. 1830.*
THE GALL, OR DYER'S OAK.

line, white solid, sometimes having a yellowish tinge. 100 parts of
acid from 36 to 40 parts of tannic acid.
wing are the essential characteristics of this substance:—It has an
stronger taste, and produces, with a solution of gelatin, a white pre-
state of gelatin); with a solution of a sesquisalt of iron, a deep blue
stone of iron); and with solutions of vegetable alkalis, white pre-
soluble in water, but very soluble in acetic acid. The
also cause precipitates with concentrated solutions of tannic acid,
alkalis and their carbonates. Gelatinous alumina rapidly absorbs
from its solution, and forms an insoluble compound with it.
acid is composed of \( C^{11} H^{10} O^{11} = C^{11} H^{10} O^{10} + 3 \text{ aq.} \); consequently its
atomic weight is 212.
acid is a very powerful astringent. Given to dogs to the extent of 12
used constipation. One of the animals being killed, the intestinal
brane was found dry, and the fecal matter hard, and collected in
in doses of two grains and a half it produced constipation in the
in doses of one grain. To the presence of this acid the vegetable astringents princi-
their medicinal activity (vide pp. 188 and 189). It has been em-
morphoses, (from the lungs, uterus, and rectum), and in profuse
charges (diarrhoea, pulmonary catarh, leucorrhcea, and gonorrhcea).
mindless in doses of three grains, in the form of pill or solution,
but few advantages over the astringent extracts.
Acid (Acidum Gallicum).—Though we obtain 20 per cent. of gallic
atgalls, these excrescences contain very little of it,—at least in the
our produce being principally the result of the decomposition of the
Nay, Pelouze thinks that even the small quantity of gallic acid
exist in nutgalls, is formed by the decomposition of the tannic acid
sequent to the process of drying these bodies.
ersion of tannic into gallic acid is effected, according to Pelouze, by
the air, the oxygen of which is absorbed, while an equal volume
acid is evolved. One atom of tannic acid and eight atoms of oxygen
elements of two atoms of gallic acid, four atoms of carbonic acid,
ms of water.

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>atoms.</td>
<td>atoms.</td>
<td>atoms.</td>
</tr>
<tr>
<td>acid consists of 18</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>n of the air . . . .</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2 atoms Water . . . . . . . . . . . . . .</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>4 atoms Carbonic acid . . . . . . . . . .</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>3 atoms Gallic acid consist of 14</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Total . . . . . . . . . . . . . . . . . .</td>
<td>18</td>
<td>8</td>
</tr>
</tbody>
</table>

air is excluded no gallic acid is formed.
action of gallic acid may also be accounted for by supposing that it
uent of tannic acid. Thus, three atoms of tannic acid contain
six atoms of gallic acid and two atoms of pyrogallic acid.
c acid is a colourless, crystallizable acid, with an acidulous and styr-
t produces a deep blue colour with the sesquisalts of iron, in which
e it agrees with tannic acid; but it differs from the latter acid in
mple. The latter is to be previously removed from its solution
in a piece of skin depilated by lime. The tannic acid is ab-
egallic acid may then be detected by the salts of iron.
d consists of \( C^3 H^5 O^3 \); hence its equivalent or atomic weight is 85.
d to 410° or 420° F., it gives out carbonic acid, and is resolved into
(\( C^3 H^5 O^3 \)). If the heat is raised to 480° F., both water and car-
evolved, and metagallic acid (\( C^{12} H^5 O^3 + \text{aq.} \)) is produced.
s and uses of gallic acid have been before noticed (p. 190).
c Acid (Acidum Elagicum).—Discovered by Braconnot, who named

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it ellagic acid, from the French word for a gall (galle) spelt backward. It is obtained from galls in the process for making gallic acid, and hence is probably a product, and not an extract. It is a white, insipid powder, which becomes a blood-red colour on the addition of nitric acid. It consists of \( \text{C}_4 \text{H}_8 \text{O}_6 \) + \( \text{H}_2 \text{O} \); hence the equivalent or atomic weight of the hydrated acid is 312.

**Chemical Characteristics.**—Infusion of nutgalls reddens the paper, forms an inky compound (tanno-gallate of iron) on the skin of a sesquisalt of iron, and a yellowish white precipitate (tannate gelatin) with a solution of gelatin. If a piece of skin, depilated with lime, be immersed in the infusion, and agitated with it from time to time, all the tannic acid is absorbed, the filtered liquor strikings blue colour (gallate of iron) with the sesquisalts of iron, but gives no precipitate with a solution of gelatin. Infusion of galls partially precipitates (metallic tannates or tanno-gallates) in many metallic solutions.

**Physiological Effects.**—As nutgalls contain a larger portion of tannic acid than any other known vegetable production, they possess in the highest degree the properties of an astringent (vide p. 188).

**Uses.**—The following are the principal uses of nutgalls:

1. **As a tonic in intermittent.**—Notwithstanding Poupart’s favorable report of the use of galls in these cases, they scarcely deserve notice, as we have in arsenic, cinchona, and sulphate of quina, more effective and certain febrifuges.

2. **As an astringent in hemorrhages, especially passive and hemorrhages.**

3. **In chronic mucous discharges, as old diarrhœas.**

4. **As a chemical antidote.**—Nutgalls may be given in poisons by ipecacuanha, emetina, the organic alkalis generally, and vegetable productions whose activity depends on an organic alkali, as opium, white hellebore, colchicum, nux vomica, &c. The efficacy arises from the tannic acid, which combines with the vegetable alkali to form a tannate possessing less activity than the other salts of these bases; perhaps because of its slight solubility. Nutgalls are recommended as an antidote in cases of poisoning by emetic but I very much doubt their efficacy (see p. 679).

5. **As a topical astringent.**—Nutgalls are applicable in any case requiring the topical use of a powerful vegetable astringent. They are in the form of gargle, in relaxation of the uvula; as an injection, gleet and leucorrhœa; as a wash, in flabby ulcers, with profuse discharge; prolapsus ani seu vaginae; in the form of ointment, piles, &c.

**Administration.**—The dose of the powder is from ten to twenty grains. The infusion is prepared with four draicks of nutgalls and six ounces of water: the dose is from 3. to 5. Ml.; or, in cases of poisoning by the vegetable alkalis, 3. IV.

Besides the following official formula for the use of galls, others have been published by Mouchon.

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1. See the table given in Mr. Brande’s *Manual of Chemistry*, p. 1106, 5th ed.
TINCTURA GALLÆ, L.; Tinctura Gallarum, E. D.; Tincture of Galls, bruised, 3v. [3iv. D.]; Proof Spirit, Oij. [wine measure, D.] e for fourteen [seven, D.] days, and filter. "This tincture may be used either by digestion or percolation, as directed for tincture cum, E.) — A powerful astringent. Dose from f3ss. to f5ij. with water, it forms a very useful and convenient astringent and wash. Its principal use is as a chemical test, especially alts of iron.

GUENTUM GALLARUM, D.; Ointment of Galls.—(Galls, in very der, Si.; Lard, 3iij. Mix them). — Astringent. Mixed with tment it is applied to piles after the inflammatory stage is.

The above is Dr. Cullen's formula; but Mr. B. Bell e
nds an ointment composed of equal parts of powdered galls, s lard or butter., in external hemorrhoidal swellings.

GUENTUM GALLÆ COMPOSITUM, L.; Unguentum Galle et Opii, spound Ointment of Galls.—(Galls, in very fine powder, 3ij.; powdered, 3ss. [3i. E.]; Lard, 3ij. [3i. E.] Mix.) — An ex-stringent application to blind piles (i. e. piles without hemor-
uid prolapsus ani. The opium diminishes the pain which the ght otherwise occasion, where the hemorrhoidal tumors are sible. From 5ss. to 5i. of camphor is frequently added to ment.

OTHER MEDICINAL CUPULIFERÆ.

Quercus Tinctoria, or the Black Oak, is a native of America. Its bark, vitrion, is used by dyers. In the United States it is employed medi-
it is said to be disposed to irritate the bowels.

Quercus Suber, or the Cork Oak, is a native of the northern parts of d of the southern parts of Europe, particularly of France, Spain, an

**Fig. 220.**

Although no medicinal agent is obtained from it, yet the important pharmaceutical uses of its cortical portion must be my excuse for noticing it.

According to Mohl**, the bark of a young branch of Quercus Suber consists of four distinct layers. 1st, an exterior layer or epidermis, 2ndly, colourless cellular tissue, 3rdly, green parenchyma, and 4thly, the liber or fibrous layer. When the branches are from three to five years old, the epidermis cracks by distension, and the second layer enlarges on the inner side by the deposition of new layers. These constitute cork*. It falls naturally every eight or nine years, but for commercial purposes is usually removed one or two years before this period. That season of the year is selected when the bark adheres the most firmly to the wood, in order that the cork may be raised

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* Jast. of Surgery.
† See also Portrochet, Comptes Rendus, t IV. p. 48. Paris, 1838.
without endangering the separation of the liber from the alburnum. By precaution, the trees are not at all injured by the corking process; nay, they are said to be more healthy and vigorous than when the cork is allowed to separate on their stems. The trees yield these crops from the age of 15 years.

To remove the cork, an incision is made from the top to the bottom of the tree, and a transverse circular incision at each extremity; the cork is then stripped off. To flatten it, a number of layers are piled up in a pit of water, and held down with weights to keep them down. Subsequently they are dried, and in that state exported. Our supply is principally derived from Spain and Portugal. Close the transverse pores, cork is charred.

The physical properties of cork are too well known to need description; its leading characteristic is elasticity. In this respect it is similar to the wood of *Pandanus*, called corkwood. When thin slices of cork are examined by the microscope, they present a cellular appearance.

When cork has been deprived of all its soluble matters by successive immersions in water and alcohol, it differs but little from ordinary cork; it is, however, termed *suberin*. This suberin is analogous in its nature to lignin; it yields a peculiar substance (*suberic acid*, composed of C8 H6 O4), which, by nitric acid, it has been regarded as a distinct principle. Suberic acid is also a product of the action of nitric acid on oleic, margaric, and stearic acids. Raspail contends that suberin is only lignin deprived of some of its fatty matters, such as wax, resin, &c.

By distilling suberate of lime, Bossingault obtained an oleaginous substance which has been denominated *suberone*.

The soluble principles of cork are *gallic acid*, some *gallates*, *resin*, a *wax substance*, *colouring matter*, &c.; hence the impropriety of employing closing vessels containing chalybeate liquids, as the iron is in part absorbed by the cork.

Cork was formerly employed in medicine. Reduced to powder, it was used as a stoptie: hung about the necks of nurses, it was thought to possess the virtue of stopping the secretion of milk; lastly, burnt cork, mixed with sugar and lard, has been used as an application to piles.

3. The large capsules or acorn-cups of *Quercus* *Aegilops* are imported from the Levant, under the name of *Velonia*. They are astringent, and are employed by dyers.

4. A saccharine substance exudes from the leaves of *Quercus Mannifera* of Kurdistan.**

**

ORDER XXVI.—ULMACEÆ, Mirbel.—THE ELM TRIBE

Essential Characters. — *Flowers* hermaphrodite or polygamous, naked. *Calyx* divided, campanulate, inferior, irregular. *Stamens* 4, inserted into the base of the calyx; erect in actuation. *Ovary* superior, celled; *ovules* solitary, pendulous; *stigmas* two, distinct. *Fruit* one celled, indehiscent, membranous, or dupeaceous. Seed solitary, pendulum. *Albumen* none, or in very small quantity; *embryo* straight or curved, with cotyledons; *radicle* superior.—*Trees* or shrubs, with scabrous, alternate, simple, deciduous leaves, and stipules (Lindley).

Properties.—Elm bark is tonic and astringent.

ULMUS CAMPESTRIS, Linn. L. D.—THE COMMON SMALL-LEAVED ELM.

*Sex.* Synt. Pentandria, Digynia, (Cortex, L. Cortex interior, D.)

History.—Dioscorides & speaks of the astringent property of the bark.

** Lindley, Botanical Register, May and June, 1840.

* Lib. i. cap. 111.
THE COMMON SMALL-LEAVED ELM. 1085


— *Leaves* doubly serrated, rough. *Flowers* nearly sessile, *Fruit* oblong, deeply cloven, naked. (Sir J. E. Smith.)

A large *tree*, with rugged *bark*. By the latter character it is readily distinguished from *Ulmus glabra*, which has a smooth, dark, lead-coloured bark.

*Hab.*—Southern parts of England. *Flowers* in March or April.

*Description.*—The officinal part of the elm is the inner cortical portion, or *liber*. To obtain it, the *bark* should be separated from the tree in spring; and, after the epidermis and a portion of the external cortex have been removed, the *liber* should be quickly dried.

As met with in the shops, the *inner elm bark* (*cortex ulmi*) consists of thin, tough pieces, which are inodorous, and have a brownish-yellow colour, and a mucilaginous, bitter, very slightly taste.

*Iteration.*—According to Rinck *, 100 parts of elm bark contain 0·63, gum and mucus 20·3, impure gallic acid (tannin ?) of lime 0·3 (?), chloride of sodium (?) 4·6.

*Acid.*—Davy * states, that 480 grs. of elm bark yielded 13 grs. of

*Acid:* *Ulmun.*—On many trees, especially the elm, there is not unobserved a substance, which was supposed to be a morbid production. It consists of a mucilaginous matter, and carbonate or acetate of the combined agency of the air and the carbonate, the organic matter in its properties, and is converted into a brown substance, which the potash. This brown matter has been termed *ulmin*, or *ulmic* y be formed, artificially, by a variety of processes; as by heating a wood and potash, by the action of sulphuric acid on vegetable matter, other methods.

*Al Characteristics.* — Infusion of elm bark becomes *rate of iron*) on the addition of a sesquisalt of iron, and *scipitate (tannate of gelatin)* with a solution of gelatin.

*Ogical Effects.*—The effects of elm bark are those of a *gent tonic*, containing a considerable quantity of mucilage, s it a demulcent property. Hence, in the classification of

*Geiger, Hand. d. Pharm.

*Phil. Trans. 1803, p. 233.*
Richter, it is arranged as a mucilaginous astringent. The decoction, taken in full doses, accelerates the pulse, and acts as a diaphoretic and diuretic.

Uses.—Lysons recommended the decoction of this bark in various eruptions; and Dr. Lettsom found it successful in itching. It has now fallen almost into disuse. It has been employed chiefly as a substitute for sarsaparilla.

Administration.—Used only in the form of decoction.

Decoctum Ulmi, L. D.; Decoction of Elm Bark.—(Fresh bark, bruised, 3ij. [3⁄4 D.]; Distilled Water, Oij. [wine measure]; Boil down to a pint, and strain).—Formerly given in skin diseases, now fallen into disuse. Dose, 3ëiv. to 3ævi., three or four times day.

Other Medicinal Ulmaceae.

Dr. M'Dowall, of Virginia, has proposed the bark of Ulmus fulva for bleaching, catheters, &c.

Order XXVII.—Urticaceae, Endlicher.—The Nettle Tribe.

Urticae, Justus

Essential Character.—Flowers small, greenish, monoeccious or dioecious, amethystaceous, or surrounded by a monophyllous involuereum. Monoeccious, three to five-lobed, persistent. Staminea definite, inserted on the base of the calyx. Ovary simple, free; styles two or one, bifid. An achene, surrounded by the persistent calyx, solitary, or inserted on a dilated fleshy receptacle. Seeds pendulous, with or without ailaemen. Flower straight, curved, or spiral. Radicle generally superior. Herbs or trees with hispid and spatulate leaves. Flowers capitate or racemose (Bot. General).

Properties.—Variable.

1. Humulus lupulus, Linn. L. E. D.—The Common Hop

Sex. Syst. Dioecia, Pentandria.

(Strobili excisitati, L. Catkin, E. Strobili siccati, D.)

History.—This plant is probably the Lupus salicarius of Pliny. Its culture was introduced into this country from Flanders, in the reign of Henry VIII.

THE COMMON HOP.

concave scales [bracts], having a single flower in the axilla of each. Ovary one. Styles two. Seed one, with an arillus. Embryo spirally contorted (Bot. Gall.).

Sp. Char.—The only species.

Perennial. Stems annual, long, weak, and climbing, scabrous. Leaves petiolate, three to five-lobed, serrated, veiny, rough. Flowers greenish yellow.

Hab.—Thickets and hedges in many parts of Europe. Indigenous (?) Flowers in July.

Cultivation.—The female plant is cultivated in several counties in England, especially Kent, Sussex, Surrey, Worcestershire, and Herefordshire. The third year after planting it generally comes into full bearing. Staking or setting the shoots is performed in April or May. The gathering or picking takes place in September. The cones are dried in kilns, and are then kept in hessian sacks, called bags or pockets. This operation is called bagging.

Description.—The aggregate fruits of the Humulus Lupulus are called bines or catkins (strobili seu amena lupuli), in commerce termed cones. They consist of scales, nuts, and lupulinic glands or grains. The scales are the enlarged and persistent bracts, which enclose the achene: they are ovate, membranous, and at their base glandular. The achenes are small, hard, nearly globular, and covered with arctic, superficial, globose glands. The lupulinic glands or grains (commonly termed yellow powder or lupulin) are the most important parts of the strobiles. By thrashing, rubbing, and sifting, Dr. Ives secured 14 ounces from six pounds of hops; and he therefore concluded that dry hops would yield about a sixth part of their weight in these grains. They are usually intermixed with sand. They are rounded, of a cellular texture, golden yellow, and somewhat transparent. They are sessile, or nearly so. The common centre, around which the cells are arranged, has been called the hilum. By drying they lose their spherical form. Placed in water they give out an immense number of minute globules. Under other circumstances they become ruptured, and allow an inner envelope to escape. According to Turpin they consist of two vesicles, one enclosing the other. The inner one contains globules, an aromatic oil,
and a gas. He also states, that in the bubbles of the disengaged gas, an immense number of crystals are formed.

COMPOSITION.—Payen, Chevallier, and Pelletan* analyzed the scales and lupulinic grains. Dr. Ives* also examined the latter.

<table>
<thead>
<tr>
<th>Lupulinic Grains.</th>
<th>Ives's Analysis.</th>
<th>Scales.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payen, Chevallier, and Pelletan’s Analysis.</td>
<td>Tannin…………… 4:16</td>
<td>Astringent matter.</td>
</tr>
<tr>
<td>Volatile oil ………………………… 2:00</td>
<td>Extractive …………… 8:33</td>
<td>Insert colouring matter.</td>
</tr>
<tr>
<td>Bitter principle (Lupulite) …… 10:30</td>
<td>Bitter principle. 9:16</td>
<td>ChlorophrYTE.</td>
</tr>
<tr>
<td>Resin ………………………… 20 to 33:00</td>
<td>Wax ……… 10:00</td>
<td>Gum.</td>
</tr>
<tr>
<td>Lignin ………………………… 32:00</td>
<td>Resin ……………… 30:00</td>
<td>Lignin.</td>
</tr>
<tr>
<td>Fatty, astringent, and gummy matters, osmazone, malic and carbonic acids, several salts (malate of lime, acetate of ammonia, chloride of potassium, sulphate of potash), &amp;c.</td>
<td>Lignin ……………… 38:33</td>
<td>Salts (of potash, lime, and nitric, containing acetic, hydro- \nitric, sulphuric, nitric, &amp;c. The scales usually contain a little of lupulinic matter, from which circumstance the presence of sulphur is inferred.</td>
</tr>
</tbody>
</table>

99:30 100:00

1. VOLATILE OIL OF HOPS.—Resides in the lupulinic grains. Obtain it by submitting these, or hops which contain them, to distillation with water. Its colour is yellowish, its odour that of hops, its taste acrid. It is soluble in water, but still more so in alcohol and ether. Its sp. gr. is 0:910. By keeping, it becomes resinified. It is said to act on the system as a narcotic. The water comes over, in distillation, with the oil, which contains acetate of ammonia and blackens silver; from which circumstance the presence of sulphur is inferred.

2. BITTER PRINCIPLE OF HOPS: Lupulite: Lupuline.—Is procured by treating the aqueous extract of the lupulinic grains, united with a little lime, with alcohol. The alcoholic tincture is to be evaporated to dryness, the residue treated with water, and the solution evaporated. The residue, when washed with ether, yields lupuline. It is uncrystallizable, yellowish white, very bitter, soluble in 20° of water, very soluble in alcohol, and slightly so in ether. The aqueous solution froths by agitation; it forms no precipitate with either tincture of nitrates or acetate of lead. Lupuline contains no nitrogen. It is devoid of the pungent property of the oil. In small doses it is said to have caused loss of appetite, and diminished digestive power; but a repetition of the experiment is very desirable.

3. RESIN.—Is of a golden yellow colour, and becomes orange-yellow on exposure to the air. It is soluble in both alcohol and ether. It appears to be a mixture of the oil changed into resin, partly by oxidization.

CHEMICAL CHARACTERISTICS.—A decoction of hops reddens litmus owing to the presence of free acid. Sesquichloride of iron strikes an olive-green colour (tannate of iron). A solution of gelatin renders the filtered decoction turbid (tannate of gelatin). Chloride of baryta occasions with it a white precipitate (sulphate of baryta). Oxide of ammonia also causes a white precipitate (oxalate of lime).

PHYSIOLOGICAL EFFECTS.—The odorous emanations (vapour of volatile oil) of hops possess narcotic properties. Hence a pillow filled with these cones promotes sleep, as I have several times witnessed. Moreover, we are told that stupor has occasionally been induced in persons who have remained for a considerable time in hop warehouses.

The lupulinic grains are aromatic and tonic. They appear to possess soothing, tranquillizing, and, in a slight degree, sedative soporific properties. But the existence of any narcotic quality

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THE COMMON HOP. 1089

... strongly denied by Dr. Bigsby,¹ Magendie,² and others. "I tried, at different times," says Magendie, "both the lupuline grains] in substance, and its different preparations, on als, but I have never observed that it is a narcotic, although this ery is one which is most strikingly displayed in experiments on als." Dr. Maton³ found that it allayed pain, produced sleep, educed the frequency of the pulse from 96 to 60 in twenty-four th infusion and tincture of hops are mild but agreeable aromatic t. They sometimes prove diuretic, or, when the skin is kept sudorific. Their sedative, soporific, and anodyne properties, say uncertain.

æ.—A pillow of hops (cervicale seu pulvinus, pulvinar lupuli) is ionally employed in mania, and other cases in which inquietude restlessness prevail, and in which the use of opium is considered ionable. In hop countries it is a popular remedy for want of The benefit said to have been obtained from it by George III., rom it was prescribed by Dr. Willis, in 1787, brought it into general use.

ips are given internally to relieve restlessness consequent upon uston and fatigue, and to induce sleep in the watchfulness of c and of other maladies: to calm nervous irritation ; and to e pain in gout, arthritic rheumatism, and after accouchement. gh they sometimes produce the desired effect, they frequently give relief. Dr. Maton used it, with good effect, as an anodyne umatism.

tonic it is applicable in dyspepsia, cachectic conditions of stem, or any other maladies characterized by debility.

ips have been applied, topically, in the form of fomentation or ice, as a resolvent or discutient, in painful swellings and tumors. e employed an ointment, composed of lard and the powder of op, as an anodyne application to cancerous sores." at the principal consumption of hops is in the manufacture of ale, to which they communicate a pleasant, bitter, and stic flavour, and tonic properties, while, by their chemical influ they check the acetous fermentation. Part of the soporific ty of beer and ale is ascribable to the hops used in the manu of these beverages.

MINISTRATION.—The best preparation of hops, for internal use, a yellow powder (lupulinic grains or lupulin). The infusion and we are less eligible modes of exhibition. The extract is still objectionable. Well-hopped beer is a convenient mode of ad- tering hops, when fermented liquors are not contra-indicated.

INFUSUM LUPULI, L.; Infusion of Hops.—(Hops, 5v. ; Boiling Med Water, Oj. Macerate for four hours, in a vessel lightly covered, train). Dose fij. to fij.

TINCTURA LUPULI, L.; Tincture Humuli, D. Tincture of Hops.

² Formulaire.
³ Observations on Humulus Lupulus, by A. Fraenke, 2nd ed.
3. **LUPULINA** : Yellow Powder; Lupuline Grains or Glands.—(Separated from the strobiles by rubbing and sifting).—Dose grs. viij. or grs. xii. taken in the form of powder or pills.

5. **TINCTURA LUPULINA**: Tincture Lupuli, E.—(Take any convenient quantity of hops, recently dried; separate by friction and sifting the yellowish brown powder attached to the scales. Then take of a powder, 3v.; and of rectified spirit, Oij.; and prepare the tincture percolation or digestion, as directed for tincture of capsicum. **Ph. E.**

—Dose, ℥ ss. to ℥ij.

2. **MO'rus NIGRA, Linn., L. D.—THE COMMON MULBERRY.**

**Sect. Syr.** Monocarp, Tetrandra.

(Fructus, L., Bacca, D.)

**History.**—The mulberry (μοπία) is mentioned by Hippocrates. "Mora caelefacium et hunmant ac alvo secedunt," says the Father Physic. Dioscorides also speaks of the mulberry.

**Botany.** Genet. Char. Monocious. Catkins unisexual. Calyx four-lobed; the lobes concave. Stamens four, alternate with the segments of the calyx. Ovary free. Stigmas two. Seeds one in two covered by the pulpy calyx (Bot. Gall.)

**Sp. Char.**—Leaves cordate, ovate, lobed, or unequally dentate, rough and thickish. Fruit dark purple (Bot. Gall.)

A small tree, with rugged branches.

**Flowers** greenish. "Fruit, consisting of the female flowers, become flat and grown together, enclosing a membranous pericarp" (Lindley).

**Hab.**—Native of Persia and China. Cultivated for its fruit. Flowers in May.

**Description.**—The fruit is usually called a berry (bacca mori nigra), but is, in fact, that kind called by botanists a sorosis. Its odour is peculiar and agreeable; its taste is peculiarly pleasant, acidulous, and sweet. The juice is dark violet red.

**Composition.**—The fruit has

* De viculis ratione, lib. ii. p. 359, ed. Ross.
* Lib. i. cap. 180.
THE COMMON FIG.

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talyzed. Its principal constituents are violet-red colouring tartaric acid, sugar, and woody fibre. The root has been

d by Wackenroder.

EFFECTS. — Mulberries are alimentary in a slight

ally thirst, diminish febrile heat, and, in large quant-

They are employed as an agreeable aliment, and are well

to check preternatural heat, and relieve thirst in fevers, but

able when a tendency to diarrhoea exists. They owe

ception to their colour and flavour.

US MORI, L.; Syrup of Mulberries.—(Juice of mulberries,

, Of.; Sugar, lb.ij. Dissolve the sugar in the mulberry

th a gentle heat, and proceed in the same manner as directed

up of Lemons).—Used as a colouring and flavouring sub-

Its acidity prevents its being used with alkalis, earths, or

bonates.

FI'CUS CARICA, Linn., L. E. D.—THE COMMON FIG.

Polygamus, Treculz, Linn.; Polygamus, Dreculz, Wild.; Dreculz, Triandria, Perr.

(Fici: fructus siccus, L.—Fici: the dried fruit, E.—Fructus siccatus, D.)

ORY.—In the Old Testament we are informed that Hezekiah

ed 600 years before Christ) used figs as a topical application


Fig. 225.

BOTANY. Gen. Char. — Monoecious. Flowers numerous, pedicellated, in-

closed within a fleshy receptacle, which is umbilicated, and nearly closed at

the apex, hollow within. Calyx three to five-lobed; lobes acuminate. Male-

flowers near the umbilicus. Stamens three to five. Ovary free (Desf.); semi-adjunct (Gaertn.) Style one. Stig-

mas two. Drupe or utricle one-seeded, sunk into the pulpy receptacle. Coat

of the nut fragile, crustaceous (Bot. Gall.)

Sp. Char.—Leaves cordate, palmate; scabrous above, pubescent beneath

(Bot. Gall.)—A small tree. Flowers in June. Receptacle green. At the

base of each receptacle are two or three bracteal scales.
Hab. — Native of Asia and South of Europe.

Description. — Figs (fici seu caricae) constitute that kind of composite fruit called, by Mirbel, a syconus. They consist of fleshy, low, pyriform receptacles, within which are numerous, small, seed-like bodies (achenia, Lindley; utricles, Auctor). In the unripe state they contain an acid and bitter juice, but which, when they are ripe, is replaced by sugar. Ripe figs are dried in the sun or in ovens, and are afterwards packed in drums and baskets, in which they are exported. As met with in the shops they are more or less compressed, covered with a whitish, saccharine efflorescence, have a brown or yellowish colour, and are somewhat translucent. They have a peculiar and agreeable odour, and contain a sweet, viscid pulp, which are the achenia. Turkey or Smyrna figs are the largest, most juicy, and sweetest: hence they are sometimes termed fat figs (campionges): they are distinguished into pulled and flat. Of 20,474 cwt.s. of figs, imported in 1830, no less than 18,801 came from Turkey (Parliament. Return.)

Composition. — Bley analyzed Smyrna figs, and obtained the following result: — Sugar of figs 62·5, fatty matter 0·9, extractive matter 3·1, chloride of calcium 0·4, gum with phosphoric acid 5·2, woody fibre and seeds [achenia] 150·0.

Physiological Effects. — Figs are nutritious, emollient, demulcent, and laxative. In the fresh state they are both agreeable and wholesome: when dried, as we receive them, they readily disorder the stomach and bowels, and occasion flatulence, griping, and diarrhoea.

Uses. — In those countries where they are plentiful, figs are used as food. Here they are chiefly employed as a dessert. Internally they are given in the form of demulcent decoctions (as the decoction of hordei compositum, L. D.) in pulmonary and nephritic affections.

THE CONTRAYERVA ROOT.

es they are sometimes taken with the food, to relieve habitual
ation, and enter into the composition of Confection Senne, L.
arium Senne, E.) Roasted or boiled, and split open, they
ployed as suppurative cataplasmis in gum-boil, &c.

DORSTENIA CONTRAJERA, Linn. L.; and DORSTENIA BRASILIEN'SIS, Lam.

Sec. Syst. Tetandria, Monogynia.
(Dorstenia Contrajera.—Radix, L.)

TORY.—The earliest notice of this plant is that by Monardesbb,
ates that the word Contrayerva is the Indian Spanish term for
armic or counter-poison. In 1581 Clusiuscc received from
Drake a root which he called, after the donor, Drakena
and which has been supposed to be contrayerva root.

ANY. Gen. Char.—Monoecious. Flowers arranged upon a fleshy
acle, usually flat and expanded, and extremely variable in
form: males on the surface of the receptacle,
two-lobed, fleshy; dian-
drous: females immersed
in the receptacle, also
two-lobed in most species.
Ovary one to two-celled,
with a single suspended
ovule in each cell. Style
one. Stigma two-lobed.
Achenia lenticular, im-
bedded in the fleshy re-
ceptacle; from which they
are projected with elas-
city when ripe. — Dwarf
herbaceous plants with
scaly rhizomes (Lindley).

Spec. 1. D. CONTRA-
JERA, Linn. L.—Caules-
stem covered with spreading green, scaly stipules. Leaves
the lobes lancolate, acuminate, coarsely serrated and
occasionall almost pinnatifid. Receptacle on a very long
quadrandular, wavy, or plated (Lindley). A native of New
Mexico, Peru, Tobago, St. Vincent’s (Wild.) The root of
not met with in commerce.

BB. BRASILIENSIS, Lam.—A native of Jamaica, Brazil, and
This yields the contrayerva root usually met with in the

bb Clusius, Exoticorum, p. 311.
cc Ibid. p. 83.
DESCRIPTION.—The contrayerva root (radix contrajervae), usually found in the shops, is imported from the Brazils. It consists of an ovoid or oblong rootstock, terminating, inferiorly, in one or several long, tapering, more or less curved, root-fibres. From the sides of the rootstock also arise numerous slender fibres. Externally the colour is yellowish-brown. The odour of the root is peculiar, but aromatic. The taste is warm, bitterish, slightly acrid.

I have also found another kind of contrayerva root in the shops. The rootstalk is smaller, cylindrical, blackish-brown, with fewer fibres. The receptacle and leaves are attached; the latter are reniform. Is this the Drakena radix of Clusius?

COMPOSITION.—The root has not been analyzed. It contains, according to Geiger, volatile oil, bitter extractive, and starch. It which may be added resin, free acid, and woody fibre.

PHYSIOLOGICAL EFFECTS.—Stimulant, tonic, and diaphoretic. Its operation is very analogous to that of serpentine root, between which and the rhizome of the sweet flag it deserves to be arranged. The root of the Dorstenia braziliensis often proves emetic. 

USES.—Obsolet, or nearly so. It has been employed in fever of a low type, and in other diseases requiring a mild, stimulant, and diaphoretic treatment.

ADMINISTRATION.—The dose of the root in powder is $\frac{3}{4}$, or $\frac{1}{3}$. The infusion (prepared by digesting from $\frac{1}{2}$ to $\frac{1}{3}$, of bainswater) may be given in doses of $\frac{1}{4}$, or $\frac{1}{2}$. The pulvis contrajervae compositus (composed of powdered contrayerva root and powdered shells lb. iss.) is no longer officinal.

OTHER MEDICINAL OR POISONOUS URTICACEAE.

1. Antiaris Toxicaria is the celebrated Antjar or Upas poison tree of Java, rendered notorious principally in consequence of certain gross falsehoods concerning it, about the year 1780, by a person of the name of Foechsch, said to have been a surgeon in the service of the Dutch East India Company. Malefants says this person, when they receive sentence of death, are offered a chance of life, if they will go to the Upas-tree for a box of poison; and although very precaution is taken to avoid the injurious influence of the emanations of the tree, yet of 700 criminals who went to collect the poison, scarcely two out of twenty returned. Foechsch further adds, that for fifteen or eighteen miles around this tree no living animal of any kind has ever been discovered. Dr. Horsemfield and M. Leschinkault have shewn that the above statements are for the most part fabulous. From their observations it appears that the true poison of Java is the Antiaris Toxicaria (fig. 228), is taken from Blume's Researches.

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* Handb. d. Pharm.
* De Candolle, Essai sur les Proprietés Méd.
* See the translation of Foechsch's paper in Burnett's Outlines of Botany, 552: also Fonsi vol. ii. p. 331.
3 For a very elaborate account of this tree, by M. I. J. Bennett, see Dr. Horsemfield's Planta & aliae variæres, p. 52.
POISONOUS URTICACEE.

One of the largest forest trees of Java, being from 60 to 100 feet high. The milky juice is collected by incision, and is then inspissated by boiling along with the juice of arum, galanga, onions, &c. The poison, when brought to this country, is found to be a thick fluid, of a grayish-brown or fawn colour, and an unpleasant odour. It consists, according to Pelliot and Caventou, of a peculiar elastic resin, slightly soluble gumy matter analogous to bassoris, and a bitter matter soluble in water. This bitter matter is composed of a colouring matter absorbable by charcoal, an undetermined acid, and anthiarin, the active principle of the plant, and which is precipitable by tincture of galls. More recently, Mulder has submitted this juice to analysis, and found it to contain:

- Albumen 16-14, gum 12-34, antiar-resin 20-93, myricia 7-02, antiarana 6-31, and extractive 33-70. The antiar-resin was composed of $C^{4+}H^{18}O_5$. Sir B. Brodie says, the poison renders theensible to the stimulus of the blood. Magendie and Delile found that,

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Artocarpus incisa.  
A. integrifolia.
besides acting on the brain and spinal marrow, it proved emetic. According to Andral, it causes convulsions with alternations of relaxation.

2. Artocarpus.—The Artocarpus incisa, or Bread-fruit tree, and the A. integrifolia or Jak fruit, deserve notice on account of their important alimentary use. Artocarpus incisa is a native of the islands of the Pacific and of the Moluccas. Its fruit is to the inhabitants of Polynesia what corn is to the people of other parts of the world. Artocarpus integrifolia is cultivated throughout southern India, and all the warmer parts of Asia. Its fruit forms a very considerable article of food in Ceylon.

3. Cannabis sativa; Common Hemp.—Herodotus mentions the hemp plant and states that the Scythians, who cultivated it, made themselves garments of it. He also adds that they threw the seeds on red-hot stones, and used the perfumed vapour thereby obtained as a bath, which excited from them erotic exultation. This I presume refers to the intoxicating properties of its smoke. The hemp may have been, as Dr. Royle suggests, the “assuager of grief” or the Nepenthes (μνενέθες) of which Homer speaks. It is known in India as the “increaser of pleasure,” the “exciter of desire,” the “cementor of friendship,” the “causer of a reeling gait,” the “laughter mover,” &c.

The plant which grows in India and has been described by some botanists under the name of Cannabis indica does not appear to me to possess any special differences from the common hemp. Roxburgh and most other distinguished botanists have considered it identical with the Cannabis sativa of Linnaeus and Willdenow. Mr. Anderson, of the Chelsea Garden, has pointed out to me, as one distinctive character, that the C. indica branches from the ground up to within two feet of the top; whereas common hemp grows three or four feet before it branches. The fruit also of C. indica is smaller, and rounder. I have carefully compared C. indica (both that grown in the Chelsea Garden, and that contained in Dr. Wallis’s Herbarium in the possession of the Linnean Society, which is Linnaeus’s collection, and I have discovered no essential distinction between them. In the female plants, the flowers of C. indica were more crowded than those of common hemp.

The parts employed, in Asia, for the purpose of intoxication, are as follows:—a. Chururn or the concreted resinous exudation from the leaves, slender stems, and flowers. “In Ceylon and the Sauger territory and in Nepal, Churum is collected during the hot season in the following singular manner: men clad in leathern dresses run through the hemp-fields brushing through the plant with all possible violence, the soft resin adheres to the leather, and is subsequently scraped off and knoed into balls, which sell from five to six rupees the seer. A still finer kind, the Momeea or waxen Churum, is collected by the hand in Nepal, and sells at nearly double the price of the ordinary kind. In Nepal Dr. M’Kinnon informs me, the leathern attire is dispensed with, and the resin is gathered on the skin of the naked coolies. In Persia, it is stated by Mirza Abdul Razee that the Churum is prepared by pressing the resinous plant on coarse cloths, and then scraping it from these and melting it in a pot with a little warm water. H
POISONOUS URTICACEAE.

The Churrus of Herat as the best and most powerful of all the varieties of the hemp plant which has flowered, and from which has not been removed. It is sold in the Calcutta bazaars for smoking in bundles of about two feet long and three inches in diameter, each containing twenty-four plants.

Subjeec, or SIDhee. This consists of the larger leaves and capsules he stalls.

Leaves of common hemp have been submitted to analysis by Tschepepe, singer, and by Bohlig. The results of the two former of these are as follows:

<table>
<thead>
<tr>
<th>Tschepepe</th>
<th>Schlessinger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bitter matter</td>
<td>1:28</td>
</tr>
<tr>
<td>Chlorophylle soluble in ether</td>
<td>4:75</td>
</tr>
<tr>
<td>Chlorophylle soluble in alcohol</td>
<td>9:375</td>
</tr>
<tr>
<td>Green resinosus extractive</td>
<td>5:0</td>
</tr>
<tr>
<td>Colouring matter</td>
<td>10:15</td>
</tr>
<tr>
<td>Gummy extract</td>
<td>10:45</td>
</tr>
<tr>
<td>Malate of lime with extractive</td>
<td>6:75</td>
</tr>
<tr>
<td>Extractive</td>
<td>6:75</td>
</tr>
<tr>
<td>Vegetable albumen</td>
<td>8:0</td>
</tr>
<tr>
<td>Lime, Magnesia, and Iron</td>
<td>9:5</td>
</tr>
<tr>
<td>Urea, Amin</td>
<td>13:0</td>
</tr>
<tr>
<td>Loss</td>
<td>6:975</td>
</tr>
</tbody>
</table>

Leaves dried at 2000. 100-900

The most important constituents, in a medicinal point of view, are probably vit and resina. Bohlig failed to detect a trace of any organic basic matter. The oil of hemp has hitherto been procured in such small quantities that its properties are but imperfectly known. When the dried plant is distilled with a large quantity of water, traces of the oil pass over, and the distilled liquor is a powerful narcotic odour of the plant. The resin of hemp (cannabin) is in alcohol and ether. It has a warm, bitterish, acrid taste, and a narcotic odour.

Shaughnessy gave ten grains of Nipalese churrus dissolved in spirit to a dog:—"In half an hour he became stupid and sleepy, dozing at a starting up, wagging his tail as if extremely contented, he ate some dry, being called to he staggered to and fro, and his face assumed a utter and helpless drunkenness. These symptoms lasted about two hours, gradually passed away; in six hours he was perfectly well and lively." General effects on man, as stated by Dr. O'Shaughnessy, from his own experience, are alleviation of pain (mostly), remarkable increase of appetite, sexual aphrodisia, and great mental cheerfulness. Its more violent effects seem to be a more profound state of a peculiar kind, and a cataleptic state. These effects are so remarkable that I shall quote some cases by way of illustration.

O. M. a grain of the resin of hemp was given to a rheumatic patient. At first he was very talkative, sang, called loudly for an extra supply of spirits, and declared himself in perfect health. At six p.m. he was asleep. At nine p.m. he was found insensible, but breathing with perfect regularity, his skin natural, and the pupils freely contractile on the approach of a light. He was able to lift up the patient's arm with the "professional skill" of his amazement." observes Dr. O'Shaughnessy, "when I examined the posture in which I placed it. It required but a few minutes to find that the patient had by the influence of the narcotic been thrown into that strange and most extraordinary of all conditions, into that state which so few have seen, and the existence of which is so generally discredited—the genuine catalepsy of the nosologist" (see. We raised him to a sitting posture, and placed his arms and limbs in the desired attitude. A waxen figure could not be more pliant or more supple in each position, no matter how contrary to the natural influence of the part. To all impressions he was meanwhile almost insensible."

1 O'Shaughnessy, op. supra cit. p. 6.
3 Pharmacutisches Central-Blatt für 1840, S. 490.
4 Ibid. S. 490.
He continued in this state till one A.M., when consciousness and voluntary motion quickly returned.

Another patient who had taken the same dose fell asleep, but was roused by the noise in the ward. He seemed vastly amused at the strange aspect of the statue-like attitudes in which the first patient had been placed. "On a sudden he uttered a loud peal of laughter, and exclaimed that four spirits were springing with his bed into the air. In vain we attempted to pacify him; his laughter became momentarily more and more incontrollable. We now observed that the limbs were rather rigid, and in a few minutes more his arms and legs could be bent, and would remain in any desired position." He was removed to a separate room, where he soon became tranquil, his limbs in less than an hour gained their natural condition, and in two hours he experienced himself perfectly well and excessively hungry."

Dr. O'Shaughnessy was kind enough to send me from Calcutta specimens of Nipalese Churrus, and an alcoholic extract of Gunjah. The two forms only came to hand. I have submitted them to experiment both on animals and man, and have given specimens of them to medical friends for trial, but the effects have hitherto proved comparatively slight. Whether this be owing to the preparations having undergone some deterioration in their passage, or to the comparative phlegmatic temperament of the English, I know not. My experiments on animals were made in the lecture-room of the London Hospital before the students of the materia medica class; and the trials on the human subject were made in the wards of the Hospital. The following are brief notices of some of the experiments:

**Expt. 1.** Ten grains of Churrus in fine powder were given to a small terrier with his food. In fifteen minutes he appeared somewhat drowsy. In fifty-five minutes when left quiet, he would sleep as he sat, and nod forward or to the side, so nearly to fall. When roused, however, he appeared quite well, but when left alone soon fell asleep again. One of the students (Mr. Porter) took charge of him for the remainder of the day, and reported that he fell asleep, but presented no other symptom.

**Expt. 2.** One drachm of Churrus in fine powder was given to a large cat, but no effects were observed.

**Expt. 3.** My colleague, Mr. Curling, to whom I had given some Churrus, informs me that 69 grs. were given, in 16 hours, to a tetanic patient on board the hospital ship the Dreadnought, without any obvious effect.

**Expt. 4.** Four grains of an alcoholic extract of Gunjah were given to a girl, aged 14, in the London Hospital, affected with a convulsive disorder, partialing of the characters of both chorea and hysteria. She was troubled with a spasmodic action of the diaphragm, and had been for several days and nights without sleep. About half an hour after taking the third-four grain dose the spasms entirely ceased, and the patient complained of vertigo and headache. The pupils were not perceptibly affected. The pulse was 93, soft and regular. She fell into a tranquil sleep, in which she remained several hours. When she awoke she had no spasms, but complained of headache and vertigo. The pupils were dilated and the skin moist. On raising her up to take another pill she complained of great faintness, and broke out into a profuse perspiration. The faintness having subsided she again sat up, when the pulse suddenly rose from 93 to 130. Some days afterwards convulsive movements appeared in other muscles. The extract was again resorted to, but its effects were never more than palliative, and notwithstanding the dose was increased to thirty grains twice, and even thrice, it ceased to produce any obvious effect. The extract never appeared to affect her appetite, which was all through good.

**Expt. 5.** A scruple of the green alcoholic extract of Cannabis indica grown at the Chelsea Garden was dissolved in about a fluidrachm of spirit, and thrown into the peritoneal sac of a middle-sized dog, but no effect was observed.

**Expt. 6.** Two drachms of the powder of the female plant of Cannabis is grown at Chelsea, were given to a small dog, but no effect was observed.

I have also tried the alcoholic extract of Gunjah, prepared at Madras, and me by my late pupil Mr. T. Brydon; but have failed with it also to produce remarkable effects observed by Dr. O'Shaughnessy. I have seen weakness the hind extremities of a cat caused by it, so as to prevent her taking the customary leap on to a wall to escape. This effect was observed 24 hours after the exhibition of the medicine, which did not appear to produce any other residu.
a gentle heat, and can be made into pills without any addition. In hydrophobia from ten to twenty grains of the resin, in soft to be chewed by the patient, and repeated according to the effect.

*Cannabis.*—Dr. O'Shaughnessy directs three grains of the extract solved in one drachm of proof spirit. Dose, in tetanus, 2j; every half 2l the paroxysms cease, or catalepsy is induced; in cholera, ten drops if hour.

*Utricularia officinalis,* or Common Water-pellitory, is a common indigenous which was formerly in great repute as a diuretic and lithotrictic. By cistioners it is still highly esteemed. It is used in calculi and other infections, and also in dropsy. The expressed juice may be taken in one or two fluidounces. Or the decoction (prepared by boiling 3j. of in a pint of water) may be substituted. The extract and distilled water been used. On account of the nitre which the plant contains, the ex-

XXVII.—PIPERACEÆ, Kunth.—THE PEPPER TRIBE.

1. Character.—Flowers naked, hermaphrodite, with a bract on the out-Stamens definite or indefinite, arranged on one side, or all round the to which they adhere more or less; anthers one or two-celled, with or t a fleshy connective; pollen smooth. Ovary superior, simple, one-containing a single erect ovule; stigma sessile, simple, rather oblique, superior, somewhat fleshy, indehiscent, one-celled, one-seeded. Seed with the embryo lying in a fleshy sac, placed at that end of the seed is opposite the hilum, on the outside of the albumen.—Shrubs or herba-

1.的性格。开花裸体的，雌雄同体的，具一苞片，在外花柱是确定的或不定的，排列在一边，或围绕在哪儿的。到它们粘附得更多或更少；一枚或两室的，与其 t 一个肉质的连接体；花粉光滑。子房在上面，简单，一个含一个直立的胚珠；柱头是 sessile，简单，略带斜对。子房在上面，简单，一个含有一个肉质的，不可开裂，单室，单籽的。种子与胚芽平行在肉质的囊中，放在种子的那端的。种子是位于外表面的水藻。—灌木或草本。

2. PIPER NIGRUM, Linn., L. E. D.—THE BLACK PEPPER.
astonishment that it should have come into general use, since neither flavour nor appearance to recommend it.

**Botany.** Gen. Char.—Spadix covered with flowers on all Stems, hermaphrodite, rarely dioecious, each supported by a Stamina two or more. Ovarium with one, solitary, erect Stigma punctiform, obtuse, or split. Berry one-seeded. A dicotyledonous [monocotyledonous, Blume], inverted (Blume).

**Sp. Char.**—Stem shrubby, radicant, terete. Leaves ovate or elliptic, acuminate, occasionally somewhat oblique, cordate, five to seven-nerved, coriaceous, smooth, recurved at the margin, greenish beneath. Spadices shortly culated, pendulous. Fruits distinct (Blume). Stem eight to twelve feet long, jointed and chotomous. Fruit at first green, then afterwards black.

According to Dr. Roxburgh⁴ **Piper tri** cultivated, and yields excellent pepper.

**Hab.**—Cultivated in various parts of India and its islands (Roxburgh); also West Indies.

**Preparation.**—When any of the berries on a spadix change from green to red, the whole are considered fit for gathering; for if allowed to become fully ripe, they are somewhat less acrid, and moreover, easily drop off. When collected they are spread on mats, dried in the sun, and the stalks separated by hand-rubbing; they are afterwards winnowed. The dried and shrivelled berries are called **black pepper (piper nigrum)**.

**White pepper (piper album)** is prepared from the best and smallest grains, taken at their most perfect stage of maturity. These are soaked in water, swell and burst their tegument, which is afterwards carefully separated, by drying in the sun, hand-rubbing, and again ceases.

**Commerce.**—The pepper countries extend from about the longitude of 90° to that of 115° E., beyond which no pepper is found; and they reach from 5° S. latitude to about 12° N., where again ceases. The following estimate of the production of pepper was drawn up by Mr. Crawford:⁵

<table>
<thead>
<tr>
<th>Production of Pepper</th>
<th>lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sumatra (west coast)</td>
<td>20,000,000</td>
</tr>
<tr>
<td>Do. (east coast)</td>
<td>8,000,000</td>
</tr>
<tr>
<td>Islands in the Straits of Malacca</td>
<td>3,000,000</td>
</tr>
<tr>
<td>Malay peninsula</td>
<td>3,750,000</td>
</tr>
<tr>
<td>Borneo</td>
<td>2,600,000</td>
</tr>
<tr>
<td>Siam</td>
<td>8,000,000</td>
</tr>
<tr>
<td>Malabar</td>
<td>4,000,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>55,000,000</strong></td>
</tr>
</tbody>
</table>

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⁴ Enum. Plant. Java, p. 64.  
⁷ Marsden, History of Sumatra, 3d ed. p. 137.  
⁸ Ibid, op. cit.  
⁹ M'Culloch, Dict. of Comm.
the year 1833, the number of pounds of pepper which paid duty per lb.) was 2,169,438. In 1840, 2,271,174 lbs. paid duty. It is usually imported in bags.

DESCRIPTION.—Black pepper (piper nigrum) is round, covered externally with a brownish-black, corrugated layer (the remains of the lent portion of the berry), which may be readily removed by boiling it in water. Internally we have a hard, whitish, spherical, husk seed, which is horny externally, but farinaceous internally. The least kind of black pepper is called shot pepper, from its density and hardness. Fulton's decorticated pepper is black pepper deprived of its husk by mechanical triturating. It is sometimes bleached by neater. The taste of pepper (both of nucleus and covering) is and hot. White pepper (piper album) is the fruit deprived of its fleshy portion of the pericarp. The grains are larger those of black pepper, spherical, whitish, and smooth, horny externally; internally they are farinaceous, or hollow in the centre. They are less acrid and pungent than black pepper.

POSITION.—In 1819, Oersted discovered piperin in pepper. In 1821, black pepper was analyzed by Pelletier. In 1832, white pepper was analyzed by Lucà.

<table>
<thead>
<tr>
<th>Black pepper (Pelletier)</th>
<th>White pepper (Lucà)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acid resin ---------------</td>
<td>16.40</td>
</tr>
<tr>
<td>Volatile oil -------------</td>
<td>1.61</td>
</tr>
<tr>
<td>Extractive, gum, and salts</td>
<td>12.40</td>
</tr>
<tr>
<td>Starch -------------------</td>
<td>18.30</td>
</tr>
<tr>
<td>Albumen -----------------</td>
<td>2.50</td>
</tr>
<tr>
<td>Woody fibre -------------</td>
<td>20.00</td>
</tr>
<tr>
<td>Water and loss</td>
<td>19.29</td>
</tr>
</tbody>
</table>

Lucà found no piperin in white pepper; but Poutet subsequently identified it. Probably, therefore, in Lucà's analysis, the piperin was mixed in the resin.

RESIN OF PEPPER (resina piperis).—This is a very acrid substance, soluble in alcohol and ether, but not so in volatile oils. It possesses in high perfection all the properties of pepper. Dissolved in ether it was employed by Dr. Lucas, and in two out of three cases with success.

VOLATILE OIL OF PEPPER (oleum piperis).—When pure this is colourless; the odour and taste of pepper. Its sp. gr. is 0.9932 (Lucà). Its composition is C\text{18} H\text{28}. It absorbs hydrochloric acid in large quantity, but does not form a stable compound with it. According to Meli, it possesses the same febrifugal properties as piperin, perhaps because it retains some of the latter principle. It has been used in some forms of dyspepsia depending on general debility.

Piperin.—This substance was discovered by Oersted in 1819, but was more recently examined by Pelletier in 1821. It exists in black, white, and long pepper, and also in cubeb.
It is a crystalline substance, the crystals being rhombic prisms, with inclosed boses. It fuses at 212° F., is insoluble in cold water, and is only very slight soluble in boiling water. Its best solvent is alcohol; the solution throws off piperin when water is added to it. Ether dissolves it, but not so readily alcohol. Acetic acid likewise is a solvent for it.

Piperin, when pure, is white; but, as met with in commerce, it is usu- straw-yellow. It is tasteless and inodorous. It was at first supposed to be alkali; but Pelletier has shown that it possesses no analogy with vegetable alkalis, and that it is related to the resins. With strong sulphuric acid it forms a blood-red liquid. Nitric acid colours it first greenish-yellow, then orange, and afterwards red. The action of hydrochloric acid is similar.

Its formula, according to Regnault, is C_{34}H_{10}N_{4}O_{4}.
Piperin has been recommended and employed by Meli and several other physicians as a febrifuge in intermittent fevers. It is said to be more certain and speedy, and also milder in its action, than the cinchona alkalis. Moreover, it is told it might be procured at a cheaper rate than sulphate of quinia. Its dose is about six or eight grains in powder or pills. Sixty grains have been taken twenty-four hours, without causing any injurious effects. Meli considers two or three scruples sufficient to cure an intermittent. Magendie proposes it for blennorrhagia, instead of cubebes.

**Physiological Effects.**—Pepper is one of the acrid spices whose general effects have been already noticed (p. 181). Its great acridity is recognised when we apply it to the tongue. On the skin it acts as a rubefacient and vesicant. Swallowed, it stimulates the stomach, creates a sensation of warmth in this viscus, and, when used in small doses, assists the digestive functions, but, if given in large quantities induces an inflammatory condition. Thirty white pepper-corns, taken for a stomach complaint, induced violent burning pain, thirst, an accelerated pulse, which continued for three days, until the fits were evacuated. Wendt, Lange, and Jager, have also reported cases in which inflammatory symptoms supervened after the use of pepper. On the vascular and secretory systems pepper acts as a stimulant. It accelerates the frequency of the pulse, promotes diaphoresis, and acts as an excitant to the mucous surfaces. On one of his patients (a lady) the copious use of pepper induces burning heat, skin, and a few spots of Urticaria evanida usually on the face. "I have seen," says Van Swieten, "a most ardent and dangerous fever raised in a person who had swallowed a great quantity of black pepper." It has long been regarded as a stimulant for the urinary and genital apparatus. The opinion is supported by the well-known influence of the peppers over certain morbid conditions of these organs. Moreover, the beneficial effect of pepper in some affections of the rectum leads us to suspect that this viscus is also beneficially influenced by these fruits.

Uses. It is employed as a condiment, partly for its flavour, partly for its stimulant influence over the stomach, by which it assists digestion. As a gastric stimulant it is a useful addition to difficultly digestible foods, as fatty and mucilaginous matters, especially in po
BLACK PEPPER.

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subject to stomach complaints from a torpid or atomic condition viscus. Infused in ardent spirit it is a popular remedy for pre- the return of the paroxysms of intermittent fevers, given shortly the expected attack. The practice is not recent, for Celsus r warm water with pepper to relieve the cold fit. The febrifuge of this spice has been fully proved, in numerous cases, by L. ; Meli & Riedmüller (Dierbach), and others; though Schmitz u it. Barbier r says, that in some instances, where large doses exhibited, death occurred in consequence of the aggravation of a stent gastritis. It has been employed in gonorrhoea as a sub- for cubeb. In relaxed uvula, paralysis of the tongue, and lations of the mouth or throat requiring the use of a power- pepper may be employed as a masticatory. In the form of at it is used as an application to tinea capitis. Mixed with d it is employed to increase the acridity of sinapis.

INISTRATION.—The dose of black pepper (either of corns or ) is from five to fifteen grains; the powder may be given in the pills.

CONFECTIO PIPERIS NIGRI, L. E.; Electuarium Piperis, E. Con- of Black Pepper.—(Black Pepper; Elecampane-root [Liquorice- powder, E.] of each, lb. j.; Fennel seeds, lb. iij.; Honey; Sugar, of each, lb. ij. Rub the dry ingredients together to a powder. The London College keeps this in a covered vessel, acts the Honey to be added when the Confection is to be used. The Edinburgh and Dublin Colleges order the Honey to be immediately after the dry ingredients have been mixed.)—reparation is intended to be a substitute for a quack medicine, "Ward’s Paste," which has obtained some celebrity as a for fistula, piles, and ulcers about the rectum. Its efficacy depends on the gentle stimulus it gives to the affected parts. Brodie " observes, that severe cases of piles are sometimes by it; and he thinks that it acts on them topically, the greater the paste passing into the colon, becoming blended with the and in this way coming into contact with the piles, on which rates as a local application, much as vinum opii acts on the of the conjunctiva in chronic ophthalmia. In confirmation s view, he mentions the case of a patient attended by Sir d Home, who was cured by the introduction of the paste into rectum. Confection of black pepper is adapted for weak and leu- gnmatic habits, and is objectionable where much irritation or motion is present. The dose of it is from one to two or drachms twice or thrice a day. "It is of no use," says Sir B.

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* Lib. iii. cap. 12.
* Hort’s Magaz. No. xvi.
* Traité Elem. de Mat. Méd. 2d. ed. t. ii. p. 57.
Brodie, "to take this remedy for a week, a fortnight, or a month it must be persevered in for two, three, or four months." As it is to accumulate in and distend the colon, gentle aperients should be exhibited occasionally during the time the patient is taking the medication.


(Prepared Hog's Lard, lb. i.; Black Pepper, reduced to powder; Make an ointment).—Formerly in vogue for the cure of tinea capitis.

2. **PIPER LONGUM, Linn. L.E.D.—THE LONG PEPPER.**

_Botany. Gen. Char._—Vide _Piper nigrum._

_Sp. Char._—Stem shrubby, climbing. Lower leaves obovate or three to five-nerved: upper ones on short petioles, oblong, serrate, oblique, and somewhat cordate at the base, obsolescent five-nerved and veined, coriaceous, smooth, greyish-green but peduncles longer than the petiole. Spadices almost cylindrical (Blume).

_Hab._—India. Found wild among bushes, on the banks of rivers, up towards the Circar mountains. It flowers and fruit during the wet and cold seasons (Roxburgh). It is cultivated in Bengal, and in the valleys amongst the Circar mountains. The roots and thickest parts of the stems, when cut into small pieces and dried, form a considerable article of commerce all over India, the name of _Pippula moola._

_Description._—When fully grown, but yet unripe, the seeds are gathered and dried by exposure to the sun. They are packed in bags for sale.

As met with in commerce, _long pepper_ (_piper longum_) is green or brown, cylindrical, an inch or more in length, having a mild aromatic odour, but a violent pungent taste.

_Composition._—This pepper was analysed by Dulong in 1833. The following are the substances he obtained from it:—Acrid matter (resin?), volatile oil, piperin, nitroguous extractive, bassorin, starch, malates and other salts.

The volatile oil of _long pepper_ is colourless, and has a disagreeable and an acrid taste.

_Physiological Effects and Uses._—The effects of _long pepper_ are analogous to those of black pepper. Cullen and Bergius consider it less powerful; but most other pharmacologists are agreeable.

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* Enum. Fl. Jane, p. 70.
* Journ. de l'Hist. v. xi. p. 52.
CUBEB PEPPER.

ing more acid. Medicinally it may be employed in similar
It is used principally for culinary purposes. It is a consti-
of several pharmacopoeial preparations.

. PI'PER CUBE'BA, Linn. L. E. D.—THE CUBEPEPPER.

Bar. Syst. Diandria, Trigynia.
(Baccis; cubeb, L.—Fruit, E.—Fructus, D.)

TORY.—It is uncertain when the cubebs of our shops were first
aced into medicine, or who first alludes to them. There does
pears to be any foundation for the opinion that the ancient
s were acquainted with them. "Many, indeed, pretend that
tpeion (καρπήσιον) of Galen is our cubeb, and that the round
of Theophrastus, the pepper of Hippocrates, were all names
m; but this is a conjecture founded on a very bad basis. The
ms are at the head of these blunders. Serapion has translated
at Galen says of carpesion into his chapter of cubeb, and attri-
all its virtues to it, and has even added every thing to the
at that Dioscorides has left us of the Ruscus. Avicenna is
the same error, and calls the carpesium cubeb; and from
authors Actarius and the other Greeks have collected their
sts. It is plain from all this, that either the carpesium of the
s and the cubeb of the Arabians are the same things, or else
Arabians have been guilty of confounding different things in
age manner together: if the latter be the case, there is no
of any thing from what they say; and if the former, it is
vident that our cubebs are not the same with theirs—that is,
he carpesium of Galen; for he expressly assures us that this
at a fruit or seed, but, as he tells us, a kind of slender woody
resembling in smell and virtues the root of the valerian.
g is more evident than that the carpesium, therefore, was
a fibrous root, or the small twigs and branches of a climbing
not a round small fruit. If the Arabians, therefore, were ac-
ed with our cubebs at all, it appears that, not knowing what
tpeion and ruscus were, they ignorantly attributed the virtues
by the Greeks to these medicines to these fruits."
bebs werein use in England 500 years ago, for in 1305 Edward I.
d to the corporation of London the power of levying a toll
farthing a pound on this article in its passage over London

tANY. Gen. Char.—Vide Piper nigrum.

Char.—Stem shrubby, terete, climbing. Leaves petiolate, ob-
tovate-oblong, acuminate, rounded or oblique cordate at the
erved, coriaceous, smooth. Peduncles almost equal to the
Berries with elongated peduncles (Blume).
Dr. Blume says that the cubeb of the shops are the fruit of P. canum, which has a smaller and shorter-stalked fruit, having a distinct anise flavour, and pungency than the fruit of P. Cubeb; but Dr. Lindley observes, that he cannot perceive any difference in the flavour of the dried fruit of P. Cubeb of the cubeb sold in the London shops. P. Cubeb is easily distinguishable from P. canum by the leaves being coriaceous, smooth, and shining, with the veins proceeding from the side of the midrib, not from its base.

hab.—Java and the Prince of Wales’s Island.

Description.—The dried unripe fruit of this plant constitutes cubeb (cubebæ vel piper caudatum) of the shops.

In appearance, cubeb resemble black pepper, except that they are lighter coloured, and are each furnished with a stalk two or three lines long, and from which circumstance they have received their name caudatum. The cortical portion of cubeb (that which constitutes the fleshy portion of the fruit) appears to have been thin and less succulent than in black pepper. Within it is a hard spheroid seed, which is whitish and oily. The taste of cubeb is aromatic, and camphoraceous; the odour is peculiar and aromatic.

Composition.—Three analyses of cubeb have been made: one by Trommsdorff, in 1811; a second by Vanquelin, in 1820; and a third by Monheim, in 1835.

Vanquelin.

1. Volatile oil, nearly solid.
2. Resin like that of copaiba.
3. Another coloured resin.
5. Extractive.

Cubeb.

1. Essential Oil of Cubeb.—(See p. 1108.)
2. Resin of Cubeb.—Vanquelin has described two resins of cubeb: one green, liquid, acrid, and analogous, both in odour and taste, to balsam of copaiba, the other is brown, solid, acrid, and insoluble in ether.
3. Cubeb (Piperia).—From cubeb is obtained a principle to which term cubebin has been applied. It is very analogous to, if not identical with, piperia. Cassola, a Neapolitan chemist, says, it is distinguished from the latter by the fine crimson colour which it produces with sulphuric acid, which remains unaltered for twenty or twenty-four hours: moreover, Cubeb is not crystallizable.

Monheim, however, declares Cubebin to be identical with piperia, and that it is combined with a soft acrid resin. In this state it is soluble in ether, alcohol, the fixed oils, and acetic acid; but it is insoluble in oil of turpentine and sulphuric acid. It fuses at 65° F.

Dr. Görres gave cubebin, in both acute and chronic gonorrhoea, to the extent of one drachm, four times daily. But he premised the use of phosphoric acid.

4. Extractive Matter of Cubeb.—Vanquelin says, the extractive matter of cubeb is analogous to that found in leguminous plants. It is precipitable with galls, but not by acetate of lead.

* Flora Medica.
  1 Schwartz, Pharm. Tabell.
  3 Journ. de Pharm. xx. 405.
Physiological Effects.—Cubebs belong to the acrid species, (p. 181) noticed. Their sensible operation is very analogous to black pepper. Taken in moderate doses, they stimulate the stomach, augment the appetite, and promote the digestive process. Larger quantities, or taken when the stomach is in an irritated or inflammatory condition, they cause nausea, vomiting, burning pain, etc., and even purging. These are their local effects. The constitutional ones are those resulting from the operation of an exciting—namely, increased frequency and fulness of pulse, thirst, and internal heat. It probably stimulates all the mucous surfaces, but usually so. In some instances, cubebs give rise to an eruption on the skin, like urticaria. Not unfrequently they cause headache; and finally disorder of the cerebro-spinal functions, manifested by ulive movements or partial paralysis, as in a case related by Broughton.

Cubebs appear to exercise a specific influence over the urinogenital apparatus. Thus they frequently act as diuretics, and at the same time deepen the color of the urine, and communicate a peculiar aromatic to the urine. Their stimulant operation on the bladder is illustrated by a case related by Sir Benjamin Brodie. A genius, labouring under chronic inflammation of the bladder, took in grains of cubebs, every eight hours, with much relief. Being desirous to expedite his cure, he, of his own accord, increased the dose to a drachm. This was followed by an aggravation of the symptoms: the irritation of the bladder was much increased, the urine was secreted in much larger quantity than before, and finally the patient died.—“his death being, I will not say occasioned,” said Sir Benjamin, “but certainly very much hastened, by his insistence in overdosing himself with cubebs.”

Three drachms of cubebs caused in Pül’s nausea, acid eructations, at the pit of the stomach, headache, uneasiness, and fever.

Uses.—The principal use of cubebs is in the treatment of gonorrhoea. They should be given in as large doses as the stomach can bear in the early part of the disease; for experience has fully proved in proportion to the length of time gonorrhoea has existed, the amenable is it to the influence of cubebs. In some instances an absolute stop is put to the progress of the malady. In others, the rect symptoms only are palliated; while in many (according to experience in most) cases no obvious influence over the disease is noticed. The presence of active inflammation of the urethra not positively preclude the use of cubebs, though I have more than once seen them aggravate the symptoms. Mr. Jeffrey thinks greatest success is met with in the more inflammatory forms of the disease. Cubebs have been charged with inducing swollen testicles; but I have not observed this affection to be more frequent.

2 Ibid. vol. i. p. 390.
4 Observ. on the Use of Cubebs, or Java Pepper, in the Cure of Gonorrhoea. 1831.
after the use of cubebes than when they were not employed. W. Broughton\textsuperscript{a} gave them to fifty patients, and in forty-five they were successful. Of these only two had swelled testicle. The explanation of the \textit{methodus medendi} is unsatisfactory. Sir A. Cooper\textsuperscript{b} thinks that cubebes produce a specific inflammation of their own on the urethra, which has the effect of superseding the gonorrhoeal inflammation. The occasional occurrence of a cutaneous eruption from the use of cubebes deserves especial attention, as I have known it cause a suspicion of secondary symptoms.

Cubebes have been recommended in gleet and leucorrhoea\textsuperscript{c}, abscess of the prostate gland, twenty or thirty grains of cubebes taken three times a day, have in many cases appeared to do good. They seemed to give a gentle stimulus to the parts, and to influence the disease much in the same way that Ward's Paste operates on abscesses and fistulae, and ulcers of the rectum. In cystorrhoea also, they have occasionally proved serviceable in small doses\textsuperscript{d}. In piles, wisely, they are given with advantage\textsuperscript{e}.

The efficacy of cubebes in mucous discharges is not confined to urino-genital mucous membrane. In catarhal affections of the membrane lining the aerian passages, it proves exceedingly useful especially when the secretion is copious and the system relaxed.

Formerly cubebes were employed as gastric stimulants and carminatives in dyspepsia, arising from an atomic condition of the stomach. They have also been used in rheumatism. The Indians make them in wine, and take them to excite the sexual feelings.

\textbf{Administration.}—Cubebes, in the form of \textit{powder}, are given in doses varying from ten grains to three drachms. In affections of the bladder and prostate gland the dose is from ten grains to thirty grains. In gonorrhoea, on the other hand, they should be administered in smaller doses. Mr. Crawford\textsuperscript{f} says, that in Malay countries they are given in doses of three drachms, six or eight times during the day.

\textbf{1. Oleum Cubebi.} E.; \textit{Volatile Oil of Cubebes.}—(Prepared by grinding the fruit, and distilling with water.) By distillation, cubeb can yield about 10\textsuperscript{\%} per cent. of a transparent, slightly-coloured (not pure, colourless), volatile oil, which is lighter than water (\textit{d}_{4} 0.929), and has the cubeb odour, and a hot, aromatic, bitter taste. It is composed of carbon and hydrogen, in the same relative proportion as in oil of turpentine; but its formula is $\text{C}_{13} \text{H}_{12}$.

By keeping, it sometimes deposits crystals (\textit{cubeb stearoptes}, \textit{cubeb camphor}), the primary form of which is the rhombic octahedron\textsuperscript{g}. Their odour is that of cubebes; their taste, at first, the cubebes and camphor, afterwards cooling. They are fusible at 185, soluble in alcohol, ether, and oils, but are insoluble in water.

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\textsuperscript{a} \textit{Med.-Chir. Trans.} vol. xii. p. 99.
\textsuperscript{b} \textit{Lancet}, vol. iii. p. 201, 1824.
\textsuperscript{e} \textit{Ibid.} p. 300.
\textsuperscript{f} \textit{Ibid.} vol. xv. 747.
\textsuperscript{g} \textit{Hist. de l'Indian Archipelago}, vol. i. p. 465.
\textsuperscript{h} Brookes, \textit{Ann. Phil. N. S.} vol. v. p. 426.
tion is C\textsubscript{10}H\textsubscript{14}O, so that they are the hydrate of the oil of cubebs is an excellent and most convenient substitute powder. The dose of it, at the commencement of its use, is twelve drops. This quantity is to be gradually increased as the stomach will bear it. In some instances, I have given it tent of a fluidrachm for a dose. It may be taken suspended by means of mucilage, or dropped on sugar. Gelatinous of cubebs, containing the oil of cubebs, are prepared by Mr. w. The mode of preparing these will be described when the gelatinous capsules of copaiva. A combination of oil of nd oil of copaiva forms a very useful medicine in some cases chorea.

continent, a preparation, called the oleo-resinous extract of used. It is prepared by adding the oil to the resinous ex-

TURCA CUBEB, L.; Tinctura Piperis Cubebeae, D. Tincture s. — (Cubebs, 3v. [3iv. D.]; Rectified [Proof, D.] Spirit, \textit{measur}, D.] Macerate for fourteen days, and filter). — gomery says, “I have found this tincture cure gonorrhoea edily and satisfactorily.” The dose of it is one or two three times a day.

OTHER NON-OFFICINAL PIPERACEÆ.

Betel is extensively used by the Malays and other nations of the consider it as a necessary of life. The mode of taking it in Sumatra consists simply in spreading on the sirik (the leaf of the Piper Betle) a small quantity of chunam (quick-lime prepared from calcined shells), and folding it up with a slice of pinang or Areca nut (vide pp. 203 & 936). From the mastication there proceeds a juice which tingles the saliva of a bright red, and which the leaf and nut, without the lime, will not yield. This hue being communicated to the mouth and lips, is esteemed ornamental, and an agreeable flavour is imparted to the breath. The juice is usually, but not always, swallowed. To persons who are not habituated to this composition it causes giddiness, astringes and excoriates the mouth and fauces, and deadens for a sulty of taste. Individuals, when toothless, have the ingredients preni to a paste, that they may dissolve without further effort.

XVIII.—EUPHORBIACEÆ, Juss.—THE EUPHORBIUM TRIBE.

Character.—Flowers monoeocious or dieceious. Calyx monosepalous; nts definite, sometimes none, very often increased on the inside by

\begin{itemize}
\item \textit{Journ. de Pharm.} t. iv. p. 40,
\item \textit{Obser. on the Bactr. Pharm.} p. 489, Lond.
\item \textit{Maraden, Hist of Sumatra}, 3rd ed. p. 281.
\end{itemize}
various squamiform or glandular appendages. *Stamens* indefinite, or definite, distinct (or monadelphous); sometimes inserted into the corolla, beneath the rudiments of the pistil. *Anthers* two-celled; sometimes distinct, dehiscing longitudinally on the outer side. *Gynoecium* sessile, or stipitate, two to three or many-celled; the cells arranged around the central placenta. *Ovules* solitary or in pairs; suspended inner angle beneath the apex. *Styles* as many as the cells; either definite, united, or none. *Stigma* single and compound or many-lobed. Of two to three distinct bivalved cells, which often burst elastically. Some or twin, with an arillus, and attached above to the central Embryo surrounded by a fleshy albumen: cotyledons flat; radicle—Herbs or shrubs generally lactescents. *Leaves* mostly stipulate, or rarely opposite. *Axillary or terminal* with bracts; bracts cases large and involucrate. (Bot. Gall.) Some of the Euphorbia sect. (as *Euphorbia sect. and E. antiqua*): Euphorbia meloformis and E. antiqua (234 & 235), and have considerable resemblance to *Cactaceae*, from which the general be distinguished by the presence of an acid juice. However, the *Mammilaria* (of the *Cactaceae*) possesses an acid juice.

**Properties.**—Acrivity is the leading quality of the plants of this family. Some species also possess a narcotic property and depress the action of the heart. The acridity resides in the milky juice. In some plants the acrid principle is volatile, as in *Hipponoea Maquinella* and *Croton Tiglium*; in the mentioned species it is of an acid nature. Some poisonous species, by nature depriving of this volatile principle, and thereby become esculent. The cases the acid principle is fixed, as in the substance called, in the shop, *Euphorbia.*

Some euphorbiaceous plants are devoid of acridity, or possess it in a slight degree only. Von Buch says, the branches of *Euphorbia* contain a mild sweet juice, which is eaten by the inhabitants of the Canaries. The aromatic tonic barks of the *Croton Casarica* is another to the very general acridity of euphorbiaceous plants. This acrid juice pervades various parts of the plants; in the stem principally in the cortical portion. *M. Berthollet* has recorded a remarkable instance of the harmless quality of the sap in the interior of a plant in the interior of a plant bark is filled with a milky proper juice of a poisonous nature. He imbibed it the natives of Teneriffe as being in the habit of removing the bark, *Euphorbia canariensis,* and then sucking the inner portion of the stem to quench their thirst, this part containing a considerable quantity of the non-elaborated sap.

1. **CRO’TON TIG’LIUM, Lamarck, L. E. D.—THE PURGING CROTON**

*Croton* Jamalgota, *Hamilton.*

*Sex. Syst.* Monocotyl, Monadelphia.

(Oleum e semiinibus exspressum, L. D.—Expressed Oil of the Seeds, E.)

**History.**—Croton seeds are mentioned by Avicenna, Serapion, under the name of *Dend* or *Dende.* The earliest E

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4. *De Sump licibus,* ccclxxviii.
five-parted. — **Males**: petals five; stamens ten or more, distinct.

**Females**: petals none; styles three, divided into two or three parts. **Capsule** tricoccous (Adr. de Jussieu).

**Trunk**—Arborescent. **Leaves** oblong-ovate, acuminate, slightly smooth. **Stamina** fifteen, distinct. Each cell of the fruit is connected with the seed.

**Body**—The tree, from 15 to 20 feet high. **Bark** smooth, ash-like. **Leaves** sometimes cordate, and with two flat round glands at the base; when young covered on both surfaces, but especially on one, with minute stellate hairs. At the base of the leaves are flat round glands. **Raceme** terminal, erect, simple. **Petals** white.

—Continent of India, islands forming the Indian Archipelago, aon.

**Croton** Pavana* is said also to yield tiglum or croton seeds. It is divided from C. Tiglum by having only ten stamens, and by the seeds being smaller than the cells in which they are placed. **C. Pavana** is a native of the eastern parts of Bengal. **Amboyna**? Dr. Hamilton thinks it is **Molucca** of Rumphius.

**Riphion**—**Croton seeds** (semina tiglii seu semina crotonis; tiglii; purging nuts of some authors), in size and shape are similar to castor seeds. Viewed laterally, their shape is oval or oblong; seen from either extremity, they have a rounded or incurvate quadrangular form. Their length does not exceed six lines; their breadth, 3 or 4 lines. The surface of the seeds is yellowish, owing to the presence of a thin investing lamina (epidermis?). The testa is dark brown, and is marked with the ramifications of the raphé. The
without odour; their taste is at first mild and oleaginous, after
acrid and burning. When heated they evolve an acrid vapour.

According to Dr. Nimmo, 100 parts consist of—

Shell or seed-coats ........................................... 36
Kernel, or nucleus ............................................. 64

Composition.—Croton seeds were analyzed by Brandes, with
the following results:—

Volatile oil ...................................................... traces
Fixed oil, with crotonic acid, and an alkaloid (crotonin) ......... 17·00
Crotonates and colouring matter ................................ 9·32
Brownish yellow resin, insoluble in ether ........................ 1·50
Searine and wax ............................................... 0·05
Extractive, sugar, and maltose of potash and lime ................. 2·00
Starchy matter, with phosphate of lime and magnesia .......... 3·71
Gum, and gummam ........................................... 10·17
Albumen ......................................................... 1·01
Glucon ............................ 0·00
Seed-coats, and woody fibre of the nucleus ......................... 30·00
Water ........................................................... 20·50

Croton seeds ..................................................... 101·41

1. Volatile Oil of Croton Seeds.—This is but imperfectly known, trace
of it having been obtained. Brandes regards it as extremely acrid, and
that by the united agencies of air and water it is converted into crotonic
for the distilled water of the seeds becomes more acid by keeping.

2. Fixed Oil of Croton Seeds.—This also is but imperfectly known,
must not be confounded with croton oil of the shops, which is a mixture
and other constituents of the seeds. Fixed oil of croton seeds is, proba
combination of crotonic and other fatty acids with glycerine.

3. Crotonic Acid. (Jatrophic Acid.)—Though this acid exists in the
state in the seed, yet an additional quantity of it is obtained when the
saponified. It is a volatile, very acrid, fatty acid, which congeals at:
and, when heated a few degrees above 32° F., is converted into vapour, has
strong nauseous odour, and which irritates the eyes and nose. It has an
taste, and acts as a powerful local irritant. It is to this acid that the cl
and poisonous qualities of croton oil are principally referrible. Pellet
Cavendish and silver, white; and the sulphate of iron, yellow. Crotonate of Pot
crystalline, and dissolves, with difficulty, in alcohol. Crotonate of Bar
is soluble in water; but Crotonate of Magnesia is very slightly soluble
in this liquid.

4. Crotonin.—The alkali which Brandes found in these seeds, and to
he gave the name of Crotonin, appears to be identical with the Tylia of A
de Jussieu. It is crystalline, has an alkaline reaction, is fusible and com
with flame, leaving a carbonaceous residuum. It is insoluble in water, dis
very slightly only in cold, but easily in hot, alcohol. If sulphuric or pho
acid be added to the spirituous solution, small prisms (sulphate or phos
crotonin), decomposable by heat, are obtained by slow evaporation. Soub
thinks that crotonin is a combination of magnesia with a fatty acid.

5. Resin.—Is brown and soft; and has a disagreeable odour, on ac
boudless, of the oil which it retains. It is soluble in alcohol, but insol
ether and in water. The alkalis dissolve it by separating a whitish matte
contributes to the purgative properties of croton oil.

3 Nouve. Traite de Phurm. t. ii. p. 163.
; but the uncertainty of its operation, and the griping which it occasions, are objections to its use. 

Lansberg² twenty of the seeds killed a horse, by causing gastro-
the pulse was frequent, small, and soft.

In the human subject, a grain of croton seed will produce full purgation. Mr. Marshall¹ says that this tide into two pills, is about equal in power to half a drachm to six grains of calomel. The operation, he adds, is much rumbling of the bowels; the stools are invari-and copious. Dr. White recommends the seeds to be deprived of their seed-coats, before employing them. 

Informed me that the labourers in the Calcutta Botanic e in the habit of taking one of these seeds as a purgative, one occasion this dose proved fatal.

-coats, the embryo, and the albumen, have each in their declared to be the seat of the acrid principle: I believe which I shall have to make with respect to the seat of of castor-oil seeds, will apply equally well to that of s. The following is a case of poisoning by the inhalation of the seeds:

Aung, aged 31, a labourer in the East India warehouses, was brought on Hospital on the 8th of December, 1841, labouring under symp-
ning by the inhalation of the dust of croton seeds. He had been eight hours in emptying packages of these seeds, by which he their dust. The first ill effects observed were loss of appetite, g sensation in the nose and mouth, tightness at his chest, and ymation, followed by epigastric pain. Feeling himself getting the warehouse, but became very giddy and fell down insensible. tance was procured, an emetic was administered, stimulants were he was wrapped in warm blankets. When he became sensible
too large for his mouth, and appeared to be without feeling, and he had been
two or three times to ascertain whether there was any sensation in it. On a
amination, however, no change could be observed in the size or appearance
the tongue or parts about the mouth. "Hot brandy and water were given to
and he was put into the hot bath with evident relief. He continued in
hospital for several days, during which time he continued to improve, but a
complained of epigastric pain. It deserves notice that his bowels were
acted on, and on the day following his admission several doses of castor-oil
given to him.

It would be interesting to know whether the seeds of Croco
Pavanea are equally active with those of Croton Tiglum; and, in
whether the seeds of both species are found in commerce.

2. of the oil. a. On Animals generally.—On vertebrated anima-
horses, dogs, rabbits, and birds), it acts as a powerful local irrit.
or acid. When taken internally, in moderate doses, it operates a
drastic purgative; in large doses, as an acrid poison, causing gast
enteritis. Moiroud says, that from twenty to thirty drops of
oil are, for the horse, equal to two drops for man; and that two
drops injected into the veins cause alvine evacuations in a
minutes. Thirty drops, administered in the same manner, hin
casted, according to this veterinarian, violent intestinal inflammas
and speedy death. A much less quantity (three or four drops) in
according to Hertwich, terminated fatally when thrown into
veins. After death the large intestines have been found to be
inflamed than the small ones. Flies, which had eaten some
moistened with the oil of croton, died in three or four hours—
wing being paralyzed or immovable before death.

ß. On Man.—Rubbed on the skin it causes rubefaction and
pustular or vesicular eruption, with sometimes an erysipelas
swelling of the surrounding parts. When rubbed into the abdomen
it sometimes, but not invariably, purges. Rayer mentions a
in which thirty-two drops rubbed upon the abdomen produced a
purging, large vesicles, swelling and redness of the face, va
small prominent, white, crowded vesicles on the cheeks, lips, ch
and nose. Applied to the eye, it gives rise to violent burning,
and inflammation of the eye and face. In one case it produc
giddiness. Ebeling obtained relief by the application of a solute
of carbonate of potash. Swallowed in small doses, as of one or t
drops, it usually causes an acrid burning taste in the mouth
throat, and acts as a drastic purgative, giving rise to watery
and frequently increasing urinary secretion. Its operation is ve
speedy. Frequently it causes evacuations in half an hour: yet it
somewhat uncertain. Sometimes six, eight, or even ten drops, be
be given at a dose, without affecting the bowels. In moderate dose
it is less disposed to cause vomiting or purging than some old
cathartics of equal power. Mr. Thiff, however, observes that
in malignant cholera, abdomen sensible to the touch, burning. In an hour and a half there were excessive and intermitting evacuations; sensation of burning in the oesophagus; sensibility of the abdomen; skin colder; respiration and breathing rapid; the cyanosis extended over the whole body; became insensible; and death occurred, with some of the symptoms of asphyxia, four hours after the poison was swallowed. A was found in the gastric membrane. The intestines presented, such as are characteristic of typhus fever.

Comparing croton oil with other violently acrid purgatives, we distinguish it by its speedy operation, the great depression of the system, as well as the general feeling of debility which preceded, and by the uncertainty of its operation.

—The value of croton oil as an internal remedial agent depends principally on two circumstances: first, its powerful and speedy action; secondly, on the smallness of the dose, which, in practice, possesses many advantages. These circumstances render it peculiarly applicable in cases requiring powerful and speedy catharsis, and in those cases where the patient cannot swallow, or does so with extreme difficulty, psychosis, coma, and some affections of the throat; or where he is unable to swallow, as in mania. In all such cases the oil may be given on the tongue. In obstinate constipation, whether from the use of lead, or from other causes, it has sometimes succeeded where powerful cathartics had been tried in vain. It is especially serviceable where the stomach is irritable, and rejects more acrid purgatives; and it is of course objectionable in all inflammatory conditions of the digestive tube. In stercoraceous vomiting, and in the constitutional symptoms of hernia, but without local
cathartic. In employing it, two cautions are necessary: it must be avoided, or at least used with great caution, in extreme debility; as it is improper in inflammatory affections of the digestive organs. The great drawback to its use is its uncertainty. In one case it actuates with extreme violence; in another, it scarcely produces any effect. In the diseases of children, where a powerful purgative is required, croton oil has been administered, on account of the minuteness of the dose, and the facility of its exhibition. In hydrocephalus, and other head affections of children, I have several times used it where all cathartics had failed, or where extreme difficulty was experienced in inducing the patients to swallow the more ordinary remedies of the class. In some of these it has disappointed me. In the case of a child of four years of age, affected with incipient hydrocephalus, I gave six doses, of one drop each, of the oil without any effect. In uterine obstructions (chlorosis and amenorrhœa) it has occasionally proved serviceable. In tape-worm it has been recommended; but I have no experience of its efficacy.

Rubbed on the skin, croton oil has been employed to produce inflammation and a pustular eruption, and thereby to relieve diseases of internal organs, on the principle of counter-irritation, before alluded to (see p. 145). Inflammation of the mucous membrane of the air-passage, peripneumonia, glandular swellings, rheumatism, and neuralgia, are some of the diseases against which it has been applied in this way, and doubtless frequently with benefit. It is sometimes used in the undiluted form, but more commonly with two or thrice its volume of olive oil, oil of turpentine, soap linseed alcohol, ether, or some other convenient vehicle. But, in all cases just enumerated, it has never appeared to me to present an advantage over many other counter-irritants in common use, as eau de tartar; while the chance of causing purging is, in some cases, an objection to its use; and its greater cost sometimes precludes employment on a large scale in pauper establishments. Friction with it on the abdomen have been used to promote alvine evacuations; but it frequently fails to produce the desired effect. In promoting the absorption of the oil in these cases, it should be solved in ether or alcohol, and the frictions are to be assiduously made.

Administration.—Croton Seeds are rarely or never used in this country. Their farina may, however, be given in doses of a grain or two.

CROTONIS OLEUM, E.; Tiglii Oleum, L.; Croton Oil.—This is the expressed oil of the seeds. It is imported from the East India, principally from Madras, but in part from Bombay. I am informed by an oil presser at Calcutta that it is prepared like castor oil, except that it is strained instead of being boiled. In shelling the seeds, women often suffer severely with swelling of the face, &c. The oil is also expressed in England. Soubeiran obtained it.
THE PURGING CROTON.

Illogramme [2 lbs. 8 oz. 84 grs. Troy] of seeds 270 grammes
1470 grs. Troy) of oil; of which 146 grammes [about 2235
roy] were procured by pressure, and 124 grammes [1915 grs.
by alcohol. As met with in English commerce, it is yellowish-
or amber-coloured, and has an unpleasant odour and an acrid
It reddens litmus, and is soluble in alcohol. It consists,
ing to Dr. Nimmo, of

| An acid matter | 4.5 |
| Bland fixed oil | 5.5 |
| Croton oil | 10.9 |

Acid matter is extracted from croton oil by alcohol. The
ic solution reddens litmus, and, when dropped into water,
a cloudiness. Dr. Nimmo supposed this acid matter to be
sinous nature; but the investigations of Pelletier and
ou, and Brandes, have shown that it is a mixture of crotonic
of crotolim [and resin]. According to Mr. Twining* there
kinds of croton oil met with in commerce. One is dark
and thickish; the other is straw-coloured. The first is the
align. These oils may, perhaps, be obtained from different
the one from Croton Tiglium, the other from Croton Pavana.
following are the characteristics of the goodness of the oil,
g the Edinburgh College:

Agitated with its own volume of pure alcohol and gently heated, it
on standing, without having undergone any apparent diminution.

In oil is exhibited in doses of one, two, or three drops. In
stances it is simply placed on the tongue, as in coma, tetanus,
&c.; or it may be taken in a tea-spoonful of syrup. These
of administering it are objectionable, on account of the
ste produced. The usual mode of employing it is in the
pill, made with conserve of roses or bread-crumbs. Some
ployed it in the form of emulsion, flavoured with some car
oil or balsamic substance; but the burning of the mouth
at, to which it gives rise, is an objection to its use.
actura Crotonis; Tincture of Croton. This is prepared by
z the seeds, or dissolving the oil in rectified spirit. Sou-
formula is one drop of croton oil and half a drachm of rec-
irit.

æo Crotonis; Croton Soap. This is prepared with two parts
in oil and one part of soap-boiler’s lye. It is in fact a
of soda. A croton soap is sold by Mr. Morson, of
pton Row, Russell Square. It may be used as a purgative,
of from one to three grains. It has been said that the
inishes the acrimonious property of the oil without affecting
rtic powers—a statement, however, which is highly impro-

* Dierbach, op. cit.
γ. Línimentum Crotonis; Croton Liniment. This is prepared by mixing one part of croton oil with five parts of olive oil. If repeatedly applied to the skin it occasions redness and a pustular eruption. It is used as a counter-irritant.

Antidotes.—In a case of poisoning by the seeds or oil, the object is to remove the oil from the stomach. Mild, demulcent, emollient drinks, are then to be given. Alkaline substances have been recommended as chemical antidotes, but their efficacy has been proved. Full doses of opium will be requisite to check the diarrhea. To relieve a failing circulation, ammonia and brandy may be given, and the warm bath employed. To combat the inflammatory symptoms, blood-letting may be used, if the condition of the system permit its employment.

2. CRO'TON ELEUTER'IA, Swartz, E.—THE SEA-SIDE BAL'S. SWEET-WOOD.

Sex. Syst. Monoeilia, Monadelphia.
(Cascarilla. Bark probably of Croton Eleuteria and possibly of other species of the same genus.)

History.—Cascarilla or Eleuteria bark was first mentioned by Stisser in 1686, at which time it was used in this country with tobacco, for smoking. In 1754 Catesby noticed and figured a plant, which, he said, grew plentifully on most of the West Indies, and yielded Cascarilla bark, or, as he called it, Ilatheria bark, "La Chacricula." This plant is generally supposed to be the Croton Cascarilla, Linn. (C. lineare, Jacq.); and the reasons led me, at one time, to think that it might be the same as the cascarilla bark of the shops—an opinion also entertained by Dr. Lindley. Dr. Lindley adduced several reasons for believing the Croton Eleuteria was the true species, as Drs. Wrigley and Woodville had already asserted. The subsequent receipt, in the Linnean vol. of specimens of the plant, from Mr. Lees, of the Bahamas, has fully confirmed the accuracy of Dr. Lindley's opinion. The Croton Cascarilla, Don, L. (C. Pseudo-China, Schiede), and Copalchi, the true Cascarilla, are not found in this country.

Sp. Char.—Leaves ovate, acuminate, quite entire, smooth, silvery, with scales. Racemes compound axillary. Stem subcent (Swartz).

Branches and twigs angular, somewhat compressed. Leaves alternate, with a short but obtuse point. Flowers monocious, sessile. Males: petal whitish; stamens ten to twelve.
he partly in thin sheets, and a thin in regular strips, cracked both longitudinally and transversely. The cortical r of a dull brown colour. The taste of this bark is warm, sudd bitter; its odour is peculiar, but agreeable. When burned, es a pleasant odour (which has been compared by Pfaff to ranilla or amber when heated), on which account it is a con-
of fumigating pastiles.

has enumerated no less than forty-three species of lichens in this bark. With one exception (Parmelia perlata, which never seen on cascarilla), every one of these lichens has an crustaceous, amorphous thallus. A very common species, lea Arthonioides, Fée: the thallus of which is very white, and thecia minute, round, and black.

ARACE.—It is imported from Nassau, in New Providence, the Bahama Islands). Of sixteen imports, which I have abled to trace since 1838 in the bills of entry, eight were from three from Belize, and two from Lima; the others were from an ports. Some of these probably were returned goods. rom Belize may perchance be the produce of the Bahama
d paid duty (one penny per lb.) in 1838. In 1840, 14,490 lbs.
ty.

sition.—Cascarilla bark was analyzed by Trommsdorff, tained from it the following substances;—Volatile oil 1-6, rsin 15-1, gum and bitter matter with trace of chloride of m 18-7, woody fibre 65-6. Meissner detected in the ashes of the oxide of copper. Brandes has announced the exist-
a peculiar alkaline substance (cascarillina).

ALTE' OIL OF CASCARILLA.—It possesses the odour and taste of the bark. is 0-938. Its colour is variable, sometimes being greenish, at others it.

It consists of two oils, one boiling at 244°, and which contains
3. Extractive.—Has a bitter, but not balsamic, taste. Its watery solution reddens litmus, and is unchanged by either ferruginous solutions or tincture of nutgalls.

Chemical Characteristics.—The sesquichloride of iron deepens the colour of the infusion of cascarilla. The tincture of nutgall causes turbidity, and at the end of twenty-four hours a very slight precipitate. The alcoholic tincture deposits some resin on the addition of water.

Physiological Effects.—Cascarilla bark belongs to the ardent bitters, before noticed (p. 189.) That is, it produces the combined effect of an aromatic and of a moderately powerful tonic; but it does not possess any astringency. Some pharmacologists place it with stimulants, others with tonics. Cullen⁸, though at one time uncertain as to which of these classes it belonged, ultimately classed it with the tonics. Krauss⁹ states that moderate doses give rise, in very susceptible, especially in sanguine, subjects, to nootropic effects; but that I have frequently employed it, I never observed an effect of this kind. Mixed with tobacco, and used for smoking, it is said to cause giddiness and intoxication⁴.

Uses.—Cascarilla has been employed as a substitute for cinchona, and, although it is inferior to the latter in tonic and febrifuge qualities, its aromatic quality frequently enables it to sit easily on the stomach, without causing either vomiting or purging, which, inutable affections of the alimentary canal, cinchona is apt to produce. In this country it is principally employed in those forms of dyspepsia requiring an aromatic stimulant and tonic. It is also used in cases of debility generally, and in chronic bronchial affections, to check excessive secretion of mucus. In Germany, where it is a favourite remedy, it is used in many other cases: such as low nervous or intermittents, the latter stages of diarrhoea, and dysentery.

Administration.—The powder may be given in doses of from one to half a drachm; but it is a less agreeable form than the infusion.

1. Infusum CASCARILLAE. L. E. D.; Infusion of Cascarilla.—(Cascarilla bark, bruised, 3iss. [3ss. D.]; Boiling [distilled, L.] Water Oj. [Oss. wine-measure, D.]) Macerate for two hours in a vessel tightly covered, and strain (through linen or calico, E.]).—A cold and aromatic bitter tonic. It is a good vehicle for acids and alkalies. The tincture of cascarilla is usually joined with it. Dose, from 3si to 3sii.

2. Mistura CASCARILLAE COMPOSITA, L.; Compound Mixture of Cascarilla.—(Infusion of Cascarilla, 3sxvii; Vinegar of Squill, D; Compound Tincture of Camphor, 3sii. Mix).—Said to be useful in chronic affections of the mucous membranes of the lungs. Dose, from 3si to 3siss. twice or thrice a day.

3. Tinctura CASCARILLAE, L. E. D.; Tincture of Cascarilla.—(Cascarilla bark, bruised [in moderately fine powder, E.], 3v. [3iv. D]

⁸ Mat. Med.
⁹ Heilmittelkreb, 8. 401.
¹ United States Dispensatory.
The castor-oil plant was known in the most ancient times, and the seeds of it in some Egyptian sarcophagi, to have been at least 4000 years old. Whether this is, as some imagine, the plant alluded to in the Bible, and which, when translated, is called the "gourd," I cannot pretend to decide. As fathers, Jerom and Augustin, differed so much in their views as to what was the particular plant meant in the passages referred to, that from words, we are told, they proceeded to ancient Greeks were acquainted with the Ricinus, for both Dioscorides and Hippocrates mention it; the latter employed it in medicine. Dioscorides calls it the Ῥικῦ or Ἰκῦ. It was the "pôro" by the Greeks, and the Ricinus by the Romans, on account of its seeds to a little insect bearing these names, which are the destruction of dogs and other animals, and whose common name in English is the "tick.

Gen. Char. — Flowers monocious. Calyx three to five, valvate. Petals none. Filaments numerous, unequally polygonal; cells of the anther distinct, below the apex of the filament. Style short; stigmas three, deeply bipartite, oblong, coloured, ovary globose, three-celled, with an ovule in each cell. Fruits prickly, capsular, trilocular. Trees, shrubs, or herbs, sometimes becoming arborescent. Leaves alternate, sessile, with glands at the apex of the petiole. Flowers in panicles, the lower male, the upper female; all articulated in peduncles, and sometimes augmented by bi-glandular bracts.
The stems of plants growing in this country are round, greenish, reddish-brown, and blue pruinose, and branch.-

Leaves on long round petioles, eight or ten lobed. A large scutelliform gland on the petiole, near its junction with the lamina. Flowers capillary, branched. Stigmas reddish.

Capsules supported on stalks, which are somewhat longer than the capsules themselves.

Hab.—India. When cultivated in Great Britain, Ricinus communis is an annual, seldom exceeding three or four feet high; but in other parts of the world it is said to be perennial, arborescent, and to attain a height of fifteen to twenty feet. Dr. Roxburgh says, that in India several varieties are cultivated, "some of the growing to the size of a pretty large tree, and many years' duration." Clusius saw it in Spain with a branched trunk as thick as a man's body, and of the height of three men. Belon also tells us that Crete it endures for many years, and requires the use of ladders to mount it. Ray found it in Sicily as large as our common alder trees, woody, and long-lived; but it has been a question with botanists whether these arborescent and other kinds are mere varieties of or distinct species from, the ordinary Ricinus communis.

The following (varieties or distinct species) are enumerated by Nees and Eckler as common in gardens, and as distinguished principally by the color of the pruinose condition of the stem—characters which, however uncertain in all cases, appear here to be constant.

1. Ricinus africanus (Willd.)—Stem not pruinose, green, or on one sideish. The fruit-racemes abbreviated, the fruit-stalk longer than the capsule. Seeds alternated on one side, marbled gray and yellowish-brown. [Arborescent. Cultivated in Bengal.]

2. Ricinus macrophyllus (H. Berol.)—Nearly allied to the foregoing: quite green, not pruinose. Fruit racemes elongated, fruit-stalk shorter than the fruit.

3. Ricinus leucocarpus (H. Berol.)—Stem pale green, white pruinose. Fruit-stalk as long as the fruit. The unripe fruit and prickles almost white.

4. Ricinus lividus (Willd.)—Stem, petiole, and midrib, purple red, not pruinose. Nearly allied to R. africanus, and, like this, more woody and perennial [Arborescent. Cultivated in Bengal (Hamilton)].

5. Ricinus viridis (Willd.)—Stem pale green, blue pruinose, by which it is distinguished from R. macrophyllus. Seeds somewhat smaller, more or less marked with white and fine brown. [Herbaceous. Cultivated in Bengal (Hamilton)].

Description.—Castor seeds (semina ricini, seu sem. catapulce...
rose corymbose are membranous or tenuose.

The only analysis of these seeds, as yet published, is by Geiger. The following are his results:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tasteless resin and extractive</td>
<td>19.1</td>
</tr>
<tr>
<td>Brown gum</td>
<td>19.1</td>
</tr>
<tr>
<td>Ligneous fibre</td>
<td>23.83</td>
</tr>
<tr>
<td>Patty oil</td>
<td>64.18</td>
</tr>
<tr>
<td>Gum</td>
<td>7.40</td>
</tr>
<tr>
<td>Caseum (albumen)</td>
<td>69.09</td>
</tr>
<tr>
<td>Ligneous fibre with starch (hardened albumen?)</td>
<td>20.00</td>
</tr>
<tr>
<td>Extracts of the seeds</td>
<td>7.89</td>
</tr>
<tr>
<td>Seeds</td>
<td>100.00</td>
</tr>
</tbody>
</table>

**Acrid Principle (Ricin and Elaioide acide).**—This principle is doubted by Geiger, and its existence has been doubted or denied by others. According as well as other facts establish, in my opinion, its presence:—

Another experienced a peculiar feeling of dryness of the eyes and throat, when having been exposed to the vapour arising from a vessel in which castor seeds and water were boiling. Secondly, Planche obtained an odorous principle by distilling a mixture of water and castor oil. He ascribes the occasional acridity of the oil to the production of the acrid principle by the action of the air on it.

This principle (whatever its nature may be) appears to reside in both the embryo and the seeds. Jussieu* and some others have asserted that it resides exclusively in the embryo; while Boutron-Chariard and Henry jun. claim the albumen to be the exclusive seat of it. But any unprejudiced person will instantly by tasting separately the embryo and albumen, that it resides in both. Dierbach* states that in fresh seeds the innermost layer of the seeds is acrid, but that in dry seeds, the contains none.

**Oil; Castor Oil (Oleum Ricini, L. E. D.) Preparation.**—The following is a common method of preparing castor oil in India, America, and Jamaica. At the factory, the fruit is shelled by women; the seeds are then placed in hempen cloths, and pressed by means of a screw or hydraulic press. The oil thus procured is afterwards placed in a tin boiler until the water boils, by which the pericarp
not; the latter yields the most oil. Ainslie describes the method of preparing the oil in India by coction. The best East Indian Castor Oil is sold in London as cold drawn.—In the United States the cleaned seeds are gently heated in a shallow iron reservoir, to render the oil liquid for easy expression, and then expressed in a powerful screw-press, by which a whitish oily liquid is obtained, which is boiled with water in clean iron boilers, and the impurities skimmed off as the rise to the surface. The water dissolves the mucilage and starch, and the latter agglutinates the albumen, which forms a whitish layer between the oil and water. If clear oil is now removed, and boiled with a minute portion of water until aqueous vapours cease to arise: by this process an acrid volatile matter is got rid of. This oil is put into barrels, and in this way is sent into the market. Good oils yield about 25 per cent. of oil. In Jamaica the bruised seeds are boiled with water in an iron pot, and the liquid kept constantly stirred. The oil, which separates, swims on the top, mixed with a white froth, and is skimmed off. The skimmings are heated in a small iron pot, and strained through a cloth. When cold, it is put in jars or bottles for use.

**Physical properties and varieties.**—Castor oil is a thickish fluid oil, usually of pale yellow colour, with a slightly nauseous odour and a mild taste. It is lighter than water, its sp. gr. being, according to Sanssouire, 0·989 at 59°. When cooled down to about 0°, it congeals into a transparent yellow mass. If exposure to the air it becomes rancid, thick, and ultimately congeals, with becoming opaque, and hence it is called a drying oil. When heated to a little more than 500° F it begins to decompose.

1. **East Indian Castor Oil** is the principal kind employed in this country. It is imported from Bombay and Calcutta. It is an oil of exceedingly good quality (both with respect to colour and taste), and is obtained at a very low price. It is procured from Ricinus communis and R. lividus.

2. **West India Castor Oil** is a very good substitute, though not being as good as the former.

7. **American or United States Castor Oil** is, for the most part, imported from New York. All the samples, which I have examined, have been of very fair quality, and, in my opinion, had a less unpleasant flavour than the East India variety. Our druggists object to it, on the ground of its depositing a white substance (margaritine) in cold weather—a circumstance which has led some persons to imagine it had been mixed with olive oil.

8. I have seen one sample of Castor Oil from New South Wales. It was of very dark colour.

**Solubility.**—In absolute alcohol, and in pure sulphuric ether, castor oil is completely soluble. In this respect it agrees with palm oil, but disagrees with all ordinary fixed oils. Hence alcohol has been proposed as a means of determining adulteration of castor oil, the adulterating oil not being soluble in alcohol. [Castor oil is entirely dissolved by its own volume of alcohol.] Ph. Ed.] Stokes says benzoic acid promotes the solution of castor oil in rectified spirit.

**Commerce.**—Castor oil is imported in casks, barrels, hogheads, and drums. The duty on it is 1s. 3d. per cwt. Of 393,191 lbs. imported in 1831, there came from the East Indies 343,373 lbs., from British Northern Colonies of America 25,718 lbs., from the United States 22,669 lbs., and from the British West India 10,47 lbs.

**Composition.**—The following is the ultimate composition of castor oil:

<table>
<thead>
<tr>
<th></th>
<th>Sanssouire</th>
<th>Uric</th>
<th>Carbon</th>
<th>74·178</th>
<th>74·90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen</td>
<td>11·834</td>
<td>10·29</td>
<td>Oxygen</td>
<td>14·788</td>
<td>15·71</td>
</tr>
<tr>
<td>Castor oil</td>
<td>100·000</td>
<td>100·000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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1 Private information from an oil-presser of Calcutta.
2 Materia Medica, vol. 1, p. 256.
3 United States Dispensatory.
6 I am informed that dappers are made of gelatine (prepared by boiling cuttings of skins) molded in earthen moulds.
7 Parliamentary Returns for 1831.
tile Oil.—This oil, obtained by distillation, is analogous to acroleine, separated from acetic acid by washing with water, and from the fatty distillation with water. It is limpid and colourless, has a peculiar acid taste, and a sp. gr. of 0.815. It is soluble in alcohol and ether, soluble in a solution of potash. By long-continued exposure to a temp. of 23° F., it becomes crystalline.

Acids (Ricinice, Elaidic, and Margaritic acids.)—These are very acid, alcohol, ether, and a weak aqueous solution of potash. They unite to form salts. The saline compounds formed by the union of these potash, soda, magnesia, and lead, are soluble in alcohol; those with soda are also soluble in water.

Ricinice acid is crystalline, solid at ordinary temperatures, and fusible at 72° F. Its crystallized hydrate consists of carbon 73.56, hydrogen 9.86, and oxygen 16.58. Formula C_{20}H_{32}O_{6} (Laurent).

Elaidic or Ricino-oleic acid is a yellow-coloured liquid at 32° F.; but at many degrees below it becomes crystalline.

Margaritic or Ricino-stearic acid crystallizes in pearly scales. It is distinguished from the two preceding acids by its high fusing point, by its partial decomposition when submitted to distillation, and by the insolubility of the margaritate of magnesia in alcohol. The crystallized hydrate consists of carbon 70.5, hydrogen 10.91, and oxygen 18.59. Formula C_{32}H_{64}O_{8} (Laurent).
PHYSIOLOGICAL EFFECTS.—1. Of Castor Seeds.—These seeds possess considerable acridity. Bergius\(^1\) states, that a man masticated a single seed at bed-time: the following morning he was attacked with violent vomiting and purging, which continued the whole day. La\(^2\) zoni also states that the life of a woman was endangered by eating three grains of the seeds\(^3\). More recently, a girl, 18 years of age, was killed by eating “about twenty” seeds: the cause of death was gastro-enteritis\(^4\).

2. Of Castor Oil.—a. On Animals generally castor oil acts as a laxative or mild purgative. Large animals, as the horse, require a pint or more for a dose; smaller ones need only a few ounces\(^5\). Y\(^6\) ouatt, however, declares this oil to be both uncertain and dangerous in the horse\(^6\).

β. On Man.—Injected into the veins, castor oil gripes and purges and causes a nauseous oily taste in the mouth\(^7\); hence it would appear to have a specific influence over the mucous lining of the alimentary canal. Swallowed to the extent of one or two ounces usually acts as a mild but tolerably certain purgative or laxative without producing any uneasiness in the bowels. “It has this particular advantage,” says Dr. Cullen\(^8\), “that it operates sooner after exhibition than any other purgative I know of, as it commonly operates in two or three hours. It seldom gives any griping, and operation is generally moderate—to one, two, or three stools at a time. It is not frequently occasions nausea, or even vomiting, especially if a somewhat rancid; in many cases, I believe, rather from its disgustingly oily quality than from any positively emetic qualities.

It has been stated by continental writers that castor oil is most equal in its action, at one time operating with considerable violence at another with great mildness; but I have never found it so, nor do I believe that a difference in the mode of its preparation, especially with reference to the heat employed, may materially affect its purgative property.

When castor oil has been taken by the mouth, it may be frequently recognized in the alvine evacuations; but it presents itself in various forms, “sometimes resembling caseous flakes, or a soapy scum, floating on the more fluid part of the dejection; occasionally it had been arranged in a form not unlike branches of grapes, more nearly of hydatids of a white colour; more generally, however, is found mixed up with the fæces as a kind of emulsion, and in some few instances it has been discharged under the form of solid tallow-like masses\(^9\). Mr. Brande\(^10\) says, in one case it was discharged for

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\(^1\) *Mat. Med.* 1, ii. p. 823, ed. 2nd.

\(^2\) Marx, *Die Lehre von d. Giften.* i. 128.


\(^5\) *The Horse,* in *Liber. of Useful Knowledge,* pp. 212 and 307.

\(^6\) Dr. E. Hale, *in Begin’s Traité de Thérapeutique.* p. 114.

\(^7\) *Mat. Med.*


\(^9\) *Diet. of Mat. Med.*
EUPHORBIUM.

the form of indurated nodules, which were at first ary concretions. A remarkable case is mentioned by woman on whom this oil does not act as a purgative, every part of her body".

or oil is used to evacuate the contents of the bowels in we are particularly desirous of avoiding the produc- nal irritation (especially of the bowels and the urino-

The principal, or I might say the only, objection to cases, is its nauseous taste. The following are the which we employ it:

imentary affections of the alimentary canal, as enteritis,
dysentery, a mild but certain purgative is oftentimes substance, I believe, answers the indication better, as castor oil.

ations and spasmodic affections of the bowels, as intus-
sus, and colic, especially lead colic, this oil is the most int we can employ.

sical operations about the pelvis or abdomen, (for omny, and the operation for strangulated hernia), as well tion, it is the best and safest purgative.

atory or spasmodic diseases of the urino-genital nation of the kidneys or bladder, calculous affections,
cure, &c., castor oil is a most valuable purgative.

ons of the rectum, especially piles, prolapsus, and etter evacuant can be employed.

helminthic for tape-worms, castor oil was first employed namn, however, has shown that it possesses no pecu-vermisuge properties.

rgative for children it has been used on account of its ts unpleasent taste is a strong objection to its use.

al costume, also, it has been recommended. Dr.
d that if castor oil be frequently repeated, the dose lually diminished; so that persons who, in the first red half an ounce or more, afterwards needed only two

TION.—The dose of castor oil for children is one or two for adults, from one to two or three table-spoonfuls. plesant flavour some take it floating on spirit (espe-
: which is frequently contra-indicated; others on coffee, int or some other aromatic water; or it may be made on by the aid of the yolk of egg or mucilage.

HA, Linn.: AN UNDETERMINED SPECIES YIELDING EUPHORBIUM, E.

Euphorbia officinarum, L. Euphorbia canariensis, D.

et. Dodecandria, Trigynia, Linn.; Monocia, Monandria, Smith.

phorium; gummi-resina, L. D. Concrete resinous juice, E.)

The saline waxy-resin, called in the shops gum euphor-

bium, is said both by Dioscorides* and Pliny** to have been first dis-
covered in the time of Juba, king of Mauritania; that is, about, or a
year or two years before, the commencement of the Christian æra. Pliny says
Juba called it after his physician, Euphorbus; and that he wrote a
volume concerning it, which was extant in Pliny’s time. Salmasi,
however, states that this is mentioned by Meleager the poet, who
lived some time before Juba.

BOTANY. Gen. Char.—Flowers collected in monocious heads, sur-
rounded by an involucrum, consisting of one leaf with five divisions,
which have externally five glands alternating with them. Male
flowers naked, monandrous, articulated with their pedicel, surrounding
female, which is in the centre. Females naked, solitary. Ovules
stalked. Stigmas three, forked. Fruit hanging out of the involu-
crum, consisting of three cells, bursting at the back with elastic
dots, and each containing one suspended seed (Lindley).

Sp. Char.—Branches channelled, with four, rarely five, angles, and
with double, straight, spreading, dark, shining spines.

These specific characters are taken from the branches found mixed with
euphorbium of commerce. They agree with the description and figure of
Euphorbia canariensis of Plukener*. From E. canariensis of Wildenow and of some other botanists, this plant is
called the true Euphorbia canariensis. On examining the E. canariensis at the
Garden, I find as many of the spines straight as uncinate. But the diameter
of the stems, and even of the young shoots, is greater than that of the stems
of Euphorbia canariensis. The species which most closely agrees
the latter in the sizes of the stems, the number of angles, and the number
and directions of the spines, is Euphorbia tetragona. This species has mostly
four stems; though some of the larger stems are somewhat channelled. The
stems found in the euphorbium of commerce appear to be uniformly channelled.
The E. officinarum has many angles; the Derrynue of Jackson** has many
angles. Euphorbia antiquorum (fig. 235) has been said to yield epi-
brium, but the statement is denied by both Hamilton*** and Royle****.

Hab.—Africa, in the neighbourhood of Mogadore.

EXTRACTION.—Euphorbium is thus procured. The inhabitants of
the lower regions of the Atlas range make incisions in the branches
of the plant, and from these a milky juice exudes, which is so
viscid that it excoriates the fingers when applied to them. This juice
hardens by the heat of the sun, and forms a whitish yel-
low solid, which drops off in the month of September, and forms
euphorbium of commerce. *The plants,* says Mr. Jackson, *"pro-
duce abundantly once only in four years; but this fourth year’s
produce is more than all Europe can consume.* The people who col-
collect it, he adds, are obliged "to tie a cloth over their mouth and nose
to prevent the small dusty particles from annoying them, as they
produce incessant sneezing."

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* Lib. iii. cap. 96.
* Trans. of the Linn. Soc. vol. xiv.
* Bot. of the Himalayan Mountains, p. 328.
EUPHORBIA.

Properties.—Euphorbium consists of irregular, yellowish, slightly
irritable tears, usually pierced with one or two holes, united at the
base, and in which we find the remains of a double aculeus. These
aculei are almost odourless; but their dust, applied to the olfactory
membrane, acts as a powerful sternutatory. Their taste is at first
acrid, afterwards more or less acrid and burning.

When heated, euphorbium melts, swells up imperfectly, evolves an
odor somewhat like that of benzoic acid vapour, takes fire, and
has with a pale flame. Alcohol, ether, and oil of turpentine, are
best solvents; water dissolves only a small portion of it.

Composition.—Euphorbium has been the subject of several ana-
as; namely, in 1800, by Lauder; in 1809, by Braconnier; in 1818, by Pelletier; and by Muhllmann; in 1819, by Brandes; more recently by Drs. Buchner and Herberger.

<table>
<thead>
<tr>
<th>Pelletier’s Analysis</th>
<th>Brandes’ Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resin</td>
<td>42.17</td>
</tr>
<tr>
<td>Wax</td>
<td>14.82</td>
</tr>
<tr>
<td>Caoutchouc</td>
<td>4.07</td>
</tr>
<tr>
<td>Malate of Lime</td>
<td>18.02</td>
</tr>
<tr>
<td>Malate of potash</td>
<td>4.90</td>
</tr>
<tr>
<td>Sulphates of potash and lime, and phos-</td>
<td>0.70</td>
</tr>
<tr>
<td>phate of lime</td>
<td></td>
</tr>
<tr>
<td>Water and loss</td>
<td>6.44</td>
</tr>
<tr>
<td>Woody fibre</td>
<td>5.80</td>
</tr>
<tr>
<td>Euphorbium</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Resin is the active ingredient of euphorbium. It coincides in many of its
properties with ordinary resins: thus, it is reddish-brown, hard, brittle, fusible,
insoluble in alcohol, ether, and oil of turpentine, and somewhat less so in oil of
vitriol. Its leading and characteristic property is intense acridity. It differs
from some resins in being slightly soluble only in alkalis. It is a compound of
resinous substances.

One resinous substance is soluble in cold alcohol. Its formula, according
to Mr. Johnston, is C_{10}H_{20}O_{9}.

The other resinous substance is insoluble in cold alcohol. The mean of
Rose’s analyses of it gives as the composition of this resin, carbon 81.58,
hydrogen 11.35, and oxygen 7.07.

Physiological Effects. a. On Animals generally.—Euphorbium
on horses and dogs as a powerful acrid substance, irritating and
irritating parts with which it is placed in contact, and by sympathizing
in the nervous system. When swallowed in large quantities,
causes gastro-enteritis (two ounces are sufficient to kill a horse);
when applied to the skin, it acts as a rubefacient and epispatic.

Persons sometimes employ it as a substitute for cantharides, for blistering
horses, but cautious and well-informed veterinarians are op-
to its use.

On Man.—The leading effect of euphorbium on man is that of
a violent acid; but under certain circumstances a narcotic ope-

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* Gmelin, Handb. d. Chem.
14 Ann. Chem. t. xxxii. 44.
15 Bull. de Pharm. iv. 502.
16 Gmelin, op. cit.
17 Ibid.
18 Christian, Treatise on Poisons.
19 Phil. Trans. 1840. p. 355.
20 Figgendorf’s Annalen, xxxiii. 52.
ration has been observed. When euphorbium dust is inhaled also applied to the face, as in grinding this drug, it causes smothering redness and swelling of the face, and great irritation about the nose. To prevent as much as possible these effects, various contrivances are adopted by different drug-grinders: some employ with glass eyes; others apply wet sponge to the nose and while some cover the face with crape. The pain and irritation, informed, are sometimes very great. Individuals who have been exposed for some time to the influence of this dust, suffer with ache, giddiness, and ultimately become delirious. All the way of whom I have inquired (and they comprise those of three firms, including the one alluded to by Dr. Christison), agree that these are the effects of euphorbium. An old labourer assumed that this substance produced in him a feeling of intoxication: it was informed at one drug-mill of an Irish labourer who was temporarily insane by it, and who, during the fit, insisted on his prayers at the tail of the mill-horse.

Insensibility and convulsions have been produced by euphorbium. The only instance I am acquainted with is the following:—was engaged at a mill where euphorbium was being ground and remained in the room longer than was considered prudent: he darted from the mill-room, and ran with great velocity up the stairs. On arriving at the ground-floor or yard he insensible, and fell. Within five minutes I saw him; he was on his back, insensible, and convulsed; his face was red and his pulse frequent and full; and his skin very hot. I bleed him within half an hour he became quite sensible, but complained of headache. He had no recollection of his flight down stairs seems to have been performed in a fit of delirium.

When powdered euphorbium is applied to the skin, it causing, pain, and inflammation, succeeded by vesication. When swallowed, it causes vomiting and purging, and, in doses, gastro-enteritis, with irregular hurried pulse and cold rations.

Uses.—Notwithstanding that it is still retained in the Pharmacopoeia, it is rarely employed in medicine. It was formerly used as an emetic and drastic purgative in dropsies; but the violent danger of its operation have led to its disuse. Sometimes it was employed as an errhine in chronic affections of the eyes, ears, or nasal passage, but its local action is so violent that we can only apply it largely diluted with some mild powder, as starch or flour.

Mixed with turpentine or Burgundy pitch (or rosin), it is employed in the form of plaster, as a rubefacient, in chronic affections of the joints. As a vesicant, it is rarely employed. As a caustic, it is employed in the form of a powder or alcoholic tincture (Tinctura Euphorbii, Ph. Bor. p. 669) by digesting euphorbium 3j. in rectified spirit, Oj.) is sometimes employed in various ulcers.

Antidote.—In a case of poisoning by euphorbium, emetic and demulcent drinks, clysters (of mucilaginous, amylovorous, astringent liquids), and opium, should be exhibited, and blood
baths employed. In fact, as we have no chemical antidote, the best plan is to involve the poison in demulcents, to diminish the severity of the living part by opium, and to obviate the inflammable blood-letting and the warm bath. If the circulation fails, laudanum and brandy will be required.

**IpHa Manihot, Kunth, E.—THE CASSAVA OR TAPIOCA PLANT.**

_Jatropha Manihot, Linn._

_Sec. Syst. Monoclea, Monadelphia._

(Fecula of the root; Tapioca, E.)

**ETY.** — Tapioca (Tipioca) is mentioned by Piso in 1648. supposedly, Janipha and Manihot are Indian appellations.

**Gen. Char.** — Flowers monoecious. Calyx campanulate, 5-lobed. Petals none. Stamens ten; filaments unequal, distinct, united into a disk, Style one. Stigmas three, consolidated into a nectarose mass (A. de Jussieu).

**Sp. Char.** — Leaves palmate, five to seven-parted, smooth, glaucous beneath: segments lanceolate, quite entire. Flowers racemose (Hooker). — Root large, thick, tuberous, fleshy, and white; containing an acrid, milky, highly poisonous juice. Flowers axillary.

**Hab.** — Brazil.

**Extraction.** — The tuberous root consists principally of starch and a white milky poisonous juice. It is rasped and pressed to separate the juice, which deposits a fecula; this, when washed and dried in the air without heat, is termed Mousache (from mouchaco, a Spanish word, signifying boy or lad), or Cipipa, and for years past has been imported into France from Martinique, and termed Arrow-root. I believe it to be identical with the Brazilian arrow-root of English commerce. When this fecula has been properly dried on hot plates, it acquires a granular character, and is termed Tapioca.

Compressed pulp is dried in chimneys, exposed to the smoke, and afterwards powdered. In this state it constitutes Cassava or Farine de Manioc. If it be granulated by agitating it in an iron pan until incipient tinesfaction, it is called Couaque or Manioc. Lastly, when dried or baked into cakes on plates of iron or copper, it constitutes Cassava or Cassuda bread.
Properties.—Two kinds of tapioca are imported. One is in the form of small lumps or granules, and is the ordinary tapioca of shops: the other is a white amylaceous powder.

1. **Granular Tapioca, or Tapioca** commonly so called, is imported from Bahia and Rio Janeiro. It occurs in irregular small lumps or grains, which are partially soluble in water, the filtered solution yielding a yellowish colour with iodine. When these grains are mixed with water, and examined by the microscope, they are found to consist of entire and broken particles. The entire ones appear either circular or mullar-shaped, having a very distinct and marked hilum (see Fig. 238). But when they are made to roll on a glass slide, the apparently rounded ones are then seen to be mullar-shaped, so that their rounded appearance arises from the endways. Sometimes the mullar-shaped particles have a contracted base. At times, instead of the flat end of the particle, we have two faces meeting at an oblique angle, so that the particles are like the third of a sphere. The base of the mullar is not always really flat, but hollow. The hilum is surrounded by rings, and is generally in a stellate form.

2. **Tapioca Meal:** *rasillar Arrow-root*;—Moussache or Cipipipe is imported from Rio Janeiro. It is white and pulverulent. When examined by the microscope, the particles seem identical with those of the common or granular tapioca.

Composition.—Tapioca has not been analysed. Its composition is doubtless analogous to that of other amylaceous matters (vide p. 47, 909, and 1013).

Chemical Characteristics.—The filtered cold infusion, coloured blue by tincture of iodine, showing that tapioca is partially soluble in cold water. In boiling water tapioca becomes turbid, gelatiniform, transparent, and viscous. Submitted to ebullition in a large quantity of water, it leaves an insoluble residue which precipitates. This residue, diluted with water, and coagulated with iodine, appears under the microscope to consist of flocks, and to have no resemblance to the primitive ingredients.

Physiological Effects. a. Of the Recent Juice.—The milk of tapioca is a powerful acrid or acro-narcotic poison; and to this the root owes its poisonous properties. The symptoms which it gives when swallowed, are pain and swelling of the abdomen, vomiting, and purging, giddiness, dimness of sight, syncope, and rapid diminution of the powers of life. The scrapings of the fresh root, successfully applied to ill-disposed ulcers, cause the root to catch birds, which, by eating it, lose the power of flying. The poisonous principle of the root may be destroyed or dissipated by heat, fermentation, &c. Hence it is either very volatile or...
sable. Guibourt⁸ says it appears to be of the nature of
amic acid.

the Fecula (Tapioca) of the Root.—When the root has been de-
its poisonous principle, it becomes highly nutritious. Of
ations of it before referred to, the only one met with in this
is the fecula (Tapioca). This is both highly nutritious and
igestion. Its local action is emollient and demulcent.
—Made into puddings, tapioca is employed as a dietetical
Boiled in water or milk, and flavoured with sugar, spices,
accordings to circumstances, it is used as an agreeable, nutri-
t, easily digestible article of food for the sick and convales-
is devoid of all irritating and stimulating properties.

OTHER MEDICINAL EUPHORBIACEÆ.

ON PSEUDO-CHINA, Schiede (Croton Cascaria, Don, Ph. L.) grows in
y of Jalapa, at Actopan, and in the district of Plau del Rio, in the
Veracruz, Mexico. Its bark, called Quina blanca, or Copalche bark,
confounded with both cinchona and cascarrilla barks. In 1817 a quan-
t of 30,000 lbs. of the same bark was sent from Liverpool to Hamburgh;
cinchona, but it was soon recognized to be a bark nearly allied to
and by those on board the vessels coming from Para was declared to
Copalcha. Subsequently the minister, Von Altenstein, procured
from Mexico, under the name of Copalche; and in 1829 the plant
was declared by Dr. Schiede to be a species of Croton, which he
de-China. Mr. Don't mistook it for cascarrilla bark. Copalche bark,
size of the quilla, and general appearance, very much resembles what
scall Ash Cinchona bark; but its cascarrilla-like flavour instantly
es it. A sample of it was given to me as a Cinchona bark.
svarilla bark it is distinguished by the length of the quilla, their co-
ence absence of transverse cracks.

OPHIA CURCAS is a native of South America and of Asia. Its fruit is
thartica americana, or nux barbadensis of some writers. Its seeds,
occasionally met with in the shops, are called physic nuts (semina ricini
gros pignon d'Inde). Pelletier and Caventou analyzed them under the
name seeds; and extracted from them a volatile acrid acid, called
(see p. 1112). Mr. Bennett⁸ swallowed four seeds, and experienced
iessant burning sensation in the stomach and bowels, with nausea,
der an interval of nearly two hours, terminated in vomiting: their
effects followed soon afterwards, and were mild; the sickness had
passed away, but the burning sensation continued for some time.
large doses they are energetic poisons.
Oleum Jatropha Curcas seu Oleum infernale) is analogous in its pro-
roton oil. It is occasionally used as a drastic purgative. In India it
amps.
ORBIA LATHYRIS, or Caper Spurge, is an indigenous biennial. It is
as an official substance in the Paris Codex. Its milky juice is viol-
. In a case of poisoning by the seeds, narcotic symptoms were also

The oil (Oleum Euphorbiæ Lathyridis), extracted from the seeds, may

Drog. t. ii. p. 455, 3me éd.
Phyl. Journ xvi. 296.
For details, consult Guibourt, Hist. des Drog.; and Goebel and Kunze, Pharm. Waaren.
Pharm. t. xv. p. 514.
D. Gaz. ix. 8.
Treatise on Poisons.
be employed as an indigenous substitute for croton oil. The dose of it is from three to ten drops 4.
4. Euphorbia ipecacuanha is a native of the United States of America, in whose Pharmacopoeia it is mentioned. It is emetic and purgative. As an emetic it is given in doses from ten to fifteen grains 5.
5. The juice of Crozophora tinctoria becomes, under the united influence of air and ammonia, blue. Linen impregnated with this blue dye is called orbisole (bezetta cornelius): it is a test for acids, which reddens it, but it is not used in this country. It must not be confounded with hitusus 6.

Order XXX.—Aristolochiaceæ, Lindley.—The Birthwort Tribe.

Aristolochiæ, Jacquin.

Essential Character.—Flowers hermaphrodite. Calyx adherent to the ovary [i.e., superior], monosepalous; the limb three-lobed or tubular, and irregularly dilated at the upper part; valvate in aestivation. Stamens definite, generally in ternary numbers, free and distinct or adherent to the style and stigma, epigynous. Ovary three- to six-celled; style short; stigma divided. Capsules or berry coriaceous, three- to six-celled, many seeded; the placenta later. Embryo very small, at the base of a cartilaginous albumen.—Usually climber, herbs or shrubs, with alternate, simple, petiolated leaves. (Bot. Gall.)

Properties.—Not important. The roots possess stimulant properties, owing to the presence of volatile oil. Some of them are acrids. Bitter extractive renders them somewhat tonic.


Aristolochia officinalis, Neele and Ebermaier.

Sex. Spat Gynandra, Hexandria.

(Radix, L. D.—The Root, E.)

History.—The first writer who distinctly mentions Virginia snake-root, or snake-weed, is Thomas Johnson, an apothecary of London, in his edition of Gerard’s Herbal, published in 1633.

Botany. Gen. Char.—Calyx tubular, ventricose at the base, dilated at the apex, and extended into a ligula. Anthers six, subulate, inserted on the style. Stigma six-lobed. Capsule six-angular, six-celled (Bot. Gall.)

Sp. Char.—Stem flexuous, ascending. Leaves cordate, acuminate, on both sides pubescent. Peduncles nearly radical, unifloral. Lip of the calyx lanceolate (Beschr. offic. Planzen).

Hab.—North America.

Collection and Properties.—The root (radix serpentinae) is collected in Western Pennsylvania and Virginia, in Ohio, Indiana, and Kentucky 6. It is imported in bales, usually containing about 100 lbs. As met with in the shops, it consists of a tuft of long, slender, yellowish, or brownish fibres, attached to a long contorted head of caudex. The odour is aromatic, the taste warm and bitter.

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4 Dierich, Neueste Entid. in d. Mat. Med. S. 76, 1837; Bally, Lancet, June 10th, 1826.
5 United States Dispensatory.
6 Vide p. 881.
7 United States Dispensatory.
COMPOSITION.—It was analyzed by Bucholz in 1807; by Chevallier in 1820, and by Peschier in 1823.

**Bucholz's Analysis.**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volatile oil</td>
<td>0.50</td>
</tr>
<tr>
<td>Greenish-yellow soft resin</td>
<td>0.05</td>
</tr>
<tr>
<td>Extractive matter</td>
<td>1.70</td>
</tr>
<tr>
<td>Gummy extractive</td>
<td>18.10</td>
</tr>
<tr>
<td>Lignin</td>
<td>62.40</td>
</tr>
<tr>
<td>Water</td>
<td>14.45</td>
</tr>
<tr>
<td>Serpentine root</td>
<td>100.00</td>
</tr>
</tbody>
</table>

**Chevallier's Analysis.**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volatile oil</td>
<td></td>
</tr>
<tr>
<td>Resin</td>
<td></td>
</tr>
<tr>
<td>Extractive</td>
<td></td>
</tr>
<tr>
<td>Starch</td>
<td></td>
</tr>
<tr>
<td>Ligneous fibre</td>
<td></td>
</tr>
<tr>
<td>Albumen</td>
<td></td>
</tr>
<tr>
<td>Malate and phosphate of lime</td>
<td></td>
</tr>
<tr>
<td>Oxide of iron and silica</td>
<td></td>
</tr>
<tr>
<td>Serpentine root</td>
<td></td>
</tr>
</tbody>
</table>

**Volatile Oil.—** Grassmann obtained only half an ounce from 100 lbs. of root. Its colour is yellowish, its odour considerable, its taste not very agreeable. Grassmann compares the odour and taste to those of valerian and camphor combined.

**Bitter Principle: Extractive.** Bucholz and Chevallier.—This is very bitter and slightly acrid. It is soluble in both water and spirit. Its solution, when yellow, is rendered brown by alkalis, but is unchanged by the ferruginous addition.

**Physiological Effects.—** These have been examined by Jörg and his pupils.

In small doses, serpentine promotes the appetite. In large doses, it causes nausea, flatulence, uneasy sensation at the stomach, and frequent but not liquid stools. After its absorption, it increases the frequency and fulness of the pulse, augments the heat of the body, and promotes secretion and exhalation. Furthermore, it would seem from the experiments before referred to, that it causes a disturbance of the cerebral functions, and produces headache, sense of oppression within the skull, and disturbed sleep.

These properties, serpentine bears some analogy to, but is much weaker than, camphor. It is more powerful than contrayerva.

**Uses.—** Its employment is indicated in cases of torpor and atony. It was formerly termed *aleziphramic*, on account of its fancied power of curing the bite of the rattlesnake and of a mad dog. At the present time it is rarely employed. It has been much esteemed as a stimulant in fevers, both continued and intermittent. A scruple of serpentine, taken in three ounces of wine, is mentioned by Sydenham as a cheap remedy for tertians in poor people. Dr. Cullen considered it as suited for the low and advanced stage of typhus fever. In an epidemical affection of the throat (called the *throat-temper*), it was given internally as a diaphoretic, and used with the other berries, in the form of a decoction, as a gargle, with benefit.

**Administration.—** The dose of it in substance is from ten to thirty grains. The infusion is the best form for the administration of serpentine.

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[... footnotes...]

1. **INFUSUM SERPENTARIE, L. E.**; *Infusion of Serpentine or Snake-root.*—Serpentine, 3ss.; Boiling Water, Oij. Infuse for four hours in a [lightly, L.] covered vessel, and strain [though linen or calico, E.] into a glass vessel. —Dose, f5j. or f3ij. every two or three hours, according to circumstances.


2. **AS'ARUM EUROPE'UM, Linn. L. D.—COMMON ASARABACCA.**

*Sex. Spat.* Dodecandria, Monogynia.

(Folia, L. D.)

**History.**—This plant was used in medicine by the ancient Dioscorides calls it ἀσάπαριον.


Sp. Char.—Leaves two on each stem, kidney-shaped, obtuse [somewhat hairy]. (Smith.)

The branching root-fibres arise from an underground stem or rhizome. The aerial stems are several from each rhizome. Leaves petiolated. From the axil of the two leaves springs a solitary, rather large, drooping flower, upon a short peduncle, of a greenish brown colour and coriaceous substance. Segment of the calyx incurved. Capsule coriaceous. Seeds ovate, with horny alburnum.

**Hab.**—Indigenous. Perennial. Flowers in May.

**Description.**—The whole plant (root-fibres, rhizome, and aerial stems, with leaves and flowers) are kept in the shops under the name of asarabacca (radix cum herba asari), but the leaves only are directed to be used in the Pharmacopoeia. Dr. Batty states that the plant is gathered for medicinal uses in the woods near Kirkby Lonsdale, Westmoreland. The rhizome is about as thick as a goose-quill, greyish, quadrangular, knotted. It has a pepper-like odour and an acrid taste. The leaves are almost inodorous, but have an acrid, aromatic, and bitter taste.

**Composition.**—Goerz published an analysis of the root in 1784; Lassaigne and Feneuille another in 1820; Regimbeau a third in 1827; and Gräger a fourth in 1830.
## COMMON ASARABACCA

### Botanical Analysis

<table>
<thead>
<tr>
<th>Root</th>
<th>Herb</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Root of Asarabacca</td>
<td>Asarum</td>
<td>100.818</td>
</tr>
</tbody>
</table>

#### Volatile Oily Matters
By submitting asarabacca root to distillation
water, three volatile oily matters are obtained; one liquid and two solid,
matter.

**Liquid Volatile Oil (Oleum Asarum)**

- It is yellow, glutinous, lighter than
- and has an acrid, burning taste, and a penetrating valerian-like odour. It
- is soluble in water, more so in alcohol, ether, and the oils (volatile and

**Asarite of Gräger**

- In small needles, of a silky lustre. It is odourless and
- and is fusible and volatileizable by heat; its vapour being white and
- irritating. It is soluble in alcohol, ether, and the volatile oils, but not in
- Both nitric and sulphuric acids dissolve the crystals without the evo-
- of gas: if water be added to the sulphuric solution, the asarite is thrown
- unchanged.

**Asarum-camphor**

- Is distinguished from asarite by the following characters:
- It throws it down from its alcoholic solution in cubes or six-sided prisms,
- kas asarite is precipitated in delicate flexible needles. It dissolves in nitric
- without effervescence. Water added to its sulphuric solution throws down
- own resin. After fusion it has the form of a crystalline, striated mass. Its
- position is C₈ H₁₄ O₂. Blanchet and Sell regard it as the hydrate of the
- volatile oil.

**Bitter Principle of Asarabacca (Asarum of Gräger and of some other
macologists)**

- Brownish, very bitter, soluble in alcohol.

#### Physiological Effects
Every part of the plant possesses acrid
properties. Applied to the mucous membrane of the nose, it excites
swelling, increased secretion of the mucus, and even a discharge of
swallowed, it causes vomiting, purging, and griping pains.

Dr. Allen has enumerated it in his list of diuretics, but expresses his
assents whether it possesses any specific power of stimulating the
renal vessels.

**Uses**

- Asarabacca has been employed in medicine to excite vomiting.
- As an emetic, it is now superseded by ipecacuanha and tartarized
- antimony. As an emetic, to excite irritation
- and a discharge of mucus from the nasal membrane, it has been used
- on certain affections of the brain, eyes, face, mouth, and throat, on the
- principle of counter-irritation: thus, in paralytic affections of the
- head and tongue, in toothache, and in ophthalmia.

**Administration**

We may administer either the root or leaves,
recollecting that the latter are somewhat milder than the former; as an emetic, the dose is half a drachm. As an erthin, or two grains of the root, or three or four grains of the dried bark are snuffed up the nostrils every night. The powder of this plant is supposed to form the basis of cephalic sniff.

**PULVIS ASARI COMPOSITUS, D. Compound Powder of Asarabacca.** (Asarabacca leaves, dried, 3i.; Lavender flowers, dried, 3i. Rub them together to powder). Used as an erthin, in headache and ophthalmia. Dose from grs. v. to grs. viii.

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**OTHER MEDICINAL ARISTOLOCHIACEÆ.**

**Aristolochia.** The roots of *Aristolochia longa* and *A. rotunda* are found in shops. The long *aristolochia root* is several inches in length, one or two inches in diameter, and has a more or less cylindrical form. The round *aristolochia root* has a more rounded and knobby form. Both kinds are bitter and astringent, especially when powdered, and have an astringent, disagreeable odour. They contain resin, gum, oil, and starch. Lassaigne found ulmin in the long species. Their stimulant effects are supposed to be principally directed to the abdominal and pelvic viscera. They have been employed in amenorrhea as an emmenagogue. Their dose is from 3 to 15 grains. Round *aristolochia root* is a constituent of the Duke of Portland's powder for gout, which consisted of equal quantities of the roots of *Gentiana* and *Bacemmedrya* (Aristolochia rotunda), the tops and leaves of *Germander* (Chamomilla), the tops and leaves of *Pine* (Chamaepitys), and lesser *Centaurium* (Chironia Centaurium), powder mixed together.

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**Order XXXI.—LAURACEÆ, Lindley.—THE CINNAMON TRIBE.**


**Essential Character.**—Calyx four to six-cleft, with imbricated segments, sometimes obsolete. Stanum definate, perigynous opposite the segments of the calyx, and usually twice as numerous as the inner segments of the calyx. Sterile or deficient; outermost scarcely ever abortive; anthers adnate, two to four-celled; ovary single, superior, with one or two single pendulous ovules; style and stigma obtuse. Fruit baccate or drupaceous, naked or covered. Seed with albumen; embryo inverted; cotyledons large, plano-convex, peltate on base; radicle very short, included, superior; plumule conspicuous, leaved. Trees, often of great size. Leaves without stipules, alternate, opposite, entire, or very nearly lobed. Inflorescence panicled or umbellate.

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*See Dr. Clephane's *Inquiry into the Origin of the Gout Powder*, in the Med. Observ. and Intell. Dr. Clephane concludes that "Celtis Aurelianum's sticticasauras and Aetium's anthopous coetacerae generibus were the same medicine, and are the old names for the Duke of Portland's Powder."
THE CINNAMON.

In many of this order owe their most important qualities to the presence of volatile oil, which is found, more or less abundantly, in all parts of the plant. This oil is sometimes liquid and highly aromatic, as oil of santon; at others it is solid at ordinary temperatures, and is endowed with medicinal properties, as camphor. The astringent principle of some species is probably the volatile oil.

 Bark and leaves, the volatile oil is usually associated with tannin acid, giving them astringency, as in cinnamon. In the fruit and seeds, on the other hand, it is usually combined or mixed with fixed oil, as in bay-berrics.

CINNAMO'MUM ZEYLANICUM, Nees, E.—THE CINNAMON.

Laurus Cinnamomum, Linn. L. D.

Sar. Syst. Emendandria, Monogynia.

e et Oleum cortex destillatum. L.—Bark; and Volatile oil of the bark. E.—Cortex et Oleum volatile, D.)

ORY.—Cinnamon (Kinman, Hebr.) is mentioned in the Old Testament, about 1490 years before Christ. In all probability the Arabs received it from the Arabians, who must, therefore, have commercial dealings with India at this early period. The first use of cinnamon (καννακίον) by the Greek writers occurs in Herodotus, who died 418 years before Christ. Probably both the Latin and Greek names for this bark are derived from the Ceylon name (ducle lignum), or the Malayan kaimanis. Hippocrates employed cinnamon externally. Dioscorides describes several kinds of cinnamon.

ANY. Gen. Char.—Flowers hermaphrodite or polygamous. Six-cleft; with the limb deciduous. Stamina twelve, in four the nine external ones fertile, the three inner ones capitate, ve; the three most internal of the fertile stamens having two glands at the base; anthers four-celled, the three inner turned red. Ovary one-celled, with one ovule. Fruit (a berry) seated cup-like calyx. Leaves ribbed. Leaf-buds naked. Flowers red, rarely fascicled. (Condensed from Endlicher.)

Char.—Branches somewhat four-cornered, smooth. Leaves or ovate-oblong, tapering into an obtuse point, triple-nerved, reticulated on the under side, smooth, the uppermost smallest. Panicles terminal and axillary, stalked. Flowers small; segments oblong, deciduous in the middle (Nees.)

Gentists admit several varieties of this species: the most important are—

Broad-leaved, Moon: Mu-pat (Cingalese). The plant above described.
Cinnamonum zeylanicum.

**Fig. 239.**

*β. Narrow-leaved, Monica monny zeylanicum var. sinia, Nees. Heen-pat (Ceylon).* This variety, which I received from Ceylon, under the name of *Bastard Cinnamon*, owes its name to the fact that its oblong or elliptical leaves tapering to the point, are much smaller at the base.

Perceval mentions another variety which is barked: *Curcuma, or honey cinnamon*, with its broad leaves, yields the best quality, *2dly, Nai curundu, or su-si-man*, also with large leaves, is far superior to the *3dly, Capuru curundu, or casuma*, an inferior kind of cinnamon, with smaller leaves, its bark has an astringent taste.

**Hab.**—Cultivated in Ceylon and Java.

**Production.**—The cinnamon bark of Ceylon is obtained by the technique of cultivation of the plant. The principal cinnamon gardens are located in the neighbourhood of Columbo.* The bark-peelers, or *cholahs*, selected a tree of the best quality, lop off such branches as are years old, and which appear proper for the purpose. Six branches, much less than half an inch or more than two or three
er, are not peeled. The peeling is effected by making two or when the branch is thick three or four, longitudinal in- then elevating the bark by introducing the peeling-knife. When the bark adheres firmly, its separation is promoted in with the handle of the knife. In twenty-four hours the tend greenish pulpy matter (rete mucosum) are carefully off. In a few hours the smaller quills are introduced into the bark, and in this way a congeries of quills formed, often meaty inches long. The bark is then dried in the sun, and is made into bundles with pieces of split bamboo twigs.

Cinnamon is imported in bales, boxes, and chests, lon principally; but in part also from Madras, Tellicherry, ly from Canton. In 1830, 14,345 lbs.; and in 1831, of cinnamon were imported from the Cape of Good Hope, entities of cinnamon on which the import duty of 6d. per lb. during the last six years, are the following:

<table>
<thead>
<tr>
<th>Year</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1837</td>
<td>15,977 lbs.</td>
</tr>
<tr>
<td>1838</td>
<td>15,533 lbs.</td>
</tr>
<tr>
<td>1839</td>
<td>15,533 lbs.</td>
</tr>
<tr>
<td>1840</td>
<td>16,515 lbs.</td>
</tr>
</tbody>
</table>

Cinnamon imported from the island of Ceylon is subject to the ex- luty of 3s. per lb. This has been put on as a substitute for bus monopoly in the cultivation and sale of cinnamon, held verment years ago it was the practice to sprinkle black pepper among f cinnamon in stowing them, in order to preserve and im- quility of the bark.

When cinnamon comes into dock, it is unpacked by all the mouldy and broken pieces are removed from them re-made into bales. These are cylindrical, 3 feet 6 long, but of variable diameter, perhaps 16 inches on the These bales are enveloped by a coarse hempen cloth, called mordial pieces. The kinds of cinnamon which I have examined are the Ceylon, the Tellicherry, and the Malain.-

Cinnamon. (Cinnamomum zeylanicum, seu Cinnamomum —This is the most esteemed kind. The fasciculi or com- quills, of which the bales are made up, are about 3 feet 6 inches under, and shivery, and are composed of several smaller quills one within the other. The bark is thin (the finest being thicker than drawing paper), smooth, of a light yellow- or brownish yellow (somewhat similar to that of Venetian

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2. strap for 1837 and 1838.
3. Century Returns.
5. In 1839 and 1840, I examined above 1000 bales of cinnamon in the Dock warehousa.
6. I kindly assisted in my examination by Mr. Carroll, of Mincing Lane, one of the most ex- nond dealers, who attended with me, and from whom I derived much practical infor-
gold), smooth, moderately pliable, with a splinterly fracture, especially in the longitudinal direction. The inner side or liber is dark and brownish, and contains, according to Nees, small medullary cells filled with a red juice, and which he regards as the peculiar bates of the aroma. The odour of the bark is highly fragrant. Its flavour is warm, sweetish, and agreeable. Inspection and tasting are the methods resorted to for ascertaining the qualities of cinnamon.

Ceylon cinnamon is characterised by being cut obliquely at the bottom of the quill, whereas the other kinds are cut transversely. In the London market three qualities of Ceylon cinnamon are distinguished, viz. first, seconds, and thirds. Inferior kinds are thicker, darker, browner, and have a pungent, succeeded by a bitter, taste.

2. Tellicherry or Bombay Cinnamon is grown on one estate only, Tellicherry, by Mr. Brown, and is wholly consigned to Messrs. Forbes and Co. Only 120 or 130 bales are annually imported. In appearance it is equal to the Ceylon kind; but the internal state of the bark is more fibrous, and the flavour is inferior. It is superior to the Malabar variety.

3. Madras or Malabar Cinnamon is of inferior quality. It is grown, as I am informed, on the Coromandel coast. It is coarser and inferior in flavour to the other kinds. In thickness it approximates to Cassia lignea. Its quality has annually deteriorated since its introduction into the market. It does not meet with a ready sale, and it is expected that its importation will cease.

Besides the above three kinds of cinnamon, another has appeared in the market, from Java. I have not, however, had an opportunity of seeing it. Java cinnamon is said to be equal in quality to that from Ceylon, over which it has the advantage of paying only a trifling export duty.

French pharmacologists describe a cinnamon cultivated at Cayenne. Cayenne cinnamon is, however, unknown in the London market. Its volatile oil is more acid and peppery than the oil in Ceylon cinnamon.

SUBSTITUTION.—In commerce, Cassia lignea is frequently substituted for cinnamon. It is distinguished by its greater thickness, its short resinous fracture, its less delicacy but greater strength of flavour, its shorter quills, and its being packed in small bundles. The difference of flavour is best distinguished when the barks are ground to powder. The great consumers of cinnamon are the chocolate-makers of Spain, Italy, France, and Mexico, and by them the difference of flavour between cinnamon and cassia is readily detected.

An extensive dealer in cinnamon informs me that the Genoese, Turks, and Russians, prefer cassia, and will not purchase cinnamon, the delicate flavour of which is not strong enough for them. In illustration of this, I was told that some cinnamon (valued at 3s. 6d.

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1 See Percival, op. supra cit.; also Marshall, op. supra cit.
2 Proceedings of the Committee of Commerce and Agriculture of the Asiatic Society, p. 102.
3 See Guibourt, Hist. abrégé des Drogués, ii. 14. French pharmacologists apply the term Cassia lignea to Cinnamon as well as to Cassia.
4 Vanqueliz, Journ. de Pharm. t. iii. p. 43A.
THE CINNAMON.

having been by mistake sent to Constantinople, was un-
dele there at any price; while cassia lignea (worth about 6d. per
as in great request.

mposition.—In 1817, Vanquelin⁹ made a comparative analysis
of cinnamons of Ceylon and Cayenne. The constituents of both
found to be volatile oil, tannin, mucilage, colouring matter (par-
soluble in water and in alcohol, but insoluble in ether), resin,
ted, and ligneous fibre.

of Cinnamon. See below.

EMICAL CHARACTERISTICS.—Sesquichloride of iron causes a
fish flocculent precipitate (tannate of iron) in infusion of cinna-
Solution of gelatine also occasions a precipitate (tannate of
me) in the infusion.

YIOLOGICAL EFFECTS.—Cinnamon produces the effects of the
already described (p. 181). In moderate doses it stimulates the
ch, produces a sensation of warmth in the epigastric region, and
otes the assimilative functions. The repeated use of it disposes
iness.

full doses it acts as a general stimulant to the vascular and
ns systems. Some writers regard it as acting specifically on the
es.—The uses of cinnamon are those of the species generally,
which have been before noticed (p. 182). It is employed by the
as an agreeable condiment. In medicine, it is frequently added
er substances; as, to the bitter infusions, to improve their
r; and to purgatives, to check their griping qualities. As a
l, stimulant, and tonic, it is indicated in all cases characterized
bleness and atony. As an astringent, it is employed in diarrhea,
ly in combination with chalk, the vegetable infusions, or opium.
cordial and stimulant, it is exhibited in the latter stages of low
. In flatulent and spasmodic affections of the alimentary canal,
en proves a very efficient carminative and antispasmodic. It
as nausea and vomiting. It has also been used in uterine
arrage.

MINISTRATION.—The dose of it in substance is from ten grains
alf a drachm.

OLEUM CINNAMOMI, L. E. D.; Oleum Cinnamomi veri offic.; Oil
Cinnamon.—(Obtained in Ceylon, by macerating the inferior pieces
he bark, reduced to a gross powder, in sea-water for two days,
 both are submitted to distillation.)—As imported the oil varies
what in its colour from yellow to cherry-red; the paler varieties
most esteemed; hence London druggists frequently submit the
oil of cinnamon to distillation, by which they procure two pale
ow oils; one lighter (amounting to about the quarter of the
le), the other heavier, than water. The loss on this process is
iderable, being near 10 per cent. Percival¹⁰ says, that the oil

m. p. 433.
obtained from the finer sorts of cinnamon is of a beautiful gold color while that from the coarser bark is darker and brownish. Its odor is pleasant and purely cinnamonic. Its taste is at first sweet, afterwards cinnamonic, burning, and acrid. The following is the composition of the oil according to Mulder:

<table>
<thead>
<tr>
<th>Atoms</th>
<th>Eq. Wt</th>
<th>Per Cl.</th>
<th>Mulder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon</td>
<td>20</td>
<td>81-63</td>
<td>81-99</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>11</td>
<td>7-48</td>
<td>7-29</td>
</tr>
<tr>
<td>Oxygen</td>
<td>2</td>
<td>16</td>
<td>10-89</td>
</tr>
<tr>
<td>Cinnamon Oil</td>
<td>1</td>
<td>147</td>
<td>100-00</td>
</tr>
</tbody>
</table>

By exposure to the air oil of cinnamon absorbs oxygen, becomes coloured, and produces cinnamic acid, two resins, and water. The coloration depends on resification.

<table>
<thead>
<tr>
<th>Reagents</th>
<th>C</th>
<th>H</th>
<th>O</th>
<th>Products</th>
<th>C</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Atoms Cinnamon Oil</td>
<td>60</td>
<td>33</td>
<td>6</td>
<td>1 Atom Cinnamic Acid</td>
<td>15</td>
<td>7</td>
</tr>
<tr>
<td>8 Atoms Oxygen</td>
<td>—</td>
<td>—</td>
<td>8</td>
<td>1 Atom beta Resin</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2 Atoms alpha Resin</td>
<td>30</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6 Atoms Water</td>
<td>6</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>33</td>
<td>14</td>
<td>Total</td>
<td>60</td>
<td>15</td>
</tr>
</tbody>
</table>

a. Cinnamic Acid.—This acid is colourless and crystalline. It is sometimes formed by exposing oil of cinnamon for some time to the air. Cinnamic acid, \( \text{C}_{10}^8 \text{H}_6 \text{O}_3 \), is the hypothetical base of this acid.

b. Resins. Alpha resin has a reddish-brown colour. It is soluble in cold and hot alcohol. Beta resin is soluble in hot, but very slightly so in cold alcohol. Its colour is cinnamon-brown. To the latter resin Mulder ascribes the colour of cinnamon.

With nitric acid, oil of cinnamon forms a white crystalline substance, composed of \( \text{C}_{10}^8 \text{H}_8 \text{N}_2 \text{O}_1 \); and a red oil.

The Edinburgh College gives the following characters of oil of cinnamon:

"Cherry-red when old, wine-yellow when recent: odour purely cinnamonic; nitric acid converts it nearly into a uniform crystalline mass."

These characters, however, are not peculiar to this oil, as they are also possessed by oil of cassia (see p. 1148).

Oil of cinnamon is sometimes employed as a powerful stimulant in the paralysis of the tongue, in syncope, or in cramp of the stomach. But its principal use is as an adjuvant to other medicines. The dose is from one to three minimns.

Oil of Cinnamon leaf has been recently imported. I am informed by a gentleman on whose estate in Ceylon it was obtained, that it is procured by macerating the leaves in sea-water, and afterwards submitting both to distillation. It is a yellow liquid, heavier than water, and has an odour and taste analogous to those of oil of cloves.


\[ ^{1} \text{Op. cit.} \]
\[ ^{2} \text{Berlinerisches Jahrbuch für die Pharmacie, Bd. xxxviii. S. 176.} \]
\[ ^{3} \text{Pharmaceutisches Centralblatt für 1839, S. 98.} \]
This water is usually the shops, by diffusing the oil through water by the aid of carbonate of magnesia. According to a formula given in the Pharmacopoeia, 3j. of oil is to be carefully triturated carbonate of magnesia, and afterwards with oil. of dist., and the water subsequently filtered. Cinnamon water is employed as a vehicle for other medicines. It is aromatic. Gœppert says it is poisonous to plants. By distillation and iodide of potassium in cinnamon water, a crystal-lized is produced, consisting of iodide of potassium 12.55, 1, oil of cinnamon 59.81.


**RA CINNAMOMI, L. E. D. Tincture of Cinnamon.**—(Cin-namised, 3ijss. [in moderately fine powder, E.]; Proof Spirit, measure, D.) Macerate for fourteen days and strain. [Proceed ion or digestion as directed for tincture of cassia, E.].—Used as an adjuvant to cretaceous, astringent, tonic, or purges. It has also been employed in uterine hemorrhage.

to f3iv.

**RA CINNAMOMI COMPOSITA, L. E.** *Compound Tincture of* —(Cinnamon, bruised [in fine powder, if percolation be 3j.]; Cardamom, bruised, 3ss. [3j. E.]; Long Pepper, ground finely, E.]; 3ijss. [3ijj. E.]; Ginger, 3ijss. [not Ed. College]; Proof Spirit, Oj. Macerate for fourteen days, L. “This tincture is best prepared by the method on, as directed for the compound tincture of cardamom, also be made in the ordinary way by digestion for seven ing and expressing the liquor, and then filtering it.” E.)—Aromatic. Used in the same cases as the last.—Dose,

**CINNAMOMI COMPOSITUS, L. Pulvis Aromaticus, E. D.; Powder of Cinnamon; Aromatic Powder.**—(Cinnamon, nom, 3iss. [3j. D.]; Ginger, 3j.; Long Pepper, 3ss. [3j. D.] together, so that a very fine powder may be made. L. D.—Aromatic and carminative.—Dose, gr. x. Principalledly employed as a corrigent of other preparations.

**ECTIO AROMATICA, L. D.; Electuarium Aromaticum Confection.**—(Cinnamon; Nutmegs, each 3j.;
Clove, 5j.; Cardamom Seeds, 3ss.; Saffron, 3ij.; Prepared Cr\v{y}v.; Sugar, lb. ij. Rub the dry ingredients together to a very powder. The *Dublin College* orders this powder to be mix degrees with lb. j. of water, and the whole beaten to a pulp. *London College*, on the other hand, directs the powder to be kept close vessel, and the water to be added when the confection is war—The *Edinburgh College* orders of Aromatic Powder, one part; 8 of Orange Peel, two parts. Mix and triturate them into a un pulp.)—The preparation of the Edinburgh Pharmacopoeia is essentially from the Aromatic Confection of the London and *Dublin College*, in not containing chalk. The London College directs the water to be added when the preparation is wanted, with view of preventing fermentation, to which the preparation is sub Some druggists substitute a strong infusion of saffron for the saffron; and precipitated carbonate of lime for chalk. Aromatic confection, Ph. L. and D. is antacid, stimulant, and carminative; it is usually added to the ordinary chalk mixture in diarrhoea, or employed on various other occasions where spices are indic

Dose, grs. x. to 3j.

8. **EMPLASTRUM AROMATICUM, D.**; *Aromatic Plaster.*—Frankincense *Thas* 1ij.; Yellow Wax, 5ss.; Cinnamon Bark, powdered 3vj.; Essential Oil of Allspice; Essential Oil of Lemons, of each. Melt the Frankincense and Wax together, and strain; when are beginning to thicken by cooling, mix in the powder of cinnamon rubbed up with the oils, and make a plaster*).—By keeping, as by the application of heat in spreading, the volatile oils of preparation are dissipated. "It is used as a stimulant, applies the region of the stomach, in dyspepsia and increased irritability that organ, to allay pain and nausea and expel flatus*.

2. **CINNAMOMUM CASTISIA, Blume, E.—THE CINNAMON CASE**

Cinnamomum aromaticum, Nees.

 SEX. Syst. Enneandrae, Monographa.

(Cassia-bark. Oil of Cassia, E.—Cassia lignea, and Cassia buds, offic.)

**History.**—It is highly probable that the bark, now called *Cassia lignea*, was known to the ancient Greeks and Romans; but we not positively prove this. The barks termed by the ancients *Cinnamomum* (*κυπαμον*) and *cassia* (*κασσια*), as well as the trees yield these substances, are too imperfectly described to enable us to determine with precision the substances referred to. The cassia tree called in Chinese *Kwei* (Quit). Cassia lignea is called *Kwei Pau* Cassia skin; while Cassia buds are termed *Kwei Tze*, or *Cassia seeds*. Cinnamon is called *Yuh Kwei* (vulgarly Yoke Quit), or cious Cassia. It is not a product of China.

**Botany.** Gen. Char.—Vide *Cinnamomum zeylanicum.*

Sp. Char.—Leaves opposite, sometimes alternate, oblong-lanceo

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**Montgomery, Observ. on the Dublin Pharm.**

* Psalm, xlv. v. 9.*
It is probable that coarse Ceylon cinnamon may have been sold in the market as cassia-ligneum; but this by no means establishes the identity of the two species. Such an occurrence can now scarcely happen, seeing that all (coarse as well as fine) exported from Ceylon pays a duty of 3s. per lb.; the value of cassia-ligneum in bond is about 6d. per lb.

Pen-lemon (a Chinese Herbal) is a drawing of the Cassia tree. It is regrowing on a hill, and as having a very crooked and knotted stem.

**Cassia-ligneum (cortex cassiae)** is imported in chests. It is made up in which are tied with slips of bamboo. It has the same appearance, smell, and taste, as cinnamon; but its substance is coarser, its colour darker, browner, and its flavour, though cinnamometic, is much less sweet and fine as Ceylon cinnamon, but is more pungent, and is followed by a less closely quilled, and breaks shorter, than cinnamon (see p. 1141). It is imported from Singapore, Bombay, and Manilla.

**Cassia-ligneum** (sometimes called *China cinnamon*) is the best quality, and is usually imported from Singapore, rarely from Canton. Mr. Reeves says vast quantities both of cassia buds and digitata are annually brought to Canton from the province of Kweih, whose principal city (Kwei Lin Too) literally the city forest (or Grove) of Cassia trees, derives its name from the fact of cassia around it. The Chinese themselves use a much bark, (which they call *Gan Kwei Pe*) unifit for the European market. Mr. Reeves informs me that they esteem it so highly as to pay 10 dollars per lb. for it. A very fine quality is occasionally with and commands the enormous price of 100 dollars
cut in the 3rd or 4th moon, the second sort in the 6th or 7th moon. *Malabar cassia-ligneae* is brought from Bombay. It is thicker and coarser than that of China, and is more subject to foul packing; hence each bundle requires separate inspection. It may perhaps be confusion; for Dr. Wight states that the bark of the older branches of the genuine cinnamon plant are exported from the Malabar coast of *cassia*. *Mauritius cassia-ligneae* I am acquainted with. *Manilla cassia-ligneae*, I am informed, is usually sold in bond for continental consumption. I have received a specimen of bark ticketed "Cassia from Manilla", the epidermis of which was imperfectly removed.

*Cassia Buds* (*Flores Cassiae immature*; *Clavell ciinnamomi*) are not contained in any of the British Pharmacopoeias. They are the produce of China, and probably procured from the same plant which yields cassia-ligneae. Mr. Butler tells me that he always understood and has no doubt that both cassia-ligneae and cassia-ligneae are obtained from the same tree. The buds are gathered in the 8th or 9th moon. Dr. T. W. C. Martius* says, that "scanning the latest observations which the elder Nees has made known, cassia-ligneae are the calyces (Pruchtkelche) of Cinnamomum arecatae, about one-fourth their normal size. It is also said that they are collected from Cinnamomum Nees, which is found in China." Cassia buds bear some resemblance to clove buds, but are smaller, or to nails with round heads; they have the colour and fragrance of cassia-ligneae or cinnamon. The exports from Canton in 1831 were 177,896 lbs. and the imports into Great Britain in 1832 were 75,173 lbs. In 1840, 6,406 paid duty (1s. per lb.) Cassia buds have not been analyzed; their constitution is similar to those of cassia-ligneae; they yield a volatile oil by distillation, which contains tannic acid.

**Commerce.**—The quantity of cassia-ligneae annually imported, the countries from which it is brought, are as follows:

<table>
<thead>
<tr>
<th></th>
<th>1827</th>
<th>1830</th>
<th>1831</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>lbs.</td>
<td>lbs.</td>
<td>lbs.</td>
</tr>
<tr>
<td>East India Company's territories and Ceylon</td>
<td>408,192</td>
<td>729,715</td>
<td>336,413</td>
</tr>
<tr>
<td>Mauritius</td>
<td>4,117</td>
<td>5,958</td>
<td>2,696</td>
</tr>
<tr>
<td>Philippines</td>
<td>3,360</td>
<td>23,096</td>
<td>34,376</td>
</tr>
<tr>
<td>Brazil</td>
<td></td>
<td>6,290</td>
<td>5,379</td>
</tr>
<tr>
<td>Netherlands</td>
<td></td>
<td></td>
<td>251</td>
</tr>
<tr>
<td>Cape of Good Hope</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>415,702</td>
<td>837,586</td>
<td>399,420</td>
</tr>
</tbody>
</table>

In 1838, duty (6d. per lb.) was paid on 88,971 lbs. *Cassia-ligneae* is imported in chests, bales, and boxes. In 1840, 63,958 lbs. paid duty.

**Composition.**—*Cassia-ligneae* was analyzed by Bucholz*, who obtained the following results:—*Volatile oil 0·8, resin 4·0, gummy (stringent) extractive 14·6, woody fibre with bassorin 64·3, water loss 16·3.

1. **Volatile Oil of Cassia.**—(See p. 1149.)
2. **Resin.**—Is peculiar, tasteless, yellowish-brown, soft (Bucholz).
3. **Tannic Acid.**—Must have been contained in what Bucholz termed gums (stringent) extractive.

**Chemical Characteristics.**—Sesquichloride of iron renders the fusion of cassia-ligneae dark green, and causes a precipitate (tannate of iron). Gelatine also produces a precipitate (tannate of gelatine).

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* Pharmacognosy, S. 213.
* McCallie's Dict. of Comm.
* Parliam. Returns, No. 90, sess. 1625; No. 357, sess. 1823; No. 500, sess. 1832.
* Trade List.
* Gréville, Histoire des Towards.
THE CAMPHOR TREE.

PHYSIOLOGICAL EFFECTS.—Similar to those of cinnamon. Sundelin'
ried it as being more astringent.

Uses.—Are the same as those of cinnamon.

ADMINISTRATION.—Dose, gr. x. to 3ss.

OLEUM CASSIE, E.; Oil of Cassia; Oil of Chinese Cinnamon
ained from Cassia-lignea by distillation with water). Its pro-
ices and composition are similar to those of oil of cinnamon before
ribed. Its odour and flavour, however, are inferior to those of
atter. Its colour is usually pale yellow. Nitric acid converts
sto a crystalline mass (see p. 1144). Its effects and uses are
lar to those of oil of cinnamon. It is employed in the prepara-
of Aqua and Spiritus Cassiae.—Dose gtt. i. to gtt. iv.

AQUA CASSIE, E.; Cassia Water.—(Cassia-bark, bruised, 3xviii.;
er, Cong. ii.; Rectified Spirit, f3iii. Mix them together, and
off one gallon).—Used as an aromatic vehicle for other medi-
. It is usually prepared from the oil in the same way that cin-
water is commonly made.

SPIRITUS CASSIE, E.; Spirit of Cassia.—(Cassia, in coarse
ler, lb. i.; Proof Spirit, Ovij. Macerate for two days in a
ed vessel; add a pint and a half of water, and distil off seven
).—Dose, f3i. to f3iv. It is usually prepared by adding oil of
 to proof spirit.

TINCTURA CASSIE, E.; Tincture of Cassia.—(Cassia, in mod-
ine powder, siijs.; Proof Spirit, Oij. Digest for seven
, express the residuum strongly, and filter. This tincture is
conveniently made by the process of percolation, the cassia
allowed to macerate in a little of the spirit for twelve hours
being put into the percolator).—Dose, f3i. to f3ii. Used as an
ant to tonic infusions.

CAM'PHORA OFFICINARUM, Nees, E.—THE CAMPHOR TREE.

Laurus Camphora, Linna. L. D.

Sect. Syt. Eucaneandria, Monogynia.

(Concretum suil generis sublimatione purificatum, L.—Camphor, E.—Camphora, D.)

ISTORY.—The Ancient Greeks and Romans do not appear to
been acquainted with camphor. C. Bauhin and several subse-
writers state that Aetius speaks of it; but I have been unable
any notice of it in his writings; and others have been equally
ccessful in their search for it. Avicenna and Serapion speak
: the latter calls it kaphor, and erroneously cites Dioscorides.
son Seth, who lived in the 11th century, describes it; and his
ption is considered, both by Voigts and by Sprengel, to be
liest on record.

STANY. Gen. Char. — Flowers hermaphrodite, panicled, naked.
 six-cleft, papery, with a deciduous limb. Fertile stamens
nine, in three rows; the inner with two, stalked, compressed gland at the base; anthers four-celled, the outer turned inwards, the inner outwards. Three sterile stamens, shaped like the first, placed in a whorl alternating with the stamens of the second row; three of the stalked, with an ovate, glandular head. Fruit placed on the chalical base of the calyx.—Leaves triple-nerved, glandular in the axils of the veins. Leaf-buds scaly (Lindley).

**Sp. Char.**—Leaves triple-nerved, shining above, glandular in the axils of the veins. Panicles axillary and terminal, corymbose, with Flowers smooth on the outside (Nees).

**Fig. 241.**

Young branches yellow and smooth. Leaves evergreen, oval, acuminate, attenuate at the base, bright green and shining above, pubescent beneath. Petioles from one inch to one and a half inches long. Panicles axillary at the terminal, corymbose. Flowers small, yellowish-white. Berry round, blackish-black, size of a black currant. Seed solitary.

Every part of the tree, but especially the flower, evinces by its smell and taste that it is strongly impregnated with camphor.

**Hab.**—China, Japan, and Cochin-China. Introduced into Java from Japan.

**Extraction.**—Kämpfer and Thunberg have described the method of extracting camphor in the provinces of Satzuma and the islands of Gothen in Japan. The roots and wood of the tree, chopped up, are boiled with water in an earthen vessel, to which an earthen head, containing straw, is adapted. Then camphor sublimes and condenses on the straw. The method practised in China appears, from the statements of the Abbé Grosier, Dentrecolles, and Davies, to be somewhat different. The chopped branches are steeped in water, and after being boiled, until the camphor begins to adhere to the stick used in steeping. The liquid is then strained, and, by standing, the camphor concretes. Alternate layers of a dry earth, finely powdered, and this camphor, are then placed in a copper basin, to which an earthen inverted one is luted, and sublimation effected.

Two kinds of unrefined or crude camphor (camphora crude) are known in commerce:—

1. **Dutch Camphor.**—Japan Camphor.—This is brought from Batavia and is said to be the produce of Japan. It is imported in tubs (hence it is called tub camphor) covered with matting, and each tub is rounded by a second tub, secured on the outside by hoops of twisted cane. Each tub contains from 1 cwt. to 1 1/4 cwt. or more.

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*A. Amoen. Exot. p. 772.*
*Fl. Japonica.*
*Hist. Gens de la Chine, t. xiii. p. 335.*
*Quoted by Davies.*
The Camphor Tree.

It consists of pinkish grains, which, by their mutual adhesion, form monosized masses. It differs from the ordinary crude camphor in having larger grains, in being cleaner, and in subliming (usually) at a lower temperature. In consequence of these properties it generally fetches 10s. per cwt. more. There is not much brought to England, and of that which does come the greater part is re-shipped the continent.

2. Ordinary Crude Camphor; China Camphor; Formosa Camphor — is imported from Singapore, Bombay, &c., in square chests lined with lead foil, and containing from 1½ to 2½ cwt. It is chiefly procured in the island of Formosa, and is brought by the Chin-Chews in very large quantities to Canton, whence foreign markets get supplied. It consists of dirty greyish grains, which are smaller than those of Dutch camphor. Its quality varies: sometimes it is tenebrous and impure; but occasionally it is as fine as the Dutch kind.

Purification.—Crude camphor is refined by sublimation. Formerly this process was carried on only at Venice. Afterwards it was successfully practised in Holland. The method at present adopted is as follows:—The vessels in which this sublimation is effected are called bomboles (bombola, Ital., βομβόλες). They are made of thin flint glass, and weigh about 1 lb. each. Their shape is that of an oblate spheroid, whose shorter or vertical axis is about ten inches, and the longer or horizontal axis about twelve inches. They are furnished with a short neck. When filled with crude camphor, they are imbedded in the sand-bath, and heated. To the melted camphor, lime is added, and heat raised so as to make the liquid boil. The vapour condenses on the upper part of the vessel. As the sublimation proceeds, the height of the sand and the vessel is diminished. In about forty-eight hours the process is usually completed. The vessels are then removed, and their necks closed with tow; water is sprinkled over them by watering-pots, by which they are cracked. When quite cold, the cake of camphor (which weighs about eleven pounds) is removed, and trimmed of the adhering impurities and a portion of the camphor; hence, to extract the latter, the cake is submitted to a strong heat in an iron-pot with a head to it, the sublimed product refined by a second sublimation.

Properties.—Refined Camphor (Camphora raffinata; Camphora, cin.) is met with in the form of large hemispherical or convex cakes, perforated in the middle. It is translucent, has a crystalline granular nature, a strong, peculiar, not disagreeable, aromatic odour, and an aromatic, bitter, afterwards cooling taste. It is solid at ordinary temperatures, soft, and somewhat tough, but may be readily powdered by the addition of a few drops of rectified spirit. A crystal of native camphor in the wood (?) camphor of Dry-
*obalanops aromatica, Gærtn.*) in the collection of Materia Medica in the College of Physicians, appears as a flat octahedron, but its primary form is a right rhombic prism. It evaporates in the air at ordinary temperatures; but in closed vessels, exposed to light, sublimes and crystallizes on the sides of the bottle. It fuses at 347° F, and forms a transparent liquid, which boils at 400° F, and in closed vessels condenses unchanged. It is lighter than water, its specific gravity being 0.9867. Small pieces rotate when thrown on this liquid. Water dissolves a very minute portion only of camphor. Alcohol readily dissolves it; but if water be added to the solution, the camphor is precipitated. Ether, bisulphuret of carbon, the oils (both fixed and volatile), and the acids, also dissolve it. The liquid obtained by dissolving camphor in nitric acid is sometimes termed *camphor oil*; it is a *nitrate of camphor*. Camphor is insoluble in alkaline solutions. The vapour of camphor passed over red-hot iron is converted into a liquid called *camphrone* (composed of C^30 H^30 O).

**Composition.**—Camphor has the following composition:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon</td>
<td>10</td>
<td>40</td>
<td>78.94</td>
<td>78.02</td>
<td>77.96</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>8</td>
<td>8</td>
<td>10.33</td>
<td>10.39</td>
<td>10.61</td>
</tr>
<tr>
<td>Oxygen</td>
<td>1</td>
<td>1</td>
<td>10.53</td>
<td>11.59</td>
<td>11.43</td>
</tr>
<tr>
<td>Camphor</td>
<td>1</td>
<td>78</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Dumas has suggested that camphor may be regarded as an oxide of a base (yet hypothetical) which he calls *camphogen*, and whose composition is C^30 H^30.

**Chemical Characteristics.**—Camphor is readily known by its odour. It does not blacken in burning. It agrees in many of its properties with the volatile oils (p. 188). From these it differs, however, in its solidity at ordinary temperatures, and in its not being converted into resin by the oxygen of the air or by nitric acid. By repeatedly distilling nitric acid from camphor, the latter is converted into *camphoric acid* (composed of C^10 H^10 O) in the anhydrous state. Before the whole of the camphor has been converted into camphoric acid, there are produced intermediate compounds of camphor and this acid, which we may regard as camphorates of camphor.

The above are the characters of the *Common or Laurel Camphor*. *Borneo Camphor*, or the Camphor of the *Dryobalanops*, will be described hereafter.

*Artificial Camphor* is a hydrochlorate of oil of turpentine or of some other volatile oil, having a similar composition. Its empirical formula is C^30 H^30 Cl + C^30 H^14 + H Cl. According to Orfila, it produces no lesion of the nervous system, but confines its action to the formation of a few small ulcers in the mucous membrane of the stomach.

**Physiological Effects.** a. *On Vegetables.*—Göppert has satisfactorily shown,—1st, that solutions of camphor act in the same deleterious manner on plants as the volatile oils; 2dly, that they destroy the mobility of contractile parts without previously exciting them; 3dly, that they have no influence either on the germinations, phanerogamia, or the vegetation of the cellular cryptogamia;

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*W. Phillips, in Paris's *Pharmacologia*.  
V. *Toxicol. Gén.*  
THE CAMPHOR TREE.

1153

that the vapour only is sufficient to destroy fleshy plants and
Miquet has confirmed these results.

On Animals generally.—The action of camphor on animals
in the subject of numerous experiments made by Hillesfield *,
Menghini and Carminati †; Viborg, Hertwich ‡, Orfila *
udery.

impregnated with the vapour of camphor proves injurious to
(thine, which destroy wool, excepted). Sooner or later it
frequent agitation, followed by languor, insensibility, con
and death (Menghini). To amphibials (frogs) the vapour also
noxious. It produces preternatural movements, difficult
ion, trembling, and stupor (Carminati). Given to birds and
In sufficient doses, camphor proves poisonous, but the
which it gives rise to do not appear to be uniform. Indeed
few remedies whose action on the animal economy is so vari-
that of camphor. Three drachms dissolved in oil and given
; the oesophagus being tied, caused violent convulsions, some-
alogous to those of epilepsy, followed by insensibility and
Orfila). When administered in substance, it inflamed the
tube, caused ulceration, and, after its absorption, gave rise
tions (Ibid). Given to horses, in doses of two drachms, it
spasmodic movements, and quickens the pulse, but does not
ne any serious result *. Tiedemann and Gmelin detected
of camphor in the blood of the vena portae and of the mesen-
in of a horse, to whom they had given camphor ; but they
recognize it neither in the chyle nor in the urine. It is evolved
system principally by the bronchial surfaces; for the breath
als, to which this substance has been administered, has a
odour of camphor. Moiroud observed that the skin of a
whoose jugular vein camphor had been injected, smelt of
stance.

e general sedative effects of camphor on animals are rarely well
; however, when administered in a proper dose, and in cases
quiring its use, it sometimes causes a diminution in the force
quency of the pulse, and seems to allay pain" (Moiroud).
ery observed that the convulsions caused in animals by
were accompanied with a peculiar kind of delirium, which
em to run up and down without apparent cause. He also
the urinary organs generally affected, and for the most part
angury.

On Man.—No article of the materia medica has had more con-
my statements made respecting its effects and mode of action
mphor. These, however, have principally referred to its in-

* Report on the Progress of Vegetable Physiology during the year 1837, p. 139. Trans. by
‡ and Observ. Phys. and Hist. vol. iii. p. 551.
§, loco. cit.

†. Gém.
‡, ap. cit.
†. Pharm. Vétr.
§ by Dr. Christison.
fluence over the functions of circulation and calorification; but
regard to the modifications which it induces in the other | scarce any difference of opinion prevails.

Its local action on the mucous surfaces, the denuded derm-
ulcers, is that of an acrid. A piece of camphor held in the nau
half an hour caused the mucous lining of this cavity to become
hot, swollen, and painful; and it is highly probable that, ex-
periment been persevered in, ulceration would have fol-
The pain and uneasiness which camphor, when swallowed
stance, sometimes produces in the stomach, is likewise imputa-
local action as an acrid. Rubbed on the skin covered with
Dr. Cullen says that it causes neither redness nor other mark
flammation; but Dr. Clutterbuck declares this to be "under
a mistake." When applied to the denuded dermis, or to ulcers
produces pain, and appears to act as an irritant. These observa-
respecting the local action of camphor on man, are confirmed
ascertained effects of this substance on other animals.

Camphor becomes absorbed, and is thrown out of the system
bronchial membrane principally, but also by the skin. Tr
and Pidoux recognized its odor in every case in the pulse
exhalation, but failed to detect it in the cutaneous perspiration.
len, however, says that "Mr. Lassone, the father, has ob-
I have done frequently, that camphor, though given very
never discovers its smell in the urine, whilst it frequently
the perspiration and sweat." The non-detection of it in the
agrees with the observation of Tiedemann and Gr.elin with
horses, already noticed.

Camphor specifically affects the nervous system.—Regarding
symptoms of this effect but little difference of opinion prevails.
moderate doses it exhilarates and acts as an anodyne. Its ex-
ating effects are well seen in nervous and hypochondriacal cases.
Large doses it causes disorder of the mental faculties, the ex-
senses, and volition, the symptoms being lassitude, giddiness,
fusion of ideas, and disordered vision, noise in the ears, drowsi-
delirium or stupor, and convulsions. These phenomena, which
been observed in several cases, agree with those noticed in
ments on brutes. In its power of causing stupor, camphor
with opium; but it differs from the latter in its more frequent
causing delirium and convulsions. Epilepsy has been ascri-
the use of camphor.

The quality of the influence which camphor exercises over the
ular system has been a subject of much contention. From my

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1 Trousseau and Pidoux, Traité de Thérap. t. i. p. 45.
5 Op, cit. p. 295.
In about twenty minutes he experienced lassitude and de-
delirium, with frequent yawnings: at the end of three-
quarters of an hour his pulse had fallen from 77 to 67. Soon after
he became gradually insensible, and in this condition was
with violent convulsions and maniacal delirium. From this
he woke as from a profound sleep; his pulse was 100, and he
to reply to interrogatories, though he had not completely
his recollection. Warm water being administered, he
the greater part of the camphor, which had been swal-
vee hours previously; and from this time he gradually
other case, a man swallowed four ounces of camphorated
aining 160 grains of camphor. The symptoms were
heat of skin, frequent, full, and hard pulse, brilliancy of
redness of the face, heaviness of the head, anxiety, agita-
tion sense of heat in the stomach—then intense headache,
indistinctness of sight, and ocular hallucinations. The
ly complained of the heat, which he said was intolerable.
ght copious sweating came on, followed by sleep. The
inued full and frequent, and the voiding of urine difficult.
other well-reported cases, camphor, in large doses, caused
ation of the vascular system. In the instances related by Fred.
chard, Pouteau, Griffin, Cullen, Callisen, Edwards, and
and Pidoux, sedation of the vascular system was observed.
ified by a languid, small, and slower pulse, coldness of the
nd pallid countenance; in some cases with cold sweat. In
ese instances, symptoms of vascular excitement followed
depression. The pulse became more frequent and fuller

and Pidoux ascribe the symptoms of sedation to the depressible influence which camphor exerts over the system by sympathy; the sanguineous excitation they refer to the passage of camphor into the blood, and the efforts of the organism to eliminate this unstable principle. But in some of the cases in which excessive use of camphor have been taken, no symptoms of depression were observed, as in the instance mentioned by Dr. Eickhorn (in whom heat, rapid but small pulse, copious sweating, and agreeable excretion), were produced by 120 grs. by Dr. Wendt, by Scud and by Bergondi.

Camphor has long been celebrated as an anaphrodisiac; the reasons of it are said to be attended with this effect; hence the School of Salernum, "Camphora per nares castrat odore". Trousson and Pidoux experienced the anaphrodisiac property of 36 grains of camphor taken into the stomach.

Strangury has also been ascribed to this substance by Heberden, by Scudery, and others.

Uses.—The discrepancy among authors as to the physical effects of camphor has had the effect of greatly circumscribing the use of this substance. Indeed, until its operation on the system was more satisfactorily ascertained, it is almost impossible to lay down general rules which should govern its exhibition. The following are the principal maladies in which it has been found useful:

1. Fever.—Camphor has been employed in those forms of fever which are of a typhoid type. It is chiefly valuable by causing a termination to the surface and giving rise to diaphoresis. Those remedies should be conjoined with it which promote the effects of the following: such as ipecacuanha, emetic tartar, and the vegetable and saline salts. Opium greatly contributes to the sudorific effects of camphor; and, when it is admissible, benefit is sometimes obtained from the administration of one grain of opium with five or eight grains of camphor. But in a great number of cases of fever the cerebral diseases forbids the use of opium. From its specific influence over cerebral functions, camphor has been frequently used in fevers to allay the nervous symptoms, such as the delirium, the watchfulness, the subsista tendinum, &c.; but it frequently fails to give the required relief. Dr. Home did not find any advantage from its use in the hot vomitus fever; and Dr. Heberden has seen one scruple of camphor given every six hours, without any perceptible effect in abating convulsive catchings, or composing the patient to rest.

2. In Inflammatory Diseases.—In the latter stages of inflammatory diseases...
also in measles, scarlatina, and miliary fever; but it is ad-
only when the circulation flags, and the temperature of the
falls below the natural standard. In such cases it is some-
ployed along with a diaphoretic regimen to determine to the
it is to be carefully avoided when inflammation of the brain
embranes is feared. It has been asserted that if a campho-
ment be applied to the face, no small-pox pustules will
eir appearance there; but the statement is not correct.

Mania, Melancholia, and other forms of Mental Disorder.—
or is occasionally taken to cause exhilaration. I am ac-
with two persons (females), both of nervous temperament,
it for this purpose. To relieve despondency I have often
serviceable. In mania and melancholia it has now and
ved serviceable by its narcotic effects; it induces mental quiet
ses sleep. It was used in these affections by Paracelsus and
ceeding writers, especially, in more modern times, by
r; and by Avenbrugger. The latter regards it as a spe-
the mania of men, when accompanied with a small con-
 penis, corrugated empty scrotum, or when both testicles are
ced that they appear to be introduced into the abdominal

Spasmodic Afections.—The narcotic influence of camphor
ionally proved serviceable in some spasmodic or convulsive
s; viz. spasmodic cough, epilepsy, puerperal convulsions,
and even tetanus; its use, however, requires caution.

Irritation of the Urinary or Sexual Organs.—A power of
ing irritation of the urinary organs has long been assigned
or. In strangury and dysury, especially when produced by
des, it is said to have been used with benefit—a statement
ly inconsistent with that more recently made of its produc-
in cases of poisoning by opium. It has also been employed to mitigate the effects of cantharides, squills, and mezereon; but toxicologists, for the most part, do not admit its efficacy; at any rate, further evidence is required to establish it. Nor does there appear any valid testimony for believing that camphor possesses the power of checking mercurial salivation, as some have supposed.

8. In Chronic Rheumatism and Gout.—A mixture of camphor and opium, in the proportions before mentioned, is useful in chronic rheumatism, by its sudorific and anodyne properties. Warm clothing and diluents should be conjoined. In chronic gout, also, camphor is said to have proved beneficial.

9. In Cholera.—The combination of camphor and opium above referred to, I have seen used with benefit in cholera.

10. Externally, camphor is employed in the form of vapour, solution, or, more rarely, in the solid state. The vapour is occasionally inhaled in spasmodic cough; and is applied to the skin to alleviate pain and promote sweat, constituting the camphor fumigation (fumigationem camphora). Dupasquier recommended the fumigations in chronic rheumatism. The patient may be in bed or seated in a chair; and, in either case, is to be enveloped by a blanket tied round the neck. About half an ounce of camphor is then to be placed on a metallic plate, and introduced within the blanket (under the chair, if the patient be seated). In solution, camphor is used either as an anodyne or a local stimulant. The nitric solution of camphor is used to relieve toothache. A solution of camphor in alcohol has been used as an injection into the urethra, to relieve arduous in gonorrhoea, and into the rectum to mitigate tenesmus arising from ascariades or dysentery. The acetic and alcoholic solutions of camphor are mostly employed as stimulants. In substance, camphor is not frequently used. A scruple or half a drachm "added to a pottle, and applied to the perineum, allays the chordoe, which is painful attendant upon gonorrhoea." Powdered camphor is a constituent of some tooth-powders, to which it communicates its peculiar odour.

The foregoing are some only of the maladies in which camphor has been extensively used and lauded. I must refer to the works of Murray for various other uses which have been made of this substance.—It is scarcely necessary to add, that camphor-bags possess no prophylactic properties against contagion.

Administration.—The medium dose of it is from five to ten gr.; but it is frequently exhibited in much smaller doses (as one grain) and occasionally a scruple has been employed. It is given in the form of a pill or emulsion. That of pill is said to be objectionable, "as in this state the camphor is with difficulty dissolved in the

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4. United States Dispensatory.
liquors, and, floating on the top, is apt to excite nausea, or pain
iness at the upper orifice of the stomach. The emulsion is
by rubbing up the camphor with loaf sugar, gum arabic, and
and the suspension will be rendered more complete by the
of a little mastic.

To Note.—In a case of poisoning by camphor, first evacuate the
of the stomach. Hufeland recommends the use of opium to
the effects of camphor. Phœbus directs chlorine water to
ministered as the antidote, and afterwards purgatives and clys-
Vinegar and coffee, he states, promote the poisonous operation, and
assists the patient's recovery.

ISTURA CAMPHORE, L. E. D.; Agua Camphore; Camphor Mix-
(Camphor, 5ss.; Rectified Spirit, ml.; Water, Oj. First rub
uphor with the spirit, then with the water gradually poured in,
through linen, L.—The Dublin College employs Cam-
; of Rectified Spirit, gtt. x.; of Refined Sugar, 3ss.;
Water, Oj. [wine measure]. The camphor is to be first
with the spirit, then with the sugar; lastly, add the water
the triturating, and filter the mixture through bibulous paper,
the Edinburgh College employs Camphor, 3j.; Sweet Almonds,
Sugar, of each, 3ss.; Water, Oj. Steep the almonds in hot
and peel them; rub the camphor and sugar well together in a
; add the almonds; beat the whole into a smooth pulp; add
ther gradually, with constant stirring, and then strain, E.)—The
mixture kept in the shops is often prepared by suspending
or in water without the intervention of any third body. The
ty of this substance dissolved is exceedingly small. The
d spirit employed by the London and Dublin Colleges serves
ote the pulverization, and, very slightly perhaps, the solution
Camphor. Sugar also assists its diffusion through water. The
ation of the Edinburgh Pharmacopœia is, in fact, an emulsion.
of these artificial mixtures, however, are very permanent, and
anity of camphor which remains in solution is so small, that
uid can scarcely be said to possess more than the flavour and
of camphor. Hence its principal value is as a vehicle for the
ion of other medicines. Its usual dose is from 3j. to 5j.

ISTURA CAMPHORE CUM MAGNESIA, E. D. Camphor Mixture
Magnesia.—Camphor, gr. x. [gr. xij. D.]; Carbonate of Mag-
gr. xxv. [3ss. D.]; Water, fævj. Triturate the camphor and
ate of magnesia together, adding the water gradually).—The
ate of magnesia promotes the solution of the camphor in water.
xiture, therefore, holds a larger quantity of camphor in solu-
than the previous one. A minute portion of magnesia is also
ed. As the magnesian carbonate is not separated by filtration,
it gives to the mixture antacid properties, in addition to those qualities which this preparation derives from the camphor. "In addition to the uses of the simple camphor mixture, this preparation has been found very beneficial in the uric acid diathesis, and also in irritation of the neck of the urinary bladder, particularly when given in combination with hyoscyamus." The dose is f\(\tilde{\text{s}}\)ss. to f\(\tilde{\text{s}}\)j.

3. Tinctura Camphorae, L. E.; Tinctura Camphorae, sive Spiritus Camphoratus, D.; Spiritus Camphorae; Spirit of Camphor; Camphorated Spirits of Wine, offic.—(Camphor, \(\tilde{\text{S}}\)v. [\(\tilde{\text{s}}\)j. D.]; in small fragments, \(\tilde{\text{s}}\)jss. E.); Rectified Spirit, Oij. [Oss. wine-measure, D. Mix, that the camphor may be dissolved.]—The principal use of this preparation is as a stimulant and anodyne liniment in sprains and bruises, chilblains, chronic rheumatism, and paralysis. Water immediately decomposes it, separating the greater part of the camphor but holding in solution a minute portion, thereby forming an extraneous camphor mixture. By the aid of sugar or mucilage, the greater part of the camphor may be suspended in water. Employed in this form, we may give tincture of camphor internally, in doses from m\(\tilde{x}\) to m\(\tilde{\text{S}}\)j.

4. Tinctura Camphorae Composita, L.; Tinctura Opii camphorata, E. D.; Elixir Paregoricum; Paregoric Elixir, offic.—(Camphor, \(\tilde{\text{S}}\)jss. [\(\tilde{\text{S}}\)ij. D.]; Opium, powdered, [sliced, E.]; gr. lxij. [S.]; \(\tilde{\text{S}}\)iv. E.]; Benzoic Acid, gr. Ixxij. [Siv. E. \(\tilde{\text{S}}\)j. D.]. Oil of Anise, f\(\tilde{\text{S}}\)j. Proof Spirit, Oij. [wine-measure, D.]. Macerate for fourteen [several E.] days, and filter.—This is a very valuable preparation, and extensively employed both by the public and the profession. Its active ingredient is opium. The principal use of it is to allay troubesome cough unconnected with any active inflammatory symptom. It diminishes the sensibility of the bronchial membrane to the influence of cold air, checks profuse secretion, and allays spasmodic cough. Dose, f\(\tilde{\text{S}}\)j. to f\(\tilde{\text{S}}\)ij. A fluidounce contains nearly two grains of opium. The name given to this preparation by the London College, though less correct than that of the Edinburgh and Dublin Colleges, is, I conceive, much more convenient; since it enables us to prescribe opium without the knowledge of the patient—no mean advantage in cases where a strong prejudice exists in the mind of the patient or his friends to the use of this important narcotic. Furthermore, it is less likely to give rise to serious and fatal errors in dispensing. In a case mentioned by Dr. M. Good, laudanum was served by an ignorant dispenser, for tinct. opii camph. The error proved fatal to the patient.

5. Linimentum Camphoratum, L. E.; Oleum Camphoratum, D.; Camphor Liniment, offic.—(Camphor, \(\tilde{\text{S}}\)v. [\(\tilde{\text{S}}\)j. D.]; Olive Oil, f\(\tilde{\text{S}}\)iv. [\(\tilde{\text{S}}\)j. D]. Shake them together until they are mixed, L. Rub them together [in a mortar, E.] until the camphor is dissolved, E. D.)—A stimulant and anodyne emollient in sprains, bruises, and rheumatic and other local pains. In glandular enlargements it is used as a resolvent.

* Dr. Montgomery, Observ. on the Dublin Pharm.  
6. LINIMENTUM CAMPHORAE COMPOSITUM, L. D.; Compound Liniment of Camphor. — (Camphor, Sijss. [sij. D.]; Solution of Ammonia, Tijss. [tij. D.]; Spirit of Lavender, Qj. [wine-measure, D.]) Mix the solution of ammonia with the spirit; then let a pint distil from a glass retort, with a slow fire; lastly, dissolve the camphor in it.

A powerful stimulant and rubefacient, producing, when freely used, considerable irritation and inflammation. It is applicable in the same cases as the simple camphor liniment and the liniment of ammonia (p. 34). From both of these compounds it differs in not being greasy.

I have used,” says Dr. Montgomery”, “a liniment composed of two parts of this and one of turpentine, with children, as a substitute for blister, and with good effect; or, with equal parts of the anodyne liniment, I have found it highly beneficial in the removal of those disagreeing pains in the back which so frequently annoy women about the close of their pregnancy.”

4. SASSAFRAS OFFICINALE, Nees, E.—THE SASSAFRAS TREE.

Laurus Sassafras, Linn. L. D.

(Nadix, L.—The Root, E.—Lignum, Radix, et Oleum volatile, D.)

HISTORY.—Sassafras wood is mentioned by Monardes”, who states that it had been recently introduced into Spain from Florida. It was never, first brought to Europe by the French.

BOTANY. Gen. Char.—Dioecious. Calyx six-parted, membranous; segments equal, permanent at the base. MALES: Fertile stamens in three rows, the three inner with double-stalked distinct glands at the base. Anthers linear, four-celled, all looking inwards. MALES with as many sterile stamens as the male, or fewer; the sex often confluent. Fruit succulent, placed on the thick fleshy axis of the peduncle, and seated in the torn unchanged calyx.—SEEDS yellow, before the leaves. Leaves deciduous (Lindley).

COMPOSITION.—Neither the wood nor the bark of sassafras has been analyzed. Both contain volatile oil.

VOLATILE OIL (see p. 1162).

PHYSIOLOGICAL EFFECTS.—The wood and the bark are stimulant sudorific. Taken in the form of infusion, and assisted by warming and tepid drinks, they excite the vascular system and prove efficaciously. They owe their activity to the volatile oil, which possesses acrid properties.

USES.—Sassafras is employed as a sudorific and alterative in cutaneous, rheumatic, and venereal diseases. On account of its stimulant properties it is inadmissible in febrile or inflammatory conditions of the system. It is rarely or never used alone, but generally in combination with sarsaparilla and guaiacum.

* Alison’s Lect. on the Nat. Med. vol. ii. p. 31.
ELEMENTS OF MATERIA MEDICA.

Administration.—Sassafras is administered in the form of oil or infusion. The dose of the oil is from two to ten drops. Sassafras tea, flavoured with milk and sugar, is sold at day-break in the streets of London, under the name of saloop. Sassafras is a constituent of the Decoctum Sarææ Compositum; but the volatile oil is dissipated by boiling (p. 1001).

Oleum Sassafras, D.; Volatile Oil of Sassafras officinale, F. Oil of Sassafras.—(Obtained by submitting the wood to distillation with water). It is colourless, but, by keeping, becomes yellow or red. Its smell is that of sassafras; its taste hot. Sp. gr. 1.061. Water separates it into two oils, one lighter, the other heavier than water. By keeping, it deposits crystals (stéaroptène), which is readily soluble. Oil of sassafras is rendered orange-red by nitric acid. It is said to be adulterated with oil of lavender or oil of turpentine; but the statement, I suspect, does not apply to the oil found in English commerce. Oil of sassafras is stimulant and diaphoretic. It may be employed in chronic rheumatism, cutaneous diseases, and venereal maladies. It is a constituent of the Compound Extract of Sarsaparilla, p. 1008.

5. LAU'RUS NOB'ILLIS, Linn. L.D.—THE SWEET BAY.

Sex. Syst. Enneandra, Monogynia.

(Bacca. Folia. L.D.)

History.—The bay-tree is mentioned, though erroneously, in the translation of the Bible; the Hebrew word, translated bay, means native. Hippocrates used both the leaves and berries of the bay tree (δάφνη) in medicine. Bay-leaf is analogous to the Malabathra of the ancients.

Botany. Gen. Char.—Flowers dioecious or hermaphrodite, involucreted. Calyx four-parted; segments equal, deciduous. Ferris stamens twelve, in three rows; the outer alternate with the segments of the calyx; all with two glands in the middle or above. Anthers oblong, two-celled, all looking inwards. Female Flowers with two to four castrated males, surrounding the ovary. Stigma capitate. Fruit succulent, seated in the irregular base of the calyx—Umbels axillary, stalked. Leaf-buds with valvate papery scales. Leaves evergreen (Lindley).

Sp. Char.—The only species.

A bush or small tree. Bark aromatic, rather bitter. Leaves alternate, lanceolate, acute, or acuminate, wavy at the edge, somewhat coriaceous. Flowers yellowish. Fruit (called by Nees a one-seeded flesh berry, by De Candolle a drupe) bluish-black, oval, size of

1 Bonnastre, Jour. de Pharm. vol. xiv.
2 Paulus, xxxvi. 35, 36.
3 Carpenter’s Script. Nat. Hist.
4 Opera, p. 207. 628, 621, &c, ed. Fœx.
5 Royce, Hindoo Med. pp. 51 and 65.
covering of the fruit.

Position.—In 1824 bay-berries were analyzed by Bonastre, and the constituents to be—Volatile oil 0·8, laurin 1·0, fixed oil 1·7, resin 1·6, uncrystallizable sugar 0·4, gummy 17·2, bassorin 6·4, starch 25·9, woody fibre 18·8, soluble traces, an acid 0·1, water 6·4, salts 1·5.—The ashes (ng 1·2) consisted of carbonate of potash and the carbonate of lime.

The Oil of Laurel Berries; Oil of Sweet Bay.—Obtained from the distillation with water. The crude oil is pale yellow, transparent, soluble in alcohol and ether. By re-distillation it yields two isomeric (as O), one having a sp. gr. of 0·837, the other 0·883, while a brown matter remains in the retort.

Camphor of the Bay berry.—A crystalline solid, fusible, and volatile with ether and in boiling alcohol. Sulphuric acid renders it tric acid liquefies it. Alkalies are without action on it. It is extracted from the berries by rectified alcohol.

Oil of Bays (see Below).

Pharmacological Effects.—The berries, leaves, and oil, are said to have aromatic, stimulant, and narcotic properties. The leaves, in cases, prove emetic.

Bay berries or leaves are rarely, if ever, used in medicine. They might, therefore, with great propriety be excised from the Pharmacopoeia. The leaves are employed by the account of their flavour. Both leaves and berries have been strenghten the stomach, to expel flatus, and to promote the natural discharge.

Irritation.—Both berries and leaves are used in the form of
oil is mixed with the decoction, on which when cold the butyrase
oil is found floating. From the dried berries it is procured by ex-
posing them to the vapour of water until they are thoroughly sob 
and then rapidly subjecting them to the press between heated metal 
plates. By the latter method they yield one-fifth of their weight of oil. 
Oil of bays is imported in barrels from Trieste. In 1839, duty (per lb.) 
was paid on 1737 lbs. of it. It has a butyaceous consistence and
a granular appearance. Its colour is greenish, its odour is that of 
the berries. It is partially soluble in alcohol, completely sol-
uble in ether. With alkalis it forms soaps. It is occasionally em-
ployed externally as a stimulating liniment in sprains and bruises, 
and in paralysis. It has also been used to relieve colic, and against
disorder. Its principal use, however, is in veterinary medicine.

OTHER MEDICINAL LAURACEÆ.

1. CULILAWAN or CLOVE BARK is obtained from Cinna-
monum Culile Blume, a native of the Indian islands. Its properties are analogous to the 
Cassia-ligneæ. It is rarely met with in London.
2. I have received from Dr. Martiny of Hesse Darmstadt a bark marked C 
Lawan papuanus. It is, I presume, the produce of Cinnamomum xanthoneurum 
Blume.
3. Massoy Bark (in commerce Misoi) is the cortex oxinus of Rumphius, 
used in the cosmetics of the natives of India. I have never found it in 
London shops.
4. Sintoe Bark is the produce of Cinnamomum Sintoe, Blume. Its prop-
erties are analogous to those of Culilawan.
5. The Folia Malabaritri of India are obtained from Cinnamomum nit 
Hooker, and Blume; and from C. Tamala. They are aromatic tonics, but 
not found in the London market.
6. Sassafras nuts are the seeds of some Lauraceous plant. "They were 
ported from Brazil into Stockholm in the middle of the last century, and 
found a valuable tonic and astringent medicine: during the continental 
they were used as a bad substitute for nutmegs." They are still to be found 
some of the old drug houses of London. It is doubtful from what plant they 
received.

ORDER XXXII.—MYRISTICACEÆ, Lindley.—THE NUTM 
TRIBE.

MYRISTICÆ, R. Brown.

Essential Character. — Flowers completely unisexual. Calyx 
trifid, in quadrifid; with valvular revestimation. Males: Filaments either separate 
completely united in a cylinder. Anthers three to twelve, two-celled, turn 
outwards, and bursting longitudinally; either conmat or distinct. Female 
Calyx deciduous. Ovary superior, sessile, with a single erect ovule; style 
short; stigma somewhat lobed. Fruit baccate, dehiscent, two-valved. S

8 Soubeiran, Nouveau Traité de Pharmacie, t. ii. p. 32, 2" éd.
10 See Pereira, in Lindley's Flora Medica, p. 331.
12 Lindley's Flora Medica, pp. 335 and 336.
THE NUTMEG TREE.

CHRISTICA OFFICINALIS, Linn., E.—THE NUTMEG TREE.

Myristica moschata, Thunberg, L. D.

Sex. Syst. Diocèsa, Monadelphia.

OLEUM destillatum nuclei, L.—Kernel of the fruit; volatile oil from the kernel; concrete oil from the kernel, E.—Nucleus. Oleum volatile et involucrum nucis dictum, D.)

ETYMOLOGY.—Both nutmegs and mace were unknown to the ancient and Romans; unless, indeed, the κάρπακος of Theophrastus*, οἴνομαν, quod comacum appellant of Pliny*, be our nutmeg, have suggested. Both mace and nutmegs are noticed by a v.

GEN. CHAR.—Flowers dioecious. Calyx urceolate, three-lobed.

MALES.—Filaments monadelphous; anthers six to ten, fleshy, two-valved, one-seeded. Seed enveloped in a fleshy pericarp.

FEMALES.:—Ovary simple; style none; stigma two-lobed. Fig. 243.

SPE. CHAR. — Leaves oblong, acuminate, smooth, whitish beneath, and with simple nerves. Peduncles one to four-flowered. A tree from 20 to 25 feet high, similar in appearance to a pear tree. Bark dark grayish-green, smooth, with a yellowish juice. Leaves aromatic. Racemes axillary. Peduncles and pedicels glabrous, the latter with a quickly deciduous ovate bract at its summit, often pressed close to the flower. Male flowers:—Three to five on a peduncle: calyx fleshy, pale yellow, with a reddish pubescence. Female flowers scarcely different from the males, except that the pedicel is frequently solitary.

Myristica officinalis.

Fruit pyriform, smooth externally, about the size of a peach, marked externally by a longitudinal groove. Pericarp fleshy, dehiscing by two equal longitudinal valves. Arillus (mace) large, fleshy, white, scarlet; when dry, yellow, brittle, and somewhat horny.

* Hist. Plant. lib. ix. cap. 7.
* Hist. Nat. lib. xi. cap. 64, ed Volp.
* Hist. ii. tract. ii. cap. xix and xix.
Nucleus or nut (nutmeg in the shell, offic.) the arillus, oval or ovate: its outer coat (tunica externa, or shell) is dark brown, hard, marked by the mace: its inner coat (endopleura tunica interna) closely invests the seed, and down into the substance of the albumen, giving marbled or ruminated appearance. The great part of the nutmeg consists of the oleaginous albumen, its so-called veins are processes of the endosperm which have a reddish-brown colour, and about 20.3% oil. Embryo at the base of the seed; radicle superior, hemispherical; cotyledons two, large, flaccid, fan-shaped; plumule two-lobed.

Hab.—Moluccas, especially the Isle of Ternate. The Dutch have endeavoured to confine the nutmeg tree to the little cluster of the Banda isles, viz. Pulo Ay, Banda, and Ambon.

Curing.—Mace is prepared for the market by separating the nutmeg, and drying it for some days in the sun, when crimson changes to dusty yellow. Nutmegs require more curing, on account of the attacks of an insect (the nutmeg-borer). They are first sun-dried for three days; then laid on hurdles, smoke-dried by a slow wood-fire for three months, at which time they are freed from their shells, and dipped thrice in lime water, or rather a thick mixture of lime and water to secure them from the depredations of insects. It is said that the nutmegs are in their shells, they are secure from the attacks of these insects.

Description. 1. Of Nutmegs (Nucia moschata).—The outer coat of commerce (formerly called the female nutmeg, muschata fœmina, Clusius) rarely exceeds an inch in length. Its surface is roundish or elliptical, like that of the French olive. Externally, marked with reticular furrows. The colour of the projecting rhizome is brownish; that of the depression sometimes whitish, from its use in curing (limed nutmeg), at other times brown (brown nutmeg). Internally it is pale reddish-grey, with red veins. The odour is strong, but pleasant, peculiar, and aromatic. The taste is agreeable and aromatic. Occasionally this kind of nutmeg is imported with the shell.

A long kind of nutmeg, called, in the shops, the wild nutmeg (the male nutmeg, nux moschata mas. Clusius), is frequently met with. Its shape is oblong, like that of the date; its length an inch and a half. Its shell is bony, somewhat brittle, externally shiny and brown, internally dull, grayish-white. The contents are paler coloured, less furrowed, and less aromatic, than in the preceding sort. Sometimes these nutmegs are imported with the shell dried around them (wild nutmegs covered with mace). Long as
sacred to be the produce of Myristica officinalis var. sphenocarpa, Dierbach). A specimen of the fruit and leaves, preserved in spirit in the Banksian collection, is marked the long nutmeg from Sumatra.

2. of Mace. (Macis.)—Mace, as met with in the shops, is a flat, regularly slit, smooth, slightly flexible or brittle membrane, of a pale amaron-yellow colour, and an odour and taste analogous to those of nutmegs.

Under the name of False Mace I have received from Dr. Martiny red mace, with scarcely any flavour or odour. It is perhaps the ace of the long nutmeg just described.

COMMERCE.—Nutmegs and mace are imported from the Indian Archipelago either directly or indirectly by the Cape of Good Hope or Holland. In 1840, the duty of 2s. 6d. per lb. was paid on 11,160 lbs. of nutmegs, and on 16,333 lbs. of mace.

COMPOSITION.—Nutmegs were analyzed, in 1804, by Schrader; and, in 1823, by Bonastre. In 1824 an analysis of mace was made by N. E. Henry.

<table>
<thead>
<tr>
<th>Schrader's Analysis</th>
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<th>N. E. Henry's Analysis</th>
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<td>aces fibre with lime,</td>
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1. VOLATILE OIL OF NUTMEGS. 
2. VOLATILE OIL OF MACE. 
3. FIXED OIL OF NUTMEGS. 

CHEMICAL CHARACTERISTICS.—The presence of starch in both nutmegs and mace may be detected by a solution of iodine, which gives them a blue tint (iodide of starch). Both of these substances yield, by distillation with water, a volatile oil, characterized by peculiar odour; and both yield, by expression, a fixed butyraceous oil.

PHYSIOLOGICAL EFFECTS.—The activity of both nutmegs and mace depends on the volatile oil which they contain. Swallowed in moderate quantities, they produce the before-described effects of the spices (p. 181). In large doses they prove narcotic, and cause giddiness, delirium, precordial anxiety, sleepiness, or actual stupor. Instances of this kind are mentioned by Boutius, Rumphius, Boel, Schmid, and Cullen. In the case related by the last...
mentioned authority two drachms of powdered nutmegs produces drowsiness, which gradually increased to complete stupor and insensibility. The patient continued for several hours alternately delirious and sleeping, but ultimately recovered. Purkinje has concluded these statements by experiments made on himself. I am acquainted with a case in which the narcotic effects of a whole nutmeg have occurred on several times experienced.

Uses.—The principal consumption of nutmegs and mace is for dietetical purposes. They serve to flavour, and, by their stimulant properties, to assist the digestive process. Food highly seasoned with these substances may prove injurious in cerebral affections (apoplexy, for example), on account of their narcotic properties.

Medicinally they are used, like other spices (see p. 181), as stimulants, carminatives, and flavouring ingredients. Nutmeg is an important constituent in the *confectio aromatica* (see p. 1146), and is used in various medicinal preparations, including medicinal preparations for diarrhea. I frequently employ nutmeg as a substitute for opium. It may be taken in warm brandy and water, unless the use of spirit be contra-indicated.

Administration.—Either nutmeg or mace may be taken in the extent of a scruple or half a drachm, in powder obtained by grinding or the volatile oil of these substances may be used, in doses up to 1 ml.

1. *Oleum Myristicae*, L. E. ; *Oleum Nucis Moschatae* : *Essential Oil of Nutmeg*. (Procured by submitting nutmegs and water to distillation.) It is usually imported. It is colourless or pale yellow, has the odour and taste of nutmegs, and a viscid consistency. It separates into two oils, one lighter, the other heavier than water. By keeping, it deposits crystals of stearic acid (myristicin) which are fusible at 212°F., volatile, soluble in alcohol, and in boiling water; from the latter liquid myristicin separates in a crystalline form as the liquid cools. Accord to Mulder the stearoptène contains C₁₉ H₃₈ O₂. Volatile oil of nutmeg is seldom employed medicinally. Its dose is 1 ml to 1 ml, taken on the tongue or dissolved in spirit.

2. *Oleum Macidis* ; *Essential Oil of Mace*. This is colourless, pale yellow, lighter than water, and has the flavour and odour of mace. Its composition, effects, and uses, are similar to those of nutmegs.

3. *Myristicae Adeps*, E. *Myristicae Oleum expressum*, L. *; Expressed Oil of Nutmegs* ; *Expressed Oil of Nutmegs*. In the shops it is under the denomination *Expressed Oil of Mace*. It is prepared by beating

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*The London College have omitted it in their list of Materia Medica, though it is directly used in the preparation of Emplastrum Picos. The Edinburgh College has also omitted respecting it; for while, in the list of Materia Medica, it is called *Myristicae Adeps*, in the *for the preparation of Emplastrum Picos* it is termed *Oil of Mace*. 
to a paste, which is to be inclosed in a bag, and then exposed to a pour of water, and afterwards expressing by heated plates. Ported in oblong cakes (covered by some monocotyledinous commonly called flag leaves), which have the shape of com-
coks, but whose size is somewhat smaller. Its colour is its consistence firm, its odour fragrant, like that of the seeds rich it is obtained. It is soluble in 4 parts of boiling al-
According to Schrader 16 parts of butter of nutmeg are com-
Tallow-like Oil 7, Yellow Oil 8 t, and Volatile Oil 9. More it has been examined by Playfair, who states its composition latile oil, sericine, a fat oil, and colouring matter. Cold dissolves the volatile oil, the fat oil, and the colouring matter, from 25 to 30 per cent of sericine.

is a white crystalline fat, fusible at 87°F., and composed of sericine or cid (C18 H37 O) and glycerine. It is soluble in hot alcohol.

essed oil of nutmegs is occasionally employed externally in rheumatism and palsy. It is a constituent of Emplastrum p. 1059).

RITUS MYRISTICE. L. E. D. Spirit of Nutmeg.—(Nutmegs, 3ijss. [3j. D.]; Proof Spirit, cong. i. [wine measure D.]; D. [sufficient to prevent empyreuma, D.]. Mix them [mace-
seventy-four hours, D.], then, [with a slow fire, L.] let a gallon
-It is frequently prepared by mixing volatile oil of nutmegs pro
spirit. It is cordial and carminative; and is employed of f3i. to f3iv., as a pleasant addition to stimulant, narcotic, or

drafts.

XXXIII.—THYMELACÆ, Lindley.—THE MEZE-
REUM TRIBE.

THYMELÆ, Jussieu.

1 Character.—Calyx inferior, tubular, coloured; the limb four-cleft, five-cleft, with an imbricated aestivation. Corolla none, or sometimes 
ke petals in the orifice of the calyx. Stamens definite, inserted in the 
its orifice, often eight, sometimes four, less frequently two; when 
in number to the segments of the calyx or fewer, opposite to them; 
two-celled, dehiscing lengthwise in the middle. Ovary solitary, with 
ary pendulous ovule; style one; stigma undivided. Fruit hard, dry, 
like, or drupaceous. Albumen none, or thin and fleshy; embryo 
t; cotyledons plano-convex; radicle short, superior; plumule inconspis-
—Stem shrubby, very seldom herbaceous, with tenacious bark. Leaves 
t stipules, alternate or opposite, entire. Flowers capitulate or spiked, ter-
ner axillary, occasionally solitary (R. Brown).

—The prevailing property of the plants of this order is acridity.
DAPH'NE MEZE'REUM, Linn., L. E. D.—COMMON MEZEREON OR SPURGE-Olive.

Sex. Syst. Octandria, Monogynia.

(Radicis cortex, L.—Root-bark, E.—Cortex, D.)

History.—Tragus\(^b\) is the earliest author who mentions this plant. He calls it *Thymelaea*. The *mezereon* of Avicenna\(^d\), and of Arabian authors, is declared, by C. Bauhin, to be *Chamelea trica* (now called *Cneorum tricoccon*), a plant of the order Euphorbiaceae, but it is probably identical with the *χαμέλαια* of Dioscorides, who is declared by Sibthorpe\(^a\) to be *Daphne oleoides*.


Sp. Char.—Flowers naked on the stem, sessile, about three together. Leaves lanceolate, deciduous (Smith).

Stem bushy, four or five feet high, with upright, alternate, smooth, tough, and pliant branches; leafy while young. Leaves scattered, lanceolate, smooth, two inches long, appearing after flowers, and soon accompanied by flower-buds for the next season. Flowers highly, and to many persons too powerfully, fragrant, set in little tufts on the naked branches, with several brown, scale-like bracts underneath. Calyx like a corolla in texture, crenate all over; the tube, externally hairy. Berries scarlet. There is a variety with white flowers, and the berries also vary to a yellow-orange hue.

Hab.—Indigenous. Plentiful near Andover. Flowers in May.

Description of the Bark.—The bark of the root (cortex radis mezeræ) is alone employed in this country. It is tough, pliable, fibrous; externally brown and corrugated; internally white and cottony. Its taste is at first sweetish, afterwards highly acrid: it has no odour. In Germany the bark of the stem and larger branches removed in spring, folded in small bundles, and dried for medicinal use.

Composition.—The bark of the stem was analyzed by C. G. Gmelin and Bär\(^f\), and found to consist of wax, an acrid resin, daphnin, a resin oil, volatile oil, yellow colouring principle, uncrystallizable but fermentable sugar, nitrogenous gummy matter, reddish brown extractive, wax, free fatty acid, and malates of potash, lime, and magnesia.

I. Acrid Resin.—Obtained by boiling the bark in alcohol; when the solution cools, some wax is deposited. The supernatant liquid is to be evaporated, and the residue treated with water. The resin then left behind is dark-green and soluble in both alcohol and ether. To this substance mezereon owes its acridity. There is, however, some reason to suspect that this resin is in a compound of two principles, viz. an acrid, vesicating, fixed oil, and such

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\(^a\) *Hist. Stirpium*. 1832.
\(^b\) *Sprengel, Hist. Rei Herb*. Pref. xi.
\(^c\) *Lih, 2ndns, tract. 2ndns*, cap. 404.
\(^d\) *Prod. Fl. Graec.*
ction of mezereon bark, taken in moderate quantities, some-
ppears to promote the action of the secreting and exhal-
especially the kidneys and the skin). But Dr. Alex. Russell's
not observe, upon the strictest inquiry, "that it sensibly in-
any of the secretions, more than the same quantity of any
would do." In some cases it proves laxative, where the
are easily moved, and large doses disturb and irritate the
. Richter* says, that, under the long-continued use of meze-
saliva acquires a peculiar odour. In larger doses it causes
and heat in the throat, increased saliva, pain in the stomach
els, and sometimes vomiting and purging; the stools being
ally bloody. The urinary organs are sometimes specifically
by it; irritation, analogous to that produced by cantharides,
up by it. An affection of the cerebro-spinal system (marked
feebleness, giddiness, incapability of keeping the erect
and slight convulsive movements) is occasionally brought
acquainted with any cases which have proved fatal from
of mezereon bark. Vicat mentions the case of a dropsical
whom the wood caused diarrhoea, pain, and vomiting, con-
tinned for six weeks.
—In this country mezereon is scarcely ever employed alone.
ally administered in conjunction with sarsaparilla, and is em-
as a sudorific and alterative in venereal, rheumatic, scrofulous,
tonic cutaneous diseases. Decoction of the root-bark of
was recommended to the notice of the profession, by Dr.
er Russell, as a very efficacious remedy in cases of venereal
and nocturnal pains. Dr. Home also speaks of it as "a pow-
substant in all venereal tumors, of the scirrhous kind, where
that the mezereum has not the power of curing the venereal disease in any one stage, or in any one form." Dr. Cullen employed it with success in some cutaneous diseases.

As a topical remedy, it is sometimes applied to relieve pain. It is occasionally used as a masticatory. Dr. Withde mayo cured a case of difficulty of swallowing (arising from a putrid affection) by mezereon, which he directed to be chewed freely.

In France the bark of both Daphne Mezereum and D. Gnidium is used as a vesicatory. The mode of applying it is this:—First, rub the bark by soaking it in hot vinegar and water, and then apply the part by a compress and bandage. The application is renewed night and morning, until vesication is produced.

ADMINISTRATION. — Mezereon is administered in the form of a decoction. As a masticatory, two grains of the bark may be chewed.

ANTIDOTE.—In a case of poisoning by mezereon, evacuate the contents of the stomach as speedily as possible, and give emetics, opiates, and the vegetable acids. To counteract inflammation, the usual antiphlogistic treatment should be adopted.

DECOCTUM MEZEREI, E. D.; Decoction of Mezereon.—[Mezereum bark, in chips, 3ij.; Liquorice root, bruised, 3ss.; Water, Oij.; wine-measure, D.] Mix them, and boil down with a gentle heat until a pint and a half [two pints wine-measure, D.] and strain.—A diaphoretic and sudorific. Used in chronic rheumatism, and secondary syphilis. Dose f'siv. to f'svij. three or four times a day.

OTHER MEDICINAL THYMELACAE.

1. Daphne Gnidium is the θυμελαια, or Thymelea, of Dioscorides, who is the θυμελαια, or Gnidium berry, used by Hippocrates. Its properties are similar to those of D. Mezereum. In France the bark (called garon) is used in the way before described, as a vesicatory.

2. Daphne Laureola is an indigenous plant, having yellowish-green and black berries. Its effects are analogous to the last-mentioned species.

3. Lagetta linaria, or the Lance Bark Tree, possesses the medicinal properties of mezereum, and has been used in the same cases. Its bark is separated into 20, 30, or more laminae, which are fine and white, like gauze; these, caps, ruffles, and even whole suits of ladies' clothes, have been made from it.

ORDER XXXIV.—POLYGONACEÆ, Lindley.—THE BUCKWHEAT TRIBE.

Polygona, Jussieu.

Essential Character.—Calyx free, simple, persistent, monosepalous, divided; the segments imbricate in aestivation, disposed in a double row.
RHEUM.

1178

opposite the sides of the ovary, the outer opposite the angles. Stamens sit, inserted into the base of the calyx. Anthers two-celled, four-furrowed, being laterally by a double chink. Ovary one, free. Styles numerous, stigmas numerous, sessile. Carpophyll, or nut, one-seeded, generally triangular or less covered by the calyx. Embryo generally lateral, sometimes terminal, often curved. Albumen farinaceous. Radicle distinct from the hilum. Herbaeous plants, rarely shrubs. Stems nodose. Leaves alternate, sheath- or adnate to an intrafoliaceous sheath or ochrea: revolute when young. Gall.)

STYLES.—Oxalic acid is an abundant product of this order. In the free or rather in the form of a supersalt, it exists in the leaves and petioles, which it communicates refreshing refrigerant qualities. In the root of herb it is found in combination with lime. Tannic acid is another important principle of this order; it exists in the roots, the stems, and the leaves, giving matter, in considerable quantity, exists in the roots. In many cases the roots are purgative. Some species of Polygonum contain a volatile acid principle. Nutritive (mucilaginous) matters are yielded by several species.

RHEUM, Linn.—ONE [OR MORE] UNDETERMINED SPECIES, E.

Rheum palmatum, L. D.—R. undulatum, D.

Sec. Syst. Enneandra, Monogynia.

(Radix, L. E. D.)

STORY.—Dioscorides* speaks of a root which he calls Rha con (ράχον), and which has been regarded by some as identical our rhubarb; but the description he has given of it does not tally with the latter substance, and it is therefore fair to presume some root must be meant. "Rha, by some called Rheon, grows," Dioscorides, "in those countries which are beyond the Bosporus, and from which it is brought. It is a root which is black externally, like to great centauries, but smaller and redder, odourless, or spongy, and somewhat smooth internally." Pliny* gives a more exact account of it, under the name of Rhacoma: it comes, he says, from the countries beyond Pontus, resembles the black costus, is fleshy, and has a hot, astringent taste. Prosper Alpinus† was of opinion that the Rha of Dioscorides was the root of Rheum Rha cum, which Alpinus obtained from Thracia, in 1608 A. D., cultivated at Pavia. The later Greek writers are supposed to have confused it with our rhubarb. Alexander of Tralles‡ is the first who speaks of it. He used it in weakness of the liver and jaundice. Paulus Aegineta seems to make a distinction between the Rheon and Rhacon. For, he says, that in the crudities and vomiting of women, we may give "the blood-wort, boiled in water, for a time; and likewise dill, and the Pontic root, called Rha in the dialect of that country." In noticing the practice of the ancients, he adds: "Alvine discharges they promoted by giving turpentine to the

* Lib. iii. cap. 11.
* De Rhabon, 1012.
* Lib. viii. cap. 3.
extent of an olive, when going to rest; or, when they wish to
purge more effectually, by adding a little rhubarb" [Rheun].
This is the first notice of the purgative properties of rhubarb.

In one of the Arabian authors (Mesue, the younger) we find
kinds of rhubarb mentioned:—The Indian, said to be the best
Barbarian; and the Turkish, which is the worst of all.

Botany. Gen. Char.—Calyx petaloid, six-parted, withering
minae about nine, inserted into the base of the calyx. Styles
refracted. Stigmas peltate, entire. Achenium three-cornered, with
the withered calyx at the base. Embryo in the centre of the
albumen (Lindley).

It is not yet ascertained what species of Rheum yields the officinal
Rhubarb. Several species, now cultivated in this country, have been at different
times declared to be, partially or wholly, the source of it. Formerly, Rheum Rheum
was supposed to yield it. In 1732, R. undulatum was sent from Russia to the Messrs. Jussieu
and Rand of Chelsea, as the true rhubarb. This is the species which
Bonne introduced as R. Rhabarbarum. About 1750, at the desire of Kattowit, the
first physician to the Emperor of Russia, the senate commissioned
a Tartarian merchant, a dealer in rhubarb, to procure them some
species of Rheum, which were obtained; namely, the undulatum and the palmae.
1762, seeds of the latter species were received by Dr. Hope, of Edin.
from Dr. Mounsey, at Petersburg: they were sown, and the plants came
with success. The root of this species being found to agree, in many
characters, with that of genuine rhubarb, led to the belief that the plant was the true species. The inquiries of Pallas, however, raised some
suspicion about the correctness of this opinion; for the Buchanans declared that the
plant was not acquainted with the leaves of the palmae, and described the true
rhubarb as having round leaves, with a few incisions only at the margin. This description was not agreeable with Rheum compactum, the roots of which were declared, by
Georgi, who cultivated the plant, to be as good as foreign rhubarb. Cossack pointed out to him the leaves of the R. undulatum as the true
rhubarb. These accounts were not satisfactory to the Russians; and in consequence
1790, Sievers, an apothecary, went to Siberia, under the auspices of CR
II., with a view of settling the question; but, after four years of patient attempts to reach the country where the true rhubarb grew, or even to collect the seeds, he was obliged to be satisfied with negative results only; in his travels," says he, "as well as acquaintance with the Buchanans, have
me that as yet nobody—that is, no scientific person—has seen the true
rhubarb. All that is said of it, by the Jesuits, is miserable, confused stuff.
from those of the Knight Murray down to the flower-pot of a private impr
will never yield true rhubarb. Until further determination, I hereby de
the descriptions in all the Materia Medica to be incorrect."

Himalayan rhubarb is obtained from several species of Rheum: viz. R.
Wallachii; R. Webbianaum, Royle; R. spiciforme, Royle; and R. Mooreri.
Royle. But there are no reasons for supposing that they yield any of

\* Ibid. ch. 43.
\* Ibid.
\* Hope, Phil. Trans. vol. ix, for the year 1765, p. 290.
\* Murray, 365-6.
\* Ibid. p. 369.
\* Duncan, Suppl. to the Edinb. New Disp. p. 89.
\* Bot. Mag. 3. 3968
and European commerce. It is not improbable that the species yielding official rhubarb is yet undescribed. Dr. Royle, after referring to the accounts of different authors, as to the precise locality of the country yielding Asian rhubarb, concludes that it is within 95° of E. long. in 35° of N. latitude—it is, in the heart of Tibet. And he adds, "as no naturalist has visited this, and neither seeds nor plants have been obtained thence, it is as yet unknown what species yields this rhubarb." Further, it is probable, I think, that Russian and Chinese rhubarbs are procured from different species.

Mr. Anderson, of the Apothecaries' Botanic Garden, Chelsea, has kindly furnished me with the fresh roots of thirteen species of Rheum: viz. R. palmatum, undulatum, compactum, Rhaponticum, Emodi, crassinerium, capiicum, tataricum, oclum, confluens, Fischeri, bardanifolium, and bullatum. Having carefully dried or by artificial heat, I found that one species only, viz. R. palmatum, closely resembled Asiatic rhubarb in the combined qualities of odour, colour, and flavour. R. undulatum agreed tolerably well in colour and marbling, but not in ir. It deserves, however, to be noticed that the specimens examined were of equal ages,—some forming the rootstock, others root-branches of the respective plants,—a circumstance which considerably diminishes the value of a comparative examination of them. Furthermore, all the samples were probably dried by the wet season. The root-branches of R. crassinerium (from a strong stock) of six or seven years old, but which had not flowered, did not resemble Asiatic rhubarb in either colour or odour.

Species. 1. Rheum palmatum, Linn. L. D.—"Leaves roundish-ovate, half palmate; the lobes pinnatifid, acuminate, deep dull green, not wavy, but uneven, and very much wrinkled on the upper part, hardly scabrous at the edge, minutely downy on the under side; as completely closed; the lobes of the leaf standing forwards and it. Petiole pale green, marked with short purple lines, terete, securely channelled quite at the upper end. Flowering stems taller than those of any other species" (Lindley).—Perennial. Grows spontaneously in the Mongolian empire, on the confines of China. Extensively cultivated near Banbury, in Oxfordshire, for the supply of English rhubarb to the London market. Its leaf-stalks make excellent tarts and puddings. Prof. Guibourt observes that of the sorts of R. palmatum, undulatum, compactum, and Rhaponticum, those of the first species only possess the exact odour and taste (grittiness excepted) of the China rhubarb. But rhubarb procured from this species cultivated in England is distinguished by several characters from Asiatic rhubarb. How far these may be the result of climate I am not prepared to say.

2. Rheum undulatum, Linn. D.—"Leaves oval, obtuse, extremely wavy, deep green, with veins purple at the base, often shorter than the petiole, distinctly and copiously downy on each side, looking as if frosted when young, scabrous at the edge; sinus open, wedge-shaped, with the lower lobes of the leaves turned upwards. Petiole downy, blooded, semicylindrical, with elevated edges to the upper side, which is narrower at the upper than the lower end" (Lindley).—
Perennial. Grows in Siberia (Georgi and Pallas, cited by Murray), and China (Ammann, quoted by Lindley). Cultivated in France, and yields part of the French rhubarb. It was formerly cultivated in Siberia as the real officinal plant; but, as genuine rhubarb could not be procured from it, its cultivation has been given up.

3. RHEUM COMPACTUM, Linn.—“Leaves heart-shaped, obtuse, very wavy, deep green, of a thick texture, scabrous at the margins, quite smooth on both sides, glossy and even on the upper side; sides nearly closed by the parenchyma. Petiole green, hardly tinged with red, except at the base, semicylindrical, a little compressed at the sides, with the upper side broad, flat, bordered by elevated edges and of equal breadth at each end” (Lindley).—Perennial. Grows in Tartary and China. Cultivated in France, and yields part of the French rhubarb. This rhubarb is a very fair imitation of that from China; but is distinguished by its reddish tint, its different odor (common to it, to R. undulatum, and R. rhaponticum), its close, radiated marbling, its not tingling the saliva, and its not grating under the teeth.

4. RHEUM EMOVI, Wallich; R. australi, Don.—“Leaves cordate, acute, dull green, but little wavy, flattish, very much wrinkled, distinctly rough, with coarse short hairs on each side; sinus of the base distinctly open, not wedge-shaped, but diverging at an obtuse angle, with the lobes nearly turned upwards. Petioles re
rough, rounded angular, furrowed; with the upper side depressed, bordered by an elevated edge, and very much narrower at the upper than the lower end" (Lindley).—Perennial. Grows on the Himalayas. Its stalks make excellent tarts and puddings.

5. RHEUM WEBBIANUM.
6. RHEUM SPICIFORME.
7. RHEUM MOORCROFTIANUM.

These three are Himalayan species. R. Emodi and Webbianum furnish Himalayan rhubarb, whose properties are very different to those of officinal rhubarb.

8. R. RHAPONTICUM, Linn.—Grows in Thrace; borders of the Euxine sea; north of the Caspian; Siberia; &c. Cultivated in this country for the leaf which are used for tarts and puddings. Cultivated also in and yields part of the French rhubarb.

CRASSINERVUM, Fischer.—Habitation unknown. Its roots according to Mr. Anderson, of the Apothecaries' Garden, the colour and odour of Turkey rhubarb.

LEUCORRHIZUM, Pallas; R. nanum, Sievers.—Said to yield Imperial rhubarb.

Preparation.—The method of curing or preparing Asiatic rhubarb varies somewhat in different localities. In China it follows:—The roots are dug up, cleansed, cut in pieces, and stone tables heated beneath by a fire. During the process are frequently turned. They are afterwards pierced, strung, and further dried in the sun. In Tartary the Moguls roots in small pieces, in order that they may dry the more and make a hole in the middle of every piece, through which drawn, in order to suspend them in any convenient place, for the most part, about their tents, and sometimes among their sheep. Sievers, however, states that the roots in pieces, strung upon threads, and dried under sheds, so as to be the solar rays; and the same author tells us, that some year elapses from the time of their collection until they are for exportation.

Suggestion.—I am acquainted with six kinds of rhubarb, Russian, Dutch-trimmed, Chinese, Himalayan, English, and
1. Russian or Bucharian Rhubarb; *Turkey Rhubarb*, offic. (*radix rhussici seu muscovitici, s. bucharici, s. sibirici, s. turcici*).—This kind of rhubarb is imported from St. Petersburg. It is said formerly have been brought by way of Natolia; hence the name of *Turk rhubarb*, which it ordinarily bears in the shops.

According to the treaty entered into between the Russians and Chinese, the commerce between the two nations takes place at 2 frontiers. Kiachta is the Russian, Maimatschin the Chinese, front town. All the so-called Russian rhubarb is brought to Kiachta by Bucharian merchants, who have entered into a contract to supply the government with that drug in exchange for furs. It is conveyed on that long chain of mountains of Tartary, destitute, for the most part of woods, and which arises not far from the town of Selin, a extends to the south as far as the lake Kokonor, near Thibet. It is conveyed in woollen sacks, on camels, to Kiachta, where it is examined with much care, in the presence of the Bucharians, by an apothecary stationed at Kiachta for the purpose. The worm-eaten pieces are rejected, the others bored to ascertain their soundness, and all the damaged or decayed parts are cut away. In accordance with the terms of the contract, the pieces which do not pass the examination are burned; the remainder is then transmitted to Petersburg and from thence to us.

It is imported in boxes or cases, covered with a pitched cloth, the outside of which is a hide. The size of the pieces is various, but, in commerce, the small ones are preferred, and they are, therefore, picked out, and sold as *radix rhei turcici electa*—the large pieces and the dust being employed for powdering. Their shape is various, being angular, rounded, irregular, &c. The external appearance of many of the pieces seems to show that the cortex of the root had been shaved off longitudinally by successive strokes of a knife; hence the angular appearance of the external surface. Holes are observed in many of the pieces: some of the extend completely, others only partially, through. Those which extend only to the centre have been evidently made for the purpose of examining the condition of the interior of the pieces.

Externally the pieces are covered with a brilliant yellow-color powder, usually said to be produced by the mutual friction of the pieces in the chests, during their passage to this country; that many druggists believe it is derived from the process of *roasting* (that is, shaking in a bag with powdered rhubarb), before its exportation. The odour is strong and peculiar, but somewhat aromatic; it is considered by druggists to be so delicate, that in all wholesale drug-houses a pair of gloves is kept in the Russian rhubarb drawer, with which only are the assistants permitted to handle the pieces. When chewed it feels gritty under the teeth, from the presence of numerous crystals of oxalate of lime: it communicates

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yellow colour to the saliva, and has a bitter, slightly astringent taste.

Under the dust with which the pieces are covered, the surface is reddish-white tint, owing to the intermixture of white and red. The yellowish-white parts have the form of lines or veins, by their union with each other, assume a reticular form. Irregularly scattered over the surface we observe small star-like spots impressions, of a darker colour. The transverse fracture is pitted, and presents numerous brownish-red or dark carmine-red undulating veins. The longitudinal fracture is still more pitted, and shows the longitudinal direction of the veins, which are interrupted with white. The surface obtained by cutting is a little yellow, and often exposes the veins, disposed in groups. Boiling very thin slices of the root in water, and then submitting them to the microscope, we observe cellular tissue, annular ducts, and numerous conglomerate raphides (clumps of crystals of oxalate of lime). From 100 grs. of Russian rhubarb, Mr. Quckett procured between 35 and 40 grs. of these raphides. Turpin considered the presence of these crystals sufficient to distinguish Russian and Chinese rhubarb from that grown in Europe; but in some specimens of English rhubarb I have met with these crystals in as great abundance as in foreign rhubarb. According to Raspail they are situated in the interstices of the elongated cellular tissue; but this statement is erroneous, the situation of the crystals being in the interior of the cells.

A powdered sample of Russian rhubarb is of a bright yellow colour, with a red tint; but, as met with in the shops, it is almost invariably brownish with the powder of English rhubarb.

Chinese or Imperial Rhubarb.—When Pallas was at Kiaucha, the Chinese merchants who supplied the crown with rhubarb, brought pieces of rhubarb as white as milk, with a sweet taste, and the properties as rhubarb of the best quality. It is not met with in European commerce as a distinct kind; and it is almost unknown in this country. But in the chests of Russian rhubarb there are occasionally pieces having an unusually white appearance: these I presume to be the kind alluded to. White rhubarb is said to be the produce of a wild species, R. nanum, Sievers.

Stem-trimmed or Batavian Rhubarb, offic. (Rhubarbe de Perse, Batavia). This kind of rhubarb is closely allied to, if not identical with, the preceding in its texture. In commerce, however, it is regarded as distinct. It is imported from Canton and Singa-

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* Chinn, *Organ.*
* Voyages, t. iv. p. 218.
* Consoli, *Gambel und Kaiser, Pharm. Warenkunde.*
pore in chests, each containing from 130 to 140 lbs. It is pro-
Bucharian rhubarb of less fine quality, sent by way of Canton
mentioned by Murray*, and which, in consequence, has been un-
confounded, by pharmacological writers, with Chinese rhubarb
shape, size, and general appearance, it resembles the Russian
for the cortical portion of the root seems to have been separate
slicing, and hence the pieces have the same angular appear-
surface that the Russian rhubarb has. The pieces are fre-
perforated, and in the holes are found the remains of the cut
which the root has been suspended. In the drug-trade this rhubarb is said to be trimmed, and, according to the shape
pieces, they are called flats or rounds. The colour and weight
pieces are variable.

3. China or East Indian Rhubarb, offic. (radix rhei chinensis,
dict.)—This kind is imported either directly from Canton, di-
crectly by Singapore and other parts of the East Indies, and is part
the produce of China (especially of the province of Se-tcho-
Halde: of Hoo-nan and Hoo-pih, as well as other provinces;
laffe and Reed). It is imported in chests. The pieces are free
cylindrical or roundish, but sometimes flattened; in trade they
are distinguished as rounds and flats. They appear to have under
a different process of preparation to that of Russian rhubarb.
the cortical portion of the root seems rather to have been s
than sliced off, and hence the surface is not so angular; and
worst pieces we observe the remains of the greenish-brown or
ish cortex. Among druggists this kind of rhubarb is frequently
half-trimmed or untrimmed rhubarb. The pieces are generally
rated with holes, in many of which we find portions of the co
which the pieces were suspended. These holes are smaller
those observed in Russian rhubarb, and that portion of the
forming their sides is usually dark-coloured, decayed, and of l
quality. The best pieces are heavier and more compact than
the Russian kind; they are covered with an easily separable
dust. When this is removed we observe that the surface is no
regularly reticulated, is more of a yellowish-brown than reddish
colour, and has coarser fibres than Russian rhubarb. On th
pieces we notice numerous star-like spots or depressions. Th
ture is uneven; the veins, especially towards the middle, have
determinate direction, and are of a duller or reddish-brown
and, in very bad pieces, of an umbre-brown colour, with a
stance between the veins.

The odour of this species is much less powerful than that of
sian rhubarb, and is somewhat less aromatic. The taste, gu
when chewed, and microscopic appearances, are similar to th
Russian rhubarb. The colour of the powder is of a more dull
or brownish cast.

4. Himalayan Rhubarb.—This is the produce probably of
Emodi, and Webbianum. The roots of R. spiciforme, and Mo
RHEUM. 1181

are lighter coloured and more compact in structure. My
seeds were furnished by Dr. Wallich, who obtained them from
inhabitants of the Himalayas, who had strung the pieces around
the necks of their mules. It has scarcely any resemblance to the
true rhubarb. The pieces are cylindrical, and are cut obliquely
down the extremities; the cortex of the root is not removed; the colour
is dark brown, with a slight tint of yellow; they are without odour,
and have a coarse fibrous texture. Dr. Royle 6 says that the Him-
layan rhubarb makes its way into the plains of India through Kalsee,
Kara, and Butan: it has, he adds, a spongy texture, and sells for
one-tenth of the price of the best rhubarb, resembling in quality
Russian, and which is found in India. Dr. Royle has kindly sup-
plied me with the dried roots of R. Webbianum, the same as those re-
served to the experiments of Mr. Twining 8. They are short, trans-
verse segments of the root, branches, of a dark brownish colour, odour-
or nearly so, with a very bitter astringent taste, and do not essen-
tially differ from the roots given me by Dr. Wallich.

English Rhubarb (radix rhei anglicae).—Two kinds of rhubarb are
sold in the shops under the name of English rhubarb: one is
med or trimmed, so as to resemble the Russian kind, and is, I be-
lieve, the produce of Rheum palmatum; the other is sometimes called
a rhubarb, and is said by Messrs. Stephenson and Churchill 9 to be
drawn from Rheum undulatum; but I suspect this statement to be
incorrect.

The dressed English rhubarb is the produce of Banbury, in Ox-
fordshire 1. It is the kind frequently observed in the show-bottles of
apothecaries' windows, and was formerly sold in Cheapside and the
Gt. Marlborough St. by persons dressed up as Turks. It
ars in various-sized and shaped pieces, which are trimmed and
perforated, so as to represent Russian rhubarb: some of
these pieces are cylindrical in their form, and are evidently segments of
the root; others are flat. This kind of rhubarb is very light,
 especially in the middle of the pieces), attractive of moisture,
and under the pestle, and has a reddish or pinkish hue not observed
in other kinds. Internally it has usually a marbled appear-
ance; the streaks are pinkish, parallel, and have a radiated disposi-
tion; and in the centre of some of the larger pieces the texture is
and woody, and may be easily indented by the nail. Its taste is
tingent and very mucilaginous; it is not at all, or only very slightly,
and under the teeth: its odour is feeble, and more unpleasant than
the Russian or East Indian kinds. The microscope discovers
it, for the most part, very few crystals of oxalate of lime.

The common stick English rhubarb is sold in herb shops. It oc-
curs in angular or roundish pieces, of about five or six inches long,
and an inch thick. When fractured it presents the radiated appearance, and the red-coloured streaks, of the kind last mentioned. Its taste is astringent, but very mucilaginous: it is not gritty under the teeth; it breaks very short.

English rhubarb is extensively employed by druggists to adulterate the powder of Asiatic rhubarb.

6. French Rhubarb (radix rhei gallici).—This kind of rhubarb is procured from Rheum rhaponticum, undulatum, and especially compacum. These are cultivated at Rheumpole, a place not far from Lorient, in the department of Morbihan. Rheum palmatum is no longer cultivated there. Through the kindness of Professor Guibourt I possess two kinds of French rhubarb. One of these he calls for and is probably the produce of R. rhaponticum; the other he termed round, and is the produce of R. compactum.

Commerce.—In 1831, the quantity of rhubarb imported from Russia was 6,901 lbs.; from the East Indies, 133,462 lbs. The quantities of rhubarb on which duty (1s. per lb.) has been paid during the last six years, are as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>East Indian</th>
<th>Foreign</th>
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<tr>
<td>1835</td>
<td>39,315</td>
<td>10,447</td>
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<td>1836</td>
<td>36,136</td>
<td>7,732</td>
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<tr>
<td>1837</td>
<td>44,069</td>
<td>5,946</td>
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<tr>
<td>1838</td>
<td>57,035</td>
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<td>1839</td>
<td>22,575</td>
<td>12,333</td>
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<td>1840</td>
<td>16,745</td>
<td>23,203</td>
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Composition.—The most important analyses of rhubarb are those of Schrader, N. E. Henry, Brande, Hornemann, Peretti, Buchner and Herberger, Lucae, O. Henry, and Brandes.

One hundred grains of the finest Russian Rhubarb, according to Mr. Brande, lost 44.2 grs. by being repeatedly digested in alcohol (sp. gr. 0.815). By evaporation the alcoholic solution yielded a residue of 36 grains (the loss 82 grs. may be ascribed to water), of which 10 grains (resin?) were insoluble in water.

The rhubarb left after the action of alcohol weighed when dried at 21.1 55.7 grs. It yielded to water 31 grains (gum?). The insoluble residue, weighing 24.8 grs., must have consisted of woody fibre, oxalate of lime, &c. It has been already stated (p. 1179) that Mr. Quicquet obtained from 35 to 40 per cent. of oxalate of lime from Russian Rhubarb.

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1 Guibourt, Hist. des Drogs. t. i. p. 309.
2 Purl. Ret. No. 596, for 1833.
3 Trade List.
5 Bull. d. Pharm. vi. 87.
8 Journ. de Pharm. xiv. 536.
9 Pharm. Central-Blatt für 1831, S. 789.
10 Ibid. für 1854, S. 78.
11 Journ. de Pharm. xxii. 403.
12 Pharm. Central-Blatt für 1856, p. 483.
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The table contains various entries, possibly related to various subjects or data points, but without clearer context, exact interpretation is challenging. The rows likely represent different categories or measurements, though the specific details of each entry are not immediately clear from the image alone.
1. Odorous Matter of Rhubarb (Volatile Oil?)—In none of the uses rhubarb is any mention made of an odorous principle; yet such was Professor Guibourt's, however, ascribes the odour, colour, and taste to one and the same principle; but this opinion can scarcely be correct, as the degrees of colour and odour bear no proportion to each other in kinds of rhubarb. The odorous principle is probably a volatile oil, but not hitherto been isolated. Dr. Bressy announced, a few years since, to the Académie de Médecine, that he had separated it, but the committee was unable to procure it by his process." Zeno that the rhubarb odour is imitated by a mixture of nitric acid, aloe, and iron.

2. Yellow Colouring Matter of Rhubarb (Rhabarberic acid, Rheinum, Hornemann; Rhabarberin, Geiger; Rhein, Auctor.)—Extra rhubarb in powder by means of ether, and obtained by distilling off a part of the ether from the tincture thus procured, and leaving the spontaneous crystallization. The crystals are purified by repeated solvent crystallizations in alcohol. When dry, they assume the form of having an intensely yellow colour, but being without any remarkable Rhabarberic acid is unchanged in the air; heated, it fuses into a yellow which, by a continuance of the heat, becomes reddish-brown, evolve yellow fumes [pyro-rhabarberic acid?], and carbonizes. It requires 1000 parts of cold water to dissolve it, but is twice as soluble in boiling. It is more soluble in alcohol and in ether: the solutions redder litmus, oil of almonds and in oil of turpentine it is slightly soluble, but is not so when these liquids are hot. It dissolves, with a dark-red colour, in and in nitric acids: water precipitates it from these solutions with Nitric acid attacks it with great difficulty. Alkaline solutions make it and generally (lime-water excepted) dissolve it. Alum renders it insoluble. The alkaline solutions of its form, with acetate of lead, chloride of calcium, chlorides of barium, yellow precipitates; with sulphate of copper, violet after some time, becomes blue. Brandes regards rhabarberic acid as a principle of rhubarb. Six grains of the pure acid given to a strong person caused graying, but did not purge. Dulk is of opinion that the active part of rhubarb is a difficulty crystallizable substance, which he terms a which, by oxidation, becomes Rhabarberic acid. This acid, according to and Leber, consists of $C_{20}H_{18}O_{19}$.s

3. Astringent Matter (Tannic and Gallic acids).—The red veins are of the astringent matter. This is proved by brushing the cut surface of a weak solution of a ferruginous salt: the red veins only undergoes of colour. From the observations of Brandes, it appears that rhubarb gallic, as well as tannic, acid.

4. Bitter Principle.—Rhubarb contains a bitter principle; but it is a substance which have been announced as the bitter principle of rhubarb, the name of caphopicrite (from καφώρ, I exhalc, and χύσος, bitter), or Ῥ, are themselves compounded of two or more principles. Thus, Pffeiffer consists of uncrystallizable sugar, extractive, resin, rhabarberic acid, and Henry's rhabarber thus consists of resin and rhabarberic acid. Buchner and Hen's rhabarber is a mixture of extractive, uncrystallizable sugar, and rhabarberic acid. Carpenter's rhabarber contains some rhabarberic acid. It would from the analysis of Brandes that the bitter principle is of the nature but Buchner admits the existence of a bitter extractive (caphopicrite), soluble in water and alcohol, but is insoluble in ether. This extractive is in intimate combination with rhabarberic, tannic, and gallic acids;
was thus formed being the resin of some chemists. It is obvious, therefore, that a further examination of the bitter matter is required to make out satisfactorily its nature.

3. RHEUMATIN.—A yellow, crystallizable, odourless, tasteless substance, raised from the root of European [English?] rhubarb. It is insoluble in cold water, ether, and the volatile oils, but soluble in 24 times its weight of boiling water, and twice its weight of absolute alcohol.

4. OXALATE OF LIME.—The conglomerate raphides before noticed (p. 1179) are crystals of oxalate of lime. They may be separated in great abundance by adding Russian or China rhubarb in water until the cohesion of the tissue is completely destroyed. When the decomposed tissue is well shaken with water, the crystals fall to the bottom of the vessel. Heated to redness, they are changed to carbonates of lime. A solution of them in diluted nitric acid, or a solution obtained by boiling the crystals with a solution of carbonate of soda, forms, with nitrate of silver, a white precipitate (oxalate of silver), which explodes when heated.

Chemical Characteristics.—If the powder of rhubarb be heated in a glass capsule over a lamp, an odorous yellow vapour (rhabarberic pyro-rhabarberic acid) is obtained, which communicates a red tinge to a solution of caustic potash. The aqueous infusion of rhubarb forms, with the sesquichloride of iron, a green compound (tannate of iron); with a solution of gelatin, a copious yellow precipitate (tannate of gelatin), which is dissolved on the application of heat, or by the addition of an excess of gelatin; with a solution of phate of quina, a yellowish precipitate (tannate of quina); with alkalies (potash, soda, and ammonia) a red-coloured solution (alkaline rhabarberates); with lime-water, a reddish precipitate (rhabarberate of lime); with the acids (the acetic excepted), precipitates (composed of rhabarberic acid and the precipitant); and with various metallic solutions (as of acetate of lead, protocloride of a, protonitrate of mercury, and the nitrate of silver), precipitates (chiefly metallic rhabarberates and tannates).

Paper coloured by rhubarb is not affected by boracic acid, or by borates rendered acid, whereas tumeric paper is reddened by these agents. A decoction of Russian, Dutch-trimmed, or of China rhubarb, becomes, with a solution of iodine, greenish-blue (iodide of starch); after a few minutes the colour disappears, and no iodine can be detected in the liquor by starch, unless nitric acid be previously added. A decoction of English rhubarb is rendered, by a solution of iodine, intensely blue (iodide of starch), the colour not completely disappearing by standing.

Physiological Effects. a. On Animals.—On the Solipedes rhubarb acts as a tonic, confining its action principally to the stomach, where digestive power it augments. On the Carnivora it operates, in doses of half a drachm, in the same way; but, in doses of several drachms, as a purgative. On the larger Herbivora it may be given to the extent of several ounces without causing purgation.

Tiedemann and Gmelin detected it by its yellow colour in the serum of

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1 Berzelius, Traité de Chim. vi. 305.
3 Meiroum, Pharm. Vetcr. p. 360.
the blood of the mesenteric, splenic, and portal veins, and in
dogs, to which rhubarb had been administered by the
They failed to recognise it in the chyle.

β. On Man.—In small doses (as from four to eight grains)
as an astringent tonic, its operation being principally or whi
tined to the digestive organs. In relaxed conditions of these
promotes the appetite, assists the digestive process, impre
quality of the alvine secretions, and often restrains diarr
large doses (as from a scruple to a drachm) it operates, sole
mildly, as a purgative, sometimes causing slight griping.
inflames the mucous membrane of the alimentary canal,
scammony, colocynth, and some other drastic purgatives, are
of doing. The constipation which follows its cathartic ef
been ascribed to the operation of its astringent matter. In
complaints and inflammatory diseases it sometimes acceler
pulse, and raises the temperature of the body, whence the im
of its use in these cases. Its yellow colouring matter (rha
acid) becomes absorbed, and may be recognised in the urin
yellow stain which this secretion produces on linen, and by
colour which it assumes on the addition of potash. By a m
longed use of rhubarb the sweat (especially of the armpits)
tinged yellow. The milk of nurses who have taken it, ac
purgative property. Rhubarb has for a long period been co
to possess a specific influence over the liver, to promote the s
of bile, and to be useful in jaundice. These opinions, which
Cullen correctly observed, have no foundation either in the
practice, arose from the absurd doctrine of signatures.

Considered in relation to other medicinal agents, rhubarb
intermediate rank between the bitter tonics on the one hand,
drastics on the other. From the first it is distinguished by it
properties; from the latter, by its tonic operation and th
ness of its evacuant effects. As a purgative it is perhaps
closely allied to aloes than to any other cathartic in ordi
but is distinguished by its much milder operation, and its
any specific action on the large intestines.

The comparative power of the several kinds of rhub
scarcely been ascertained with precision. The remarks abo
apply to the Russian and Chinese varieties, whose power is
equal. From experiments made by Dr. Parry, at the Bath H
it appears that the purgative qualities of the English rhub
are much greater than those of the Russian and Chinese varie
mentioned qualities render rhubarb peculiarly valuable as a purgative. In mild cases of diarrhoea it sometimes proves particularly efficacious; by first evacuating any irritating matter contained in the bowels, and afterwards acting as an astringent. Given at the commencement of the disease, it is a very popular remedy; and though harmless it is often employed unnecessarily (since, as Dr. Cullen has truly observed, in many cases no further evacuation is necessary or safer than what is occasioned by the disease) yet it rarely if ever does harm. Sulphate of potash is a very useful adjunct to it, and promotes its purgative operation. Antacids (as chalk or magnesia) are frequently conjoined with it. It is not fitted for inflammatory or acute cases. As an infant's purgative it is deservedly celebrated.

It is well adapted for a variety of children's complaints; but is peculiarly adapted to scrofulous subjects and those afflicted with enlargement of the mesenteric glands, accompanied with tumid belly and leprophy. Magnesia, sulphate of potash, or calomel, may be associated with it according to circumstances. For an ordinary purgative in habitual costiveness it is scarcely adapted, on account of the constipation which follows its purgative effect.

2. As a stomachic and tonic.—In dyspepsia, accompanied with a debilitated condition of the digestive organs, small doses of rhubarb sometimes prove beneficial, by promoting the appetite and assisting the digestive process. In scrofulous enlargement of the lymphatic glands, in children, rhubarb, in small doses, is often combined with mercurial alteratives (as the hydrargyrum cum cretido), or with antacids (as magnesia or chalk), and frequently with apparent advantage.

3. As an external application.—Sir Everard Home used it as a topical application to promote the healing of indolent, non-painful ulcers. The powder is to be lightly strewn over the ulcer and a compress applied. In irritable ulcers an eighth part of opium is to be added. When applied to large ulcers it has produced pretty active purging.

The powder of rhubarb, incorporated with saliva and rubbed on the abdomen, proves purgative.

Administration.—The powder of Russian or China rhubarb may be exhibited, as a stomachic and tonic, in doses of from five to ten grains; as a purgative, from a scruple to a drachm. The dose of indigenous rhubarb should be about twice as much as the above.

By roasting it with a gentle heat, till it becomes friable [Rheum borefticum], its cathartic power is diminished, and its astringency supposed to be increased” (Lewis).

1. INFUSUM RHEI. L. E. D.: Infusion of Rhubarb. — (Rhubarb, sized [in coarse powder, E.]; 5iij. [9i. E.; 9i. D.]; Boiling [distilled, L.]; Water, Oj. [Oss. wine measure, D.; 6xviiij. E.]) [Spirit of Cinnamon, tis. E.]. Macerate for two hours in a lightly-covered vessel, and strain [through linen or calico, E.].—Boiling water extracts from rhubarb, rhubarberic acid, resin, tannin, gallic acid, sugar, extractive, and starch. As the liquor cools it becomes turbid, owing to some rhubarberic acid, resin, tannin, gallic acid, and tannate of...
starch being deposited (Brandes). Infusion of rhubarb is strong and gently purgative. It is usually employed as an adjunct for other mild purgatives or tonics. The alkalies or ma are sometimes conjoined. The stronger acids and most spirituous solutions are incompatible with it.—Dose, fʒ. to fʒj.

2. TINCTURA RHEI, E.; Tincture of Rhubarb.—(Rhubarb, in rately fine powder, ʒiṣ. ; Cardamom Seeds, bruised, ʃʒ. ; Spirit, Oj. Mix the rhubarb and cardamom seeds, and proceed with the process of percolation, as directed for tincture of cinchona. Tincture may also be prepared by digestion.—The alcoholic t of rhubarb contains rhabarberic acid, impure rhabarberic acid, yellow colouring matter of rhubarb), taunin, semi-resin, a crystallizable sugar (Brandes). Cordial, stomachic, and mild purgative.—Dose, as a stomachic, fʒ. to fʒj.; as a purgative to fʒj.

3. TINCTURA RHEI COMPOSITA, L. D.; Compound Tincture of Rhubarb.—(Rhubarb, sliced, ʒiṣ. ; Liquorice, bruised [ʃʃ. D.]; Saffron, ʒiṣ. ; Ginger, sliced, ʒiṣ. ; Cardamom Seeds, ʃʃ. D.), Proof Spirit, Oj. [wine measure, D.] Macerate fourteen [seven, D.] days, and strain.—Cordial, stimulant, stomachic, and mildly purgative. A popular remedy in various disorders of the alimentary canal, especially at the commencement of diarrhoea, also in flatulent colic. It is a very useful adjunct to purgative mixtures, in cases in which the use of a cordial and strong cathartic is required.—Dose, as a stomachic, fʒ. to fʒj.; as a purgative, fʒʃ. to fʒʃj.

4. TINCTURA RHEI ET ALOES, E.; Tincture of Rhubarb and Aloes.—(Rhubarb, in moderately fine powder, ʃʃ. ; Socotrine Indian Aloes, in moderately fine powder, ʒv.; Cardamom bruised, ʒv.; Proof Spirit, Oj. Mix the powders, and proceed as directed for the tincture of cinchona).—A cordial and stomachic purgative in doses of from fʒʃ. to fʒj.

5. TINCTURA RHEI ET GENTIANAE, E.; Tincture of Rhubarb and Gentian.—(Rhubarb, in moderately fine powder, ʒi.; Gentian cut or in coarse powder, ʃʃ.; Proof Spirit, Oj. Mix the powders and proceed as directed for tincture of Cinchona).—Stomachic, and feebly purgative.—Dose, as a tonic, fʒ. to fʒj.; as a very purgative, fʒʃ. to fʒj.

6. VINUM RHEI, E.; Wine of Rhubarb.—(Rhubarb, in coarse powder, ʒv.; Canella, in coarse powder, ʒi.; Proof Spirit, fʒv.; Oj. and fʒxv. Digest for seven days, strain, express strong residuum, and filter the liquors.)—Cordial, stomachic, and a purgative. Used in the same cases as the compound tincture of rhubarb.—Dose, as a stomachic, fʒ. to fʒj.; as a purgative, fʒʃ.

7. EXTRACTUM RHEI, L. E. D.; Extract of Rhubarb.—(Rhubarb powdered, ʃʃv. [βj. D.]; Proof Spirit, Oj. [wine measure, D.]; filled Water, Ojv. [wine measure, D.] Macerate for four days in a gentle heat, afterwards strain, and set by, that the dregs may
our off the liquor, and evaporate it, when strained, to a consistence. L. D.—The process of the Edinburgh College is as follows:—Take of Rhubarb, lbj.; Water, Ov. Cut the rhubarb into small fragments; macerate it for twenty-four hours in three pints of water; filter the liquor through a cloth, and express it with a press or otherwise moderately; macerate the residuum with the same water for twelve hours at least; filter the liquor with the press as before, and express the residuum strongly. The littered again, if necessary, are then to be evaporated together and expressed in the vacuum-bath. The extract, however, of finer quality by evaporation in a vacuum with a gentle heat, are prepared in the above process. Great care is required in the preparation of this extract, as both the purgative and red properties of rhubarb are very apt to become deteriorated by keepers. I have some extract prepared in vacuo more than three weeks ago, which still preserves the proper odour and flavour of rhubarb. The dose of extract of rhubarb, as a purgative, is from 3 to 5 drams.

**ULES RHEI, E.**; **Rhubarb Pills.**—Rhubarb, in fine powder, 1 oz.; Acetate of Potash, one part; Conserve of Red Roses, 1 oz. Beat them into a proper mass, and divide it into five-grain pills. Stomachic and purgative. The acetate of potash is added, I presume, to prevent the pills becoming hard by keeping. It contains nearly three and a half grains of rhubarb.

**ULES RHEI COMPOSITAE, E.**; **Compound Pills of Rhubarb.**—Rhubarb, powdered, 3 j. [twelve parts, E.]; Aloes, powdered 3 j. [six parts, E.]; Myrrh, powdered, 3 s. [six parts, E.]; Soap, 3 j. [six parts, E.]; [Oil of Caraway, 1 s.]; Oil of Peppermint, one g. Syrup, q. s. [Conserve of Red Roses, five parts, E.]. Mix the ingredients, beat them into a proper mass, and divide this into five-grain pills. This pill may be also made without oil of peppermint, if preferred, E. Tonic and mildly purgative. Dose 3 j. or 5 j.

**ULES RHEI ET FERR, E.**; **Pills of Rhubarb and Iron.**—Sulphate of Iron, four parts; Extract of Rhubarb, ten parts; Conserve of Red Roses, about five parts. Beat them into a proper mass, and divide it into five-grain pills.—Tonic. Dose, two to three.

**ULVIS RHEI COMPOSITUS, E.**; **Compound Powder of Rhubarb.**—Rhubarb, lbj.; Ginger, in fine powder, 5 j. Rhubarb, in fine powder, 1 oz. Mix them thoroughly, and preserve the powder in well-closed bottles. A very useful antacid and mild stomachic purgative, specially adapted for children. Dose, for adults, 3 j. to 5 s.; for children, gr. v. to gr. x.
2. RU'MEX ACETO'SA, Linn. L. D.—COMMON SORREL.  

Sex. Syst. Hexandria, Trigynia.  
(Folia, L. D.)

Botany. Gen. Char.—Calyx six-parted; the three outer sepal somewhat cohering at the base; the three inner becoming so after flowering. Stamens six. Styles three, reflexed. Anther three, cut. Nut with three sharp angles. Embryo on one side. Radicle superior (Bot. Gall. for the most part)  

Sp. Char.—Flowers dioecious. Leaves oblong, arrow-shaped. Manent petals tuberculated (Smith).  


Description.—Sorrel leaves have an agreeable, acid, and astringent taste.  

Composition.—I am unacquainted with any analysis of this plant. The leaves are composed of binoxalate of potash, tartaric acid, salicagine, feca, chlorophyle, tannic acid, and woody fibre.  

Physiological Effects.—Slightly nutritive. Refrigerant and diuretic. Esteemed antiscorbutic.  

Uses.—Employed as a pot-herb and salad; from the latter it, it has been termed green-sauce*. Rarely applied medicinally. A decoction of the leaves may be administered in whey, as a light and pleasant drink in febrile and inflammatory diseases. In parts of Scandianvia, bread is made of it in times of scarcity. Laugier has suggested that the use of aliments containing tannic acid may, under some circumstances, dispose to the formation of mulberry calculi.

3. RU'MEX HYDROLAP'ATHUM, Hudson.—GREAT WATER DUCKWORT.  

Rumex aquaticus, D.  
(Sex. Syst. Hexandria, Trigynia.  
(Radix, D.)


Sp. Char.—Permanent petals ovate-oblong, nearly entire, unpubescent. Leaves lanceolate, acute at each end. Whorls crowded, almost entirely leafless (Smith).  


Description.—The herb and root were formerly used under the name of herba et radix britannicae. The root is inodorous, but has an acid bitter taste.  

Composition.—I am unacquainted with any analysis of this plant. The root contains tannic acid.

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* Withering, Bot. vol. ii.  
* Clarke, Travels in Scandianvia, Part. III. S. ii. p. 90. 1823.
PHYSIOLOGICAL EFFECTS.—The root is astringent, and is reputed scorbatic. Scarcely employed. Has been exhibited internally in skin diseases, and rheumatism. The powdered root has been as a dentifrice; the decoction of the root as an astringent gargle cerated or spongy gums.

POLYG'ONUM BISTORTA, Linn. D.—GREAT BISTORT OR SNAKE-WEED.

Gen. Char.—Calyx four- to six-partite, persistent. Stigmae five to nine, generally eight. Ovary with two to three styles, many stigmas. Cariopsis or nut ovate or triangular. Embryo or central; the radicle superior (Bot. Gall.)

Char. — Stem simple, with a single, spiked, cluster of flowers.


Scrip. — Bistort root (radix bistortae) is twice bent on: hence its name from bis, twice; and torta, twisted or bent. Rugous and brown externally; reddish internally; almost inus; it has an austere, strongly astringent taste.

Imp.—This root has not been analyzed. The principal tinctures are tannic acid, starch, oxalate of lime, colouring matter, woody fibre.

Ph. Physiological Effects.—The local effect is that of a powerful agent, depending on the tannic acid which it contains; its remote acts are those of a tonic (vide p. 186). The presence of starch is a nutritive: hence in Siberia it is roasted and eaten.

Uses.—It is but little employed. A decoction of the root is sometimes applied as an astringent injection in leucorrhoea and gleet; a gargle in spongy gums and relaxed sore throat; and as a lotion ointment attended with a profuse discharge.

Internally it has been employed, in combination with gentian, in fevers. It has also been used as an astringent in passive swellings and chronic alvine fluxes.

Administration.—The dose of the powder is from 9j. to 5ss. The decoction (prepared by boiling 9j. of the root in 8j. of boiling water) may be administered in doses of from 3j. to 3j.
ORDER XXXV.—CHENOPODIACEÆ, Lindley.—THE GOOFOOT TRIBE.

Atriplices, Jussieu.—Chenopodes, Vcnetat.

The substance called Barilla (impure carbonate of soda), described as being obtained by the combustion of plants belonging to the genera Salicornia, Salix, and Chenopodium. None of the Chenopodiaceae are employed in this country. Some few are used as pot-herbs or salads, as Spinach (oleracea) and Beet (Beta vulgaris).

ORDER XXXVI.—LABIATE, Jussieu.—THE MINT TRIBE.

Lamiaceae, Lindley.

Essential Character.—Calyx tubular, inferior, persistent, the odd tooth next the axis; regular five- or ten-toothed, or irregular bilabiata or ten-toothed. Corolla monopetalous, hypogynous, bilabiata; the sepal divided or bissed, overlapping the lower, which is larger and the Stamens four, didynamous, inserted upon the corolla, a with the lobes of the lower lip, the two upper sometimes anthers two-celled; sometimes apparently uniting, consequence of the confluence of the cells at the apex; one cell altogether obsolete, or the two cells by a bifurcation of the connective. Ovary deeply seated in a fleshy hypogynous disk; the lobes each one erect ovule; style one, proceeding from the base of the lobes of the ovary; stigma bifid, usually acute. Fruit four small nuts, enclosed within the persistent calyx, erect, with little or no albumen; embryo erect; cotyledons—Herbaceous plants or shrubs. Stem four-cornered opposite ramifications. Leaves opposite, divided or undivided, without stipules, replete with receptacles of aroma. Flowers in opposite, nearly sessile, axillary cymes, reass whorls; sometimes solitary, or as if capitulate (Lindley).

Properties.—The medicinal activity of the plants of this family depends on volatile oil, bitter extractive, and astringent matter.

The volatile oil resides in small receptacles (by some called globules) contained in the leaves. "These glands are placed quite superficially, or in depressed points, and are commonly of a shining yellow colour. We regard them as oleo-resinous matter separated from glands lying on the surface. When macerated in strong spirit of wine they remain unchanged; they appear under the microscope as transparent, probably cellular, vesicles with a yellow granular matter." The oils of labiate plants, like other oils, consist of elaeotene and etaropene: it is the latter substance described by some chemists as camphor.

The bitter extractive is found, in greater or less quantity, in all the Labiates. It is this principle which communicates the bitterness to the watery infusions of these plants.

The presence of astringent matter is shown by the green colour produced when a ferruginous salt is added to the infusion of some of the Labiatae.

The volatile oil gives to these plants aromatic, carminative, and slight

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1 See Goebel's analysis of the ashes of many species of this order in the Pharmaceutisc!. Blatt. für 1830, S. 377. Also Guibourt's analysis of the ashes of Salica Tragum in the Pharm. t. xxvi. p. 264.

GARDEN LAVENDER.

1. LAVAN'DULA VE'RA, De Cand. E.—COMMON OR GARDEN LAVENDER.

Lavandula angustifolia, Ehrenberg.—Lavandula Spica, L. D.

Sex. Syst. Didynamia, Gymnosperma.

(Flowers, L. D.—The flowering heads; and volatile oil of ditto, E.)

History.—No plant is mentioned, under the name of Lavender, Hippocrates, Theophrastus, Dioscorides, or Pliny. It is not improbable, however, that lavender may be alluded to, under some other name, by one or more of these authors; but it is impossible now to identify it with any certainty. Sprengel delares, on the authority of auctius, that the 'spoon' of theophrastus is Lavandula Spica.

Botany. Gen. Char.—Calyx tubular, nearly equal, fifteen or less fifteen-ribbed, shortly five-toothed, with the four lower teeth nearly equal, or the two lower narrower; the upper either but little less than the lateral ones, or expanded into a dilated appendage. Upper lip of corolla two-lobed; lower three-lobed; all the divisions nearly equal. Stamens didynamous, declinate. Filaments smooth, erect, not toothed. Anthers reniform, one-celled (Condensed from Linnam; Lindley).

Sp. Char.—Leaves oblong-linear or lanceolate, quite entire, when dry hoary and revolute at the edges. Spikes interrupted. Whorls of six to ten flowers. Floral leaves rhomboid-ovate, acuminate, puberulous, all fertile, the uppermost shorter than the calyx. Bracts scarcely any (Bentham).—Shrub, one to two feet high. Flowers spikish-gray.

Lavandula Spica, De Cand. (L. latifolia, Villars) or French Lavender, formerly considered as a variety only of the preceding species, is not used in medicine. It is distinguished by its lower habit, whiter colour, the leaves more congested at the base of the branches, the spike denser and shorter, the floral leaves lanceolate or linear, and the presence of bracts (Bentham). It yields by distillation of spike (oleum spica) sometimes called foreign oil of lavender, or in order to distinguish it from the oil of Lavandula Stoechas, the true oil of spike (oleum spica). This oil is distinguished from the genuine oil of Lavandula vera by its green colour, and its less grateful odour. It is used by painters on porcelain and by artists in the preparation of varnishes.

Hab.—South of Europe. Extensively cultivated at Mitcham, Surrey, from which place the London market is principally supplied.

Properties.—Lavender flowers have a bluish-gray colour, a pleasant odour, and a pungent bitter taste. The flowering stems are collected in June or July, dried in the shade, and made up into bundles for sale. A cold infusion of the flowers is deepened in color (tannate of iron) by sesquichloride of iron.

Composition.—The principal constituents of the flowers are volatile oil, resin ?, tannic acid, a bitter principle, and woody fibre.

Volatile Oil (see below).

Physiological Effects.—The flowers are carminative, mildly stimulant, and somewhat tonic. Kraus says, that when taken internally, they cause tormentia ventris.

Uses.—Lavender flowers are sometimes employed as Erick. They enter into the composition of the pulvis asari compositus (p. 1188). The following are the officinal preparations, with the uses, of lavender flowers:

1. Oleum Lavandule, L. E. D.; Oleum Lavandulae verae: Eng. Oil of Lavender, offic.—(Prepared by submitting lavender flower distillation with water). It has a pale yellow colour, a hot taste, a very fragrant odour. Its sp. gr. varies from 0.877 to 0.905; lightest oil being the purest. It boils at 397° F.; and is composed according to Dr. Kane, of C₁₁₂ H₁₄ O₁₁. One pound of oil is obtained from fifty to seventy pounds of the flowers. When the stalks and leaves are distilled with the flowers, the odour of the oil is considerably deteriorated. It is a stimulant and stomachic, and is sometimes given in hysteria and headache; but is more commonly employed as a perfume for scenting evaporating lotions, ointments, emulsions, &c.—Dose, gtt. ij. to gtt. v.


Lavender Water.—The fragrant perfume sold in the shops, under the

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1 Holmstett, p. 472.
SPEARMINT.

lavender Water, is a solution of the oil of lavender and of other odoriferous
ances in spirit. There are various formulæ for its preparation, scarcely two
facturers adopting precisely the same one. The following yields a most
cent product:—Oil of Lavender, Oil of Bergamot, aa. f 3 iij.; Otto of Roses,
Cloves, an. gtt. vj.; Musk, gr. ij.; Oil of Rosemary, f5ij.; Honey, 3j.;
Acid. 3ij.; Rectified Spirit, 0j.; Distilled Water, 3ij. Mix, and, alter-
ing a sufficient time (the longer the better), filter. This agreeable perfume
employed for scenting spirit washes, &c. but is principally consumed for
 Estimates.

FINCTURA LAVANDULAE COMPOSITA, L.; Spiritus Lavandule
situs, E. D.; Lavender Drops or Red Lavender Drops, offic.
 of Lavender, Ojss. [Oij. E. Oiij. wine-measure, D.]; Spirit of
mary, Oss. [f3xij. E. Oij. wine-measure, D.]; Cinnamon, bruised,
[5j. E.]; 3ijs. D.]; Nutmeg, bruised, 3ijss. [3ss. E.; D.]; [Cloves,
d, 3ij. E.; D.]; Red Sandal [Saunders, offic.]; Wood, raspings, 3v.
E. 3j. D.] Macerate for fourteen [seven, E. ten, D.] days, and
[through calico, E.]; Stimulant, cordial, and stomachic. It
y to relieve gastric uneasiness, flatulence, low spirits, lan-
faintness, &c. A favourite remedy with hysterical and hypo-
tical persons.—Dose, from f3ss. to f3ij. administered in water
sugar. The red Saunders wood is merely a colouring ingre-

2. MENTHAs VIRIDIS, Linn. L. E. D.—SPEARMINT.

Sex. Syst. Didynamia, Gymnospermia.

(herba, D.—Herb, B.)

STORY.—Hippocrates employed in medicine a plant which he
Minthē; but it is uncertain what particular species he referred to.
count of its agreeable odour it was also called Ἡλικοζνυς (from
weet; and ὁμις, smell), a name by which Dioscorides' design-
it. Strabo tells us that Minthē was a concubine of Pluto, and
she was changed by Proserpine into a plant, which was called
ther. Ovid also alludes to this fable.

BOTANY. Gen. Char.—Calyx campanulate or tubular, five-toothed,
or somewhat two-lipped, with the throat naked inside or villous.
with the tube enclosed, the limb campanulate, nearly equal,
pleat: the upper segment broader, nearly entire or emarginate.
enses four, equal, erect, distant; filaments smooth, naked; anthers
two parallel cells. Style shortly bifid, with the lobes bearing
mas at the points. Achenia dry, smooth (Bentham).

* P. 359, &c. ed. Foss.
* Lib. iii. cap. 41.
* Metamorph. lib. x. ver. 729.
Sp. Char.—Stem erect, smooth. Leaves subsessile, ovate-late, unequally serrated, those under the flowers all broader rather longer than the whorls; last and the calyxes hairy or Spikes cylindrical, loose. Present, or the lowest of them distant (Bentham).—Creeping rooted.

Hab.—Marshy places. Indigenous to the milder parts of Europe, also of Africa and Asia. Perennial. Flowers in August, collected for medicinal use when about to open.

Properties.—The whole plant called green-mint or spearmint (Mentha viridis), is employed in medicine. It has a strong but pleasant odour, and an aromatic, bitter taste, followed by a sense of coolness when air is drawn into the mouth. Sesquichloride of iron gives a green colour (tannate of iron) to the cold watery infusion.

Composition.—Its odour and aromatic qualities depend on the oil. It also contains tannic acid, resin, a bitter principle, and woody fibre.

Volatile Oil. (See p. 1197.)

Physiological Effects.—Aromatic, carminative, mildly stimulant and tonic. Feebler than Peppermint. Said, though without sufficient foundation, to check the secretion of milk, and to act as an emmenagogue.

Uses.—Employed as a salad and sweet herb. In medicine, principally used as a flavouring ingredient, and to allay indigestion, prevent colicky pains. The following are its officinal preparations with their uses:

1. Infusum Menthe Simplex, D.; Infusion of Spearmint; Spearmint Tea. (Spearmint leaves, dried, 5ij.; Boiling water, a sufficient quantity to afford six ounces of strained liquor).—Stomachic, carminative. Used in irritable conditions of the stomach;ordinarily a vehicle for other remedies.—Dose, 3ij. to 4ij. ad libitum.

2. Infusum Menthe Compositum, D. Compound Infusion of Spearmint. (Spearmint leaves, dried, 3ij.; Boiling Water, a sufficient quantity to afford six ounces of strained liquor. Digest for an hour in a covered vessel, and, when the liquor has grown cold, then add Refined Sugar, 3ij.; Oil of Spearmint, gtt. iij. dissolv. *
OLEUM MENTHAE VIRIDIS, L. E. D. Oil of Spearmint.—(Obtained by submitting the fresh herb to distillation with water.) It is pale yellowish colour, but becomes reddish by age. It has the colour and taste of the plant, and is lighter than water; sp. gr. 0.914. boils at 320° F.; and is composed, according to Dr. Kane, of C₁₃₄ O₂. The average produce of the essential oil is not more than 20th of the fresh herb. It is carminative and stimulant. Dose, f₃j. to f₅j. to gtt. v. rubbed with sugar and a little water.

SPIRITUS MENTHAE VIRIDIS, L. D. Spirit of Spearmint.—(Oil of spearmint, ʒii; [by weight, ʒss. D.]; Proof [Rectified, D.] t, Cong. j. [wine measure, D.] ; Water, Oj. [as much as may be requisite to prevent empyreuma, D.]. Mix them; then, with a slow boil, let a gallon distil). Dose, f₃ss. to f₅j. —This preparation has no antivertigo effect, while it is much weaker than the more simple and antidiarrhoea, the essence of spearmint of the shops.

DISTILLATION OF SPEARMINT.—Dissolve f₃j. of Oil of Spearmint in f₃j. of Rectified Spirit. It may be coloured green by spearmint or spinach leaves. Dose, gtt. x. to xx. taken on sugar or in water.

AQUA MENTHAE VIRIDIS, L. E. D. Spearmint Water.—(Spearmint leaves, if dried, lb. ʒj.; if fresh, lb. iv. [or Oil of Spearmint, ʒjj.]. Proof Spirit, ʒjj. [Rectified Spirit, f₃jj. E.]; Water, Cong. j. Let a gallon distil. The Dublin College employs no spirit; distils a gallon of water from lb. jss. of herb).—Spearmint water usually made extemporaneously by suspending or dissolving a lbm of the oil in four pints of distilled water, by means of a lbm of rectified spirit and a lump of sugar (see p. 258). Spearmint water is carminative and stomachic. It is commonly used as a stimulant for other medicines. Its dose is f₃j. to f₅jj.

3. MEN'THÀ PIPERÌTA, Linn. L. E. D.—PEPPERMINT.

SEX. SYST. Didynamia, Gymnospermae.

(Herb, D.—Herb; Volatile oil, E.)

HISTORY.—This plant was probably introduced into medicine in last century; at least Hill in 1751, says that it “has lately got great esteem;” and Geiger says, it was introduced into Germany as a medicine, through the recommendations of the English, in latter half of the last century.

BOTANY. Gen. Char. —See Mentha viridis.

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² Hist. of the Nat. Med. p. 328.
Sp. Char.—Stem smooth. Leaves petiolated, ovate-oblong, serrate, rounded-crenate at the base, smooth. Spikes lax, short, interrupted at the base. Pedicels and calyx at the smooth; teeth hispid (Bentham).—Creeping-rooted.

Hab.—Watery places. Indigenous. Extensively cultivated Mitcham, in Surrey, from whence the London market is principally supplied. Found in various parts of Europe; also in Asia, and America.

Properties.—The whole herb (herba menthae piperite) is of an aromatic, pungent, bitter, and cooling nature. It has a peculiar aromatic odour, and a warm, burning, bitter taste, followed by a sensation of coolness when air is drawn into the lungs. The Sesquichloride of iron communicates a green colour (tannine-like) to the cold infusion of peppermint.

Composition.—The principal constituents are volatile oil, a bitter principle, tannic acid, and woody fibre.

Volatile Oil (see below).

Physiological Effects.—Peppermint is an aromatic or carminative, stimulant, and stomachic. It is the most agreeable and effective of all the mints.

Uses.—It is employed in medicine for several purposes, especially to expel flatus, to cover the unpleasant taste of other medicaments, to relieve nausea, griping pain, and the flatulent colic of children. The following are the official preparations, with their uses:

1. Oleum Menthae Piperitae, L. E. D.; Oil of Peppermint

(Obtained by submitting the fresh herb to distillation with water. It is colourless, or nearly so, sometimes having a pale yellowish or greenish tint, and becoming reddish by age. It has a peculiar odour like that of the plant, and a burning aromatic taste, followed by a sensation of coldness. The vapour of it applied to the eye gives rise to a feeling of coldness. English Oil of Peppermint is superior to the foreign kind. Its sp. gr. is 0.902. It boils at 365° F.; according to Dr. Kane, of C_21 H_20 O_9. The stearoptene of oil of peppermint is isomeric with the liquid oil. Action of oil of vitriol it yields a light oil called menthen (C_10 H_10 O + C_20 H_20 O_3). In a warm, dry, and favourable climate, the produce of oil from a given quantity of the fresh herb, is about three drachms and a half of oil from two pounds of fresh mint, and the smallest about a drachm and a half from the same quantity. I was informed by a distiller at Mitcham, that seven mats of the herb (each mat containing about 1 cwt.) yield from seven lbs. of oil. It is carminative and stimulant, and is useful occasionally as an antispasmodic. It is taken on sugar, in doses of gtt. ii. to gtt. v.)

2. Spiritus Menthae Piperitae, L. D.; Spirit of Peppermint

(Prepared with the Oil of Peppermint, in the same way as the latter.)

AQUA MENTHAE PIPERITAE, L. E. D. — (Prepared with the herb oil of peppermint in the same way as the *Aqua Menthae viridis*). Used to relieve flatulence, and as a le for other medicines. Dose, $\frac{1}{3}$j. to $\frac{1}{3}$ij.

Besides the above, there are several popular preparations of peppermint extensively used.

*Infusum Menthae piperitae* (Peppermint Tea) is prepared in the same way as mint tea.

*Eleoraccharum Menthae piperitae*, Ph. Bor., is prepared by mixing $\frac{1}{4}$j. of the sugar, in powder, with gtt. $\frac{1}{3}$xvi. of the oil of peppermint.

*Rota Menthae piperitae* (in plano-convex masses, called peppermint drops,—attenuated circular disks, termed peppermint lozenges) should consist of sugar of peppermint only, though flour is sometimes introduced.

*A liqueur* sold at the spirit-shops as *mint* or *peppermint* is used as a cordial (*364*).

**4. MEN’THA PUL‘EGIUM, Linn. L. E. D.—PENNYROYAL.**

**Sex. Syst. Didynamia, Gymnosperma.**

*(Herba, D.—Herb, K.)*

**HISTORY.**—This plant was employed in medicine by the ancients and Romans. It is the *Γυμνάς* of Hippocrates and Dioscorides, and the *Pulegium* of Pliny.

**BOTANY.** *Gen. Char.*—See *Mentha viridis*.


**Rab.**—Wet commons and margins of brooks. Indigenous. A native of most parts of Europe, of the Caucasus, Chili, and Teneriffe.

**Properties.**—The herb with the flowers (herba seu summitas pubes) is employed in medicine. It has a strong but peculiar odour; hot, aromatic, bitter taste, followed by a feeling of coolness in the mouth. Sesquichloride of iron causes a green colour (tannate of iron) to the cold infusion of pennyroyal.

**Composition.**—Its principal constituents are *volatile oil, a bitter diter, resin 2, tannic acid, and woody fibre.*

*P. 235*, &c. ed Foss.

*Lib. iii. cap. 36.

*I Nat. Nat. lib. xx cap. 54, ed Valp.*
VOLATILE OIL (see below).

PHYSIOLOGICAL EFFECTS.—Its effects are analogous to the mints. Emmenagogue and antispasmodic properties are ascribed by the public, and formerly by medical practitioners.

USES.—A popular remedy for obstructed menstruation, hysteric complaints, and hooping-cough. Rarely employed by the professional man. The following are its officinal preparations, with uses:—

1. OLEUM MENTHAE PULEGII, L. E. D.; Oleum Pulegii, offic. of Pennyroyal.—(Obtained by submitting the herb to distillation with water.)—It has a pale colour, a warm taste, and the peculiar odour of the herb. It boils at 395° F. Its sp. gr. is 0·925; and it is prepared, according to Dr. Kane, of C\textsuperscript{10} H\textsuperscript{8} O. The fresh herb yields from 1-120th to 1-100th of its weight of oil\textsuperscript{1}. It is stimulant, carminative, and is used, as an antispasmodic and emmenagogue. Doses of from gtt. iij. to gtt. v. taken on sugar.

2. SPIRITUS MENTHAE PULEGII, L.; Spiritus Pulegii, Sp. of Pennyroyal.—(Prepared with Oil of Pennyroyal as the Sp. Menthae viridis).—Usually prepared by dissolving the oil in Stimulant and carminative. Employed as an antispasmodic and carminative.—Dose, iij. to fsij.

Essence of Pennyroyal (prepared by dissolving fsij. of the volatile oil of rectified spirit) may be given in doses of from gtt. x. to gtt. xx.

3. AQUA MENTHAE PULEGII, L. E. D.; Aqua Pulegii, offic.; Pulegii Water.—(Prepared with the herb or oil like Aqua Menthae viridis).—Carminative and stomachic.—Dose, iij. to fsij.

The liquid sold in the shops as Pennyroyal and Hysteric Water is prepared by adding iij. of the compound spirit of bryony to OSS. of petrolatum water.

5. ROSMARINIUS OFFICINALIS, Linn. L. E. D.—COMMON ROSMARY.

Sex. Spat. Diandria, Monogynia.

(Cacuminia, L. D.—Tops, E.)

HISTORY.—The Λίβανωρις στεφανωματικῆ, or Libanotis corona-rius, is supposed to be our officinal rosemary, which received its name, Λίβανωρις (from Λίβανος, Thus) on account of its odor, στεφανωματικῆ (στεφανωματικός, corona-rius) from its use in crowns and garlands. Pliny\textsuperscript{th} calls it Rosmarinum. The flowers are termed anthoς (from ἀνθος, a flower), signifying they are the flowers of excellence; just as we call cinchona the bark, and the inspissation of the poppy, opium (i.e. the juice).

BOTANY. Gen. Char.—Calyx ovate-campanulate, two-lipped, upper lip entire, the lower bifid, the throat naked within.
COMMON ROSEMARY.

... protruding tube, smooth and not ringed in the inside, somewhat thickened in the throat; limb bilabiate; lips nearly equal, the lower spreading, trisected, with two lobes erect, the middle lobe large, and hanging down. No rudiments of the superior stamens; inferior ones, two, ascending, protruding. Filaments inserted at the base. Anthers abbiocular; cells straggling, confluent, connate at the upper lobe of the style very short. Stigmas minute, Achenes dry, smooth (Bentham).

S.-The only species. Leaves sessile, linear, revolute at the tip beneath. Calyx purplish. Corolla white or pale purple.

South of Europe; also Asia Minor.

Fruits.—The flowering tops (cuminum rosmarinum) are the parts. They have a strong and remarkable odour, and a bitter taste.

Position.—The peculiar odour and flavour of this plant depend on the oil. Besides this, the tops contain tannic acid, a bitter resin, and woody fibres.

OIL (see below).

MEDICAL EFFECTS.—Carminative and mildly stimulant, as to the other labiate plants.

Rarely employed medicinally. Infusion of rosemary (rosmarinus) is sometimes used as a substitute for ordinary tea by hypochondriacs. The admixed flavour of Narbonne honey on the bees collecting this substance from the rosemary plants is said in the neighbourhood of Narbonne: hence sprigs of the plant are sometimes added to the honey of other places, in order to improve the flavour of Narbonne honey.

OLIUM ROSMARINI, L. E. D.; Oleum Anthos, offic.; Oil of Rosemary. Prepared by submitting the rosemary tops to distillation with alcohol. This oil was first procured by Raymond Lully. It is a colourless, yellowish oil, with the odour of rosemary, and a hot, burning taste. Its sp. gr. is 0.897; and it boils at 365° F. It contains no metallic matter, and is not frequently used externally, in conjunction with other substances, as a stimulating liniment; for example, in alopecia, and also as a perfume. Dose, gtt. ij. to gtt. v.


2 Brande, Dict. of Nat. Med. p. 46.
with a gallon of Spirit [Rectified, E.; Proof, wine-measure, D.], so as to obtain seven [five, D.] pints of the distilled spirit. It's usually prepared merely by dissolving the oil in spirit, distillate being superfluous. Seldom employed internally. Its principal use is as an odoriferous adjunct to lotions and liniments. It is a constituent of the Linimentum Saponis (p. 568), and Tinctura Lavandulae composita (p. 1195).

Aqua Hungarica; Aqua Rosmarini seu Anthos composita; Hungary Water.—Various formulae for the preparation of this perfume have been given. The following is from the Pharm. Wurtem. and Bav. :-Take of fresh Rosemary, a blossom, lbs. iv.; fresh Sage, in blossom, 3½j.; Zingiber, 3½j. Cut into pieces and add Rectified Spirit, lb. xij.; Common Water, Oij. Let eleven pints heat by a gentle heat. A hermit is said to have given the formula for the preparation of this perfume to a queen of Hungary; whence this water has been called the Queen of Hungary's water (Aqua Regina Hungarica). Hungarian water is frequently imitated by mixing Spirit of Lavender, 1½xj., with Spirit of Rosemary, 3½j. This liquid is employed principally as a perfume for the toilette; also as an excitant and restorative in fainting. Externally it is used as a stimulating liniment.

6. ORIG’ANUM VULGA’RE, L. E. D.—COMMON MARJORAM.

Sex. Syst. Didynamia, Gymnospermia.
(Herb, E.—Oleum ex herba, D.)

History.—Several kinds of 'Opiyvoc are mentioned by the Graec and Latin writers, but their descriptions are too vague to enable us to determine with precision the particular plants referred to.

Botany. Gen. Char.—Calys ovate, tubular, ten to thirteen-nerved, striated, with five equal or three superior scarcely longer teeth; throat villous within. Tube of the corolla almost the length of the calyx, or scarcely longer; limb sub-bilabiate; upper limb nearly erect, emarginate; the lower spreading, trifid, with nearly equal lobes. Stamina four, protruding, distant, somewhat didynamous, the lower ones longer. Style cleft at the point into two nearly equal parts. Achenia dry, somewhat smooth (Bentham).

Sp. Char.—Erect, villous. Leaves petiolate, broad-ovate, obtuse, subcordate, rounded at the base, green on both sides. Spikes oblong or cylindrical, clustered in corymbose panicles. Bracts ovate, obtuse, coloured, half as long again as the calyx (Bentham).—Creeping-rooted. Flowers light purple.

Hab.—In bushy places, on a limestone and gravelly soil. Indigenous. A native of several parts of Europe; also of Asia. Flowers in July and August.

Properties.—The whole herb (herba origani) is officinal. It has a peculiar aromatic odour, and a warm, pungent taste. Sesqui-chloride of iron produces a green colour (tannate of iron) with the cold infusion of origanum.

Composition.—Volatile oil, resin?, tannic acid, a bitter principle, and woody fibre, are the principal constituents of this plant.

Physiological Effects.—Stimulant and carminative, like the other labiate plants.
SWEET MARJORAM.

—Principally employed to yield the volatile oil. The dried leaves have been used as a substitute for China tea. The infusion has been administered in chronic cough, asthma, and rheumatism.

ORIGANI, L. E. D.; Oil of Common Marjoram; Oil of Origanum.—(Obtained by submitting the herb to distillation with water). As imported it has a red colour, of which it may be by redistillation. Mr. Whipple has shown me a sample, oblique him, which was as colourless as water. The taste of this is at least; its odour that of the plant. It boils at 354° F., and is a, according to Dr. Kane, of C^50 H^60 O. Its sp. gr. is 0.867. A rage produce of essential oil from the herb is one pound to hundred weight; but it varies exceedingly with the season of the plant. It is a powerful acrid and stimulant; applied to carious teeth by means of lint or cotton, to relieve mixed with olive oil, it is frequently employed as a ng liniment against alopecia or baldness, rheumatic or paraplegias, sprains, bruises, &c.

MAJORANA HORTENSIS, Munch. —SWEET MARJORAM.

Origanum Majorana, Linn. D.

Sex. Syst. Didynamia, Gymnospermia.

(Herba, D.)

Murray.—Some botanists regard the μαύροκολον of Hippocrates, μύχος of Dioscorides, the Amaracum or Sampsecanum of Pliny, the Majorana hortensis.

Cy. Gen. Char.—Calyx very shortly campanulate at the base; cleft superiorly, flattened and dilated, quite entire, orbicular-margin rolled in beneath the base; faces naked. Tube of Ila as long as the calyx; limb sub-bilabiate, the upper lip rect, emarginate, the lower one spreading, trifid, with almost stamens four, protruding, distant, didynamous, the inner longest. Anthers two-celled; the cells parallel, diverging, stigma straggling. Style cleft into two nearly equal parts. minute (Bentham).

Bentham.—Branchez smoothish, racemose-paniculate. Leaves pebblong-ovate, obtuse, quite entire, on both sides hoary-tomentose, pikelets obtuse, on sessile, crowded branchlets (Bentham).—purple or white.

Africa and Asia. Cultivated in kitchen-gardens.

Propert—The whole plant (herba majoranae) has a warm aro-

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2 Page 388 and 645, ed. Fuss.
3 Lib. iii cap. 47.
5 Dierbach, Archicinotti, d. Hippokrat. p. 179.
matic flavour, and a peculiar savoury smell. Its watery infusion deepened in colour (tannate of iron) by sesquichloride of iron.

Composition.—By distillation the plant yields volatile oil. Other constituents are tannic acid, resin?, bitter matter, and aglycones of the fibre.

Oil of Sweet Marjoram (Oleum Majorana) is pale yellow or brownish. It imparts a strong odour and taste of marjoram.

Physiological Effects.—Tonic and mild stimulant.

Uses.—Principally employed as a sweet herb by the cooks. Its powder is sometimes used, either alone or mixed with some other powder, as an errhine. Marjoram tea is occasionally employed as a popular remedy for nervous complaints.

8. MELISSA OFFICINALIS, Linn. E. D. — COMMON BALM

Botany. Gen. Char.—Calyx tubular, 13-nerved, generally bilobate; upper lip spreading, three-toothed; lower lip with two fauces naked or villous. Tube of corolla straight or bent, not accrescent, generally protruding; fauces bilabiate; limb bilobate, with upper lip erect, flat; the lower spreading. Stamina four, diminutive, generally approximated in pairs; upper ones sometimes minute; filaments toothless; anthers free, two-celled; connectives thickened. Achenia dry, smooth (condensed from Bentham).

Sp. Char.—Herbaceous, erect, branching. Leaves broad-ovate, truncate or cordate at the base. Whorls axillary, loose, many-sided. Bracts few, ovate. Corolla longer by half than the calyx (Bentham).

Hab. — South of France.

Properties.—The fresh herb (herba melisae) has a strong, peculiar odour, which is somewhat similar to that of lemons. By distilling, this is, for the most part, lost. The taste is aromatic, bitter, and somewhat astringent. Sesquichloride of iron gives a greyish-colour (tannate of iron) to the cold infusion.

Composition.—The principal constituents of balm are volatile oil, resin, bitter matter, gum, tannic acid, and woody fibre*.

Oil of Balm (Oleum Melissa) is pale yellow, and has the peculiar odour of balm. Its sp. gr. is 0.975. Oil of lemon is said to be frequently substituted for it.

Physiological Effects.—The effects of balm are similar to those of the labiate plants already described.

* Hist. Rei Herb. t. i, p. 106.
* Lab. iii. cap. 118.
ildness of its operation arises from the small portion of volatile
ich the plant contains.

s.—Balm tea is sometimes employed as a diaphoretic in fevers, 
exhilarating drink in hypochondriasis, and as an emmena-
ain amenorrhoea and chlorosis.

ARRU'BIIUM VULGA'RE, Linn. L. D.—WHITE HORSEHOUND.

Sex. Syt. Didynamia, Gymnospermia.

(Herba.)

Sorory. — This is the plant which is called Πάρσκον by Hippo-
,' Theophrastus, and Dioscorides; and Marrubium by Pliny.

ANY. Gen. Char. — Calyx tubular, five- to ten-nerved, equal, 
ev to ten acute, spiny teeth. Corolla with the upper lip erect, 
ver spreading and trisid, with the middle lobe broader and 
ily emarginate. Stamens didynamous, inclosed; anthers with 
atting, somewhat confluent lobes, all nearly of the same form. 
ith short obtuse lobes (condensed from Bentham).

Char. — Branches white-woolly. Leaves ovate or rounded, softly 
; greenish- or white-woolly beneath, crenate. Whorls man-
ed. Calyx villose, woolly, with ten subulate, recurved-spread-
eth. Corolla with an oblong helmet, bilid at the point (Ben-

Flowers white.

— Dry waste grounds. Indigenous. Grows in most parts of 
; also in Asia and America.—Flowers in July.

Properties. — The whole herb (herba marrubii) is used in medi-
It has an aromatic odour, and a bitter taste. Sesquichloride 
communicates an olive green tint (tannate of iron) to the cold 
infusion.

Position.—Its bitterness depends on extractive: its aromatic 
eries on volatile oil. Besides these principles it contains resin, 
cid, bitter matter, and woody fibre.

Physiological Effects.—Horehound is tonic, mildly stimulant, 
large doses, laxative. Taken in the form of infusion, it pro-
the secretions of the skin and kidneys. It was formerly sup-
to possess emmenagogue properties.

es.—It is rarely employed by medical practitioners. As a 
stic remedy it is used in chronic pulmonary complaints, 
ially catarrh. It was formerly given in uterine and hepatic 
ions.

Ministration.—Horehound tea (prepared by infusing an ounce 
herb in a pint of boiling water) is taken in the dose of a wine- 
. Syrup of horehound (prepared with the infusion and sugar) 
popular remedy, and is kept in the shops. Candied horehound 
to be made of the same ingredients.
OTHER MEDICINAL AND DIETETICAL LABIATAE.

The following species, enumerated by Loudon *, are cultivated in this as sweet herbs (see p. 181):—Common or Garden Thyme (Thymus vulgaris, Linn.), Lemon Thyme (T. citriodorus, Schreber.), Sage (Salvia officinalis, Linn.), Clary (S. Scutellaria, Linn.), Peppermint (Mentha piperita, Linn.), Spearvin (Vindis, Linn.), Pennyroyal (M. Pulegium, Common Marjoram (Origanum vulgare, Linn.), Winter Sweet Marjoram (O. heracleoticum, Linn.), Sweet Marjoram (Majorana hortensis, Moench.), Pot Marjoram (M. Onites, Benth.), Savory (Satureja montana, Linn.), Summer Savory (S. hortensis, Linn.), or Larger Basil (Ocimum Basilicum, Linn.), Bush or Least Basil (O. basilicum, Linn.), Rosemary (Rosmarinus officinalis, Linn.), and Garden Lavender (Lavandula vera, De Cand.) Some of these species have been, or are, medicine, and several of them are officinal. The general effects and uses of sweet or savoury herbs have been before pointed out.

Besides the labiate plants above described, and which are the only ones in the British pharmacopoeias, a considerable number of other species have been at different times introduced into medicinal use. Some of these are in volatile oil, but abound in a bitter principle, on which account they have been employed as stomachics and tonics: such are Water Germander (Teucrium Scordium, Linn.), Wall Germander (T. Chamaedrys, Linn.), Ground Pine (Ajuga Chamaepitys, Smith); the two last of which have been used, as I have before mentioned, as anti-arthritic remedies (p. 1138), abound in essential oil, and are consequently more aromatic, stimulant, minative; such as Cat- or Cat-Marjoram (Teucrium Marum, Linn.), Common Marjoram (Hyssopus officinalis, Linn.), Dittany of Crete (Amaracaeae Dictamnus, Be

ORDER XXXVII.—SCROPHULARIACEÆ, Lindley.—The Figwort Tribe.

PERSONATE, De Cand.—Scrophularineæ, R. Brown.

Essential Character.—Calyx free, four-divided, or more generally (by the cohesion of two) four-divided; the sepal free, or less united, or sometimes free, unequal, upper one largest; the lateral ones smallest; imbricated at the base. Monopetalous, five-divided or (by the cohesion of the two upper petals) four-divided; the tube short, or elongated; the limb expanded, nearly equal, or parti or bilabiate; imbricated at the base. Simple, opposite the sepals; the upper stamens entirely wanting, or very rarely fertile; shorter than the others; the two lateral equal and abortive; the two lower equal to, or longer than, the lateral ones, sometimes wanting. Anthers two or one-celled, dehiscing longitudinally, free, two-celled; the cells two- or many-seeded. Style simple, rarely bifid. Fruit capsular, rarely baccate, two-celled, two-seeded, dehiscing by valves or pores. Dissemination parallel, or opposite to the valves, becoming in the centre, or altogether free. Placenta adhering to the dissemination, sometimes separating when ripe. Seeds generally indefinite. Embryos placed in the albumen.—Inodorous or fetid herbs or shrubs (Masses).

Properties.—Not uniform; suspicious.

1. DIGITÁLIS PURPÚREA, Linn. I. E. D.—Purple Foxglove.

Sex. Syst. Didynamia, Angiosperma.

(Folia; Semina, L.—Folia, D.—Leaves, E.)

History.—It appears very improbable that the ancient have overlooked so common and elegant a plant as foxglove;
their writings can we find any plant whose description pres-
swers to the one now under examination. Fabricius Co-
horted that it was the Ἐφύσερον of Dioscorides, but the
men of the latter does not at all agree with foxglove. The
of the same writer has also been referred to, but with little
probability of correctness. The term Fœxglope occurs in a
neat manuscript, probably written before the Norman Con-
D. 1066), and in a MS. Saxon translation of L. Apulius;
ich are among the Cottonian manuscripts in the British
Fuchsias is usually regarded as the earliest botanist
ations this plant, which he named Digitalis (from Fingerhut,
tall, on account of the blossoms resembling the finger of a
Fuchsins states, that until he gave it this appellation, the
no Greek or Latin name.

2. Gen. Char.—Calyx five-partite, unequal. Corolla cam-
the limb obliquely four-lobed; the lobes unequal. Stamens
namous; no vestige of the fifth apparent. Stigma simple
late. Capsule ovate-acuminate (Bot. Galt.)
r.—Segments of the calyx ovate, acute. Corolla obtuse; its
scarcely cloven. Leaves downy (Smith).
aceous. Root of numerous long and slender fibres; biennial.
ct, three or four feet high, commonly simple, roundish with
right angles, downy. Leaves alternate, ovate-lanceolate or
long, crenate, downy, rugged, and veiny, of a dull green;
at the base into winged footstalks; lower ones largest.
terminal, erect, one-sided, long, simple, of numerous, large,
, odourless flowers. Corolla crimson, elegantly marked
like spots, as well as hairy, within.
ity with white flowers, spotted with shades of cream-colour
met with in gardens: it remains tolerably constant from
Indigenous: in pastures and about hedges or banks, on a
or sandy soil.
ition.—The official parts are the leaves and seeds; the
ever, are rarely employed. As some doubts have been
 as to the equal activity of cultivated specimens, wild or
ments are to be preferred.
ove leaves (Folia Digitalis).—The leaves should be gathered
plant is in the greatest perfection,—that is, just before or
period of inflorescence; and those are to be preferred
full-grown and fresh. As the petioles possess less activity
amine or expanded portions of the leaves, they ought to
Dr. Withering directs the leaves to be dried either in
, or in a tin pan or pewter dish before the fire; but the
, and, I believe, better mode of proceeding, is to dry them

* Quoted by Mentzelius, Index Nom. Plant. p. 104.
* Lib. iv. cap. xxviii.
* Lib. iii. cap. 51.
* Hist. Stirp. 1542.
* Account of the Foxglove, p. 181. 1785.
in baskets in a dark place, in a drying stove. Both dried leaves or powder should be preserved in well-stoppered bottles, covered externally by dark-coloured paper, and kept in a dark cupboard. As they undergo changes by keeping, whereby their medicinal activity is considerably diminished, they ought to be renewed annually. The foxglove leaves have a dull green colour, a faint odour, and a bit nauseous taste.

2. *Foxglove seeds (Semina Digitalis).*—The seeds of the foxglove are small, roundish, and of a grayish-brown colour.

**Composition.**—The chemistry of digitalis is in an unsatisfactory state. This arises from the inconclusive and discordant results obtained by those who have submitted this plant to chemical examination. Analyses of it have been published by Destouches, Béclard, de Villiers, Rein and Haase, Le Royer, Welding, Radig, Brantl and Poggiole. Schlesinger in 1839, analyzed the leaves of a Digitalis (*folia Digitalis ambiguæ*).

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1. **Digitalina of Lancelot** and of Radig. This substance has been observed by Radig in small crystals, whose forms were not accurately determined. It is colourless, has an acrid taste, is unchanged in the air, renders syrup of vitriol green, and restores the blue colour of redden ed litmus. It is soluble in aqueous and in acids: the solutions were very bitter, and were decomposed by water diacetate of lead, and by infusion of nutgalls. Concentrated sulphuric acid first reddens digitalina, and then makes it olive-green. By distillation it does not evolve ammonia. Dr. David found that, when from $\frac{1}{2}$ to $\frac{1}{3}$ grains of it were injected into the veins of an animal, death speedily ensues without convulsion and with the same effect upon the pulse which characterizes digitalis.

2. **Picroin (from πυκνός, bitter).**—The substance which Radig calls picroin, of which he says is identical with the digitalin of Le Royer, is bitter, hygroscopic, soluble in water, alcohol, and ether, and precipitable from its water solution by chloride of mercury, ferro-cyanide of iron, and acetate of lead. Brantl and Poggiole, however, declare the digitalin of Le Royer to be a compound of chlorophyll, resin, a fatty matter, and some traces of salts of lime and potash; and they ascribe the activity of foxglove to the combination of all the principles which this plant is composed, but especially to the resin.

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4 *Bullet. de Pharm. t. i. p. 123.
5 *Essai sur les Progrès méd. de la Digit. surymp., 3e édit. 1812.
6 *Diss. de Digit. surymp. 1812, quoted in Schwartz's *Pharm. Tabell.*
8 *Journal of the Philadelphia Coll. of Pharm.* July 1833.
10 *Journ. de Pharm. t. xxv. p. 130, 1835.
12 Ibid. 1833, p. 620.
13 *Op. supra cii.*
Hance (tannin-gallate of iron) with decoction of foxglove. It as with the tincture diluted with water. A solution of the decoction, causes, after some time, a scanty (gallate of gelatine). Tincture of nutgalls has scarcely a slight turbidness) when added to the decoction diluted with water.

Physiological Effects. a. On Vegetables.—Marcet said that if the watery extract of foxglove killed a haricot plant (Ulgeinis) in twenty-four hours.

Effects generally.—The effects of foxglove have been tried on horses, rabbits, turkeys, the domestic fowl, and frogs; has been found to act as a poison. One drachm of the powdered was given to horses as a sedative in inflammation. Two produced death in twelve hours. According to the of Orfila, the first symptoms of poisoning observed in animals is vomiting. The influence of the poison over the pulse appear to be uniform; for in some cases he found the pulse unaltered, in others accelerated, while they were retarded. In the horse killed by two ounces the pulse was 130 per minute, a short time before death the standard pulse of the horse being 40 or 42 per minute. cerebro-spinal symptoms observed in animals, are muscular power, convulsive movements, tremors, and .

The powder acts as a local irritant, giving rise to of parts to which it is applied (Orfila).

b.—We may, for convenience, establish three degrees of effect, or that produced by small and repeated doses, sometimes affects what are termed the organic functions, ordering the animal or cerebro-spinal functions. Thus we
the diuresis, at others nausea, and occasionally the affection of the circulation, being the first obvious effect.

The influence of foxglove over the circulation is not at all constant. In some cases the frequency of the pulse is augmented, in others decreased, while in some it is unaffected. Lastly, in a considerable number of instances, the pulse becomes irregular or intermittent under the use of foxglove⁵. A few drops of the tincture will, in some cases, reduce the frequency of the pulse, and render it irregular or intermittent, while in other instances much larger doses may be taken without any obvious effect on it. Dr. Withering⁶ mentions one case in which the pulse fell to 40, and I have several times seen it reduce to 50. In some cases the slowness of the pulse is preceded by an increased activity of the vascular system. From Sandras’s⁷ report this would appear to occur more frequently after small than large doses of foxglove. Dr. Sanders⁸ indeed asserts, that foxglove invariably excites the pulse, and refers to an experience of 2000 cases in proof. He says, that he has seen the pulse rise from 70 to 110 under the use of foxglove, and at the end of twenty-four hours, sooner, fall with greater or less rapidity to forty, or even below it. But an experience of the use of foxglove in only twenty cases, I believe, convince most persons that Dr. Sanders has fallen into an error in the sweeping assertion which he has made. A great deal, however, depends on the position of the patient. If it be desired to reduce the frequency of the pulse, the patient should be kept in a recumbent posture. The important influence of posture was pointed out, I believe, by Dr. Baildon⁹. His own pulse, which had been reduced by this plant from 110 to 40 beats per minute while he was in the recumbent position, rose to 70 when he sat up, and to 110 when he stood. We have a ready explanation of this fact. In a state of health the pulsations of the heart are more frequent (usually to the extent of five or six in the minute) in the erect than in the horizontal position; and it is very obvious that greater force is required to carry on the circulation in the former than in the latter, since, in the erect position, the heart and arteries have to send blood to the head against gravity. Now, the power of the heart being enfeebled by foxglove, when a demand is made on this viscus for an increase in the force of contractions by the change from the recumbent to the standing attitude, it endeavours to make up for a diminished force by an increase in the frequency of its contractions. I need scarcely add that the sudden change of position in those who are much under the influence of this medicine, is attended with great danger, and in several instances has proved fatal; for, in consequence of the heart not having sufficient power to propel the blood to the head against gravity, fatal syncope has been the result⁵. 

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⁵ See the statistical résumé of Sandras, Bull. de Thérap. t. vi. 
⁶ Account of the Foxglove, p. 73. 1785. 
⁸ Dr. B. W. 
⁹ Treat. on Pals. Consumption, ed. 1808. 
The important fact connected with the repeated uses of small doses of foxglove is the cumulative effect sometimes observed. It has not happened that, in consequence of the continued use of this medicine, very dangerous symptoms, in some cases in death, have occurred. The most prominent of these are depression of the vascular system, giddiness, want of sleep, and sometimes nausea and vomiting. A knowledge of this occurrence impresses us with the necessity of exercising caution in the use of this remedy, particularly with respect to the dose of its administration and increase of dose; and it is necessary to suspend from time to time the exhibition of the remedy in order against the effects of this alarming accumulation. I have, however, used it, and seen others employ it, actively, and in full doses, and have rarely seen any dangerous symptoms; and I believe, therefore, the effects of accumulation much less frequent than the statements of authors of repute lead us to expect. The experience of Dr. Holland is to the effect that employing the medicine somewhat largely I have observed, "I do not recollect a case in which I have observed serious consequences from this cause."

The diuretic operation for which we employ foxglove is very important. Dr. Withering stated, that this medicine more frequently produces a diuretic than any other, and that if it fail, there is but little use of any other remedy succeeding. My experience, however, has been in accordance with Dr. Withering's. I have frequently failed in exciting diuresis, and have often found the influence lessening (Cutting pancreas) subsequently, exceed-
In some cases the bladder has appeared more irritable than usual, a patient having a frequent desire to pass his urine.

An increased flow of saliva is an occasional consequence of continued use of moderate doses of foxglove. Dr. Withering has noticed this effect. Dr. Barton has also seen it produced from ordinary doses.

2. The second degree of operation of digitalis, or that operation resulting from the use of too large or too long-continued doses, is manifested by the disordered condition of the alimentary canal of the circulating organs, and of the cerebro-spinal system. More ordinary symptoms are nausea or actual vomiting, slow often irregular pulse, coldness of the extremities, syncope or tend to it, giddiness, and confusion of vision. Sometimes the sickness is attended with purging, or even with diuresis; at other times the patient is neither vomited nor purged; and the principal disorder of the system is observed in the altered condition of the nervous and vascular organs. External objects appear of a green or yellow color, the patient fancies there is a mist, or sparks, before his eyes; sensation of weight, pain, or throbbing of the head, especially in the frontal region, is experienced; giddiness, weakness of the limbs, of sleep, occasionally stupor or delirium, and even convulsions, also be present. The pulse becomes feeble, sometimes frequent, sometimes slow; there may be actual syncope, or only a tendency to it, and profuse cold sweats. Salivation is sometimes induced by sonorous doses of foxglove. It was observed in a case, narrated by Dr. Henry, and has been known to last three weeks.

The quantity of digitalis that may be given to a patient with destroying life, is much greater than is ordinarily imagined. In instance I saw twenty drops of the tincture given to an infant lying under hydrocephalus, three times daily for a fortnight, at the end of which time the little patient was completely recovered, with one untoward symptom. I have frequently given a drachm of tincture (of the best quality) three times daily to an adult, for a month, without observing any marked effect. I know that some practitioners employ it in much larger doses (as an ounce or half an ounce of the tincture), with much less effect than might be imagined. A following communication on this subject, from my friend Dr. Chestnuck, illustrates this point:—“My first information on this subject was derived from an intelligent pupil, who had been an assistant to Mr. King, a highly respectable practitioner at Saxmundham, Suffolk, who, on a subsequent occasion, personally communicated the statement. This gentleman assured me, that he had been for many years in the habit of administering the tincture of digitalis, to a patient, in such a state of fever, of from half an ounce to an ounce at the time, not only with safety, but with the most decided advantage, as a remedy for acute inflammation,—not, however, to the exclusion of blood-letting.

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7 Rust’s Magazine, xxv. 278.
the contrary, he previously uses with considerable freedom. To
its he often gives an ounce of the tincture (seldom less than half
ounce), and awaits the result of twenty-four hours, when, if he
not find the pulse subdued, or rendered irregular by it, he
ates the dose; and this, he says, seldom fails to lower the pulse in
degree wished for; and when this is the case, the disease rarely
to give way, provided it has not gone the length of producing or-
organization of the part. He has given as much as two drachms
child of nine months. Sometimes vomiting quickly follows these
doses of the digitalis, but never any dangerous symptom, as far
observation has gone, which has been very extensive. In less
cases he sometimes gives smaller doses, as thirty drops, several
in a day.
Such is the account I received from Mr. King himself, and
was confirmed by his assistant, who prepared his medicines.
not see any ground for questioning the faithfulness of the report.
myself exhibited the tincture to the extent of half an ounce
more), in not more than two or three instances (cases of fever
pneumonia). To my surprise there was no striking effect pro-
ed by it; but I did not venture to repeat the dose. In numerous
ances I have given two drachms; still more frequently one
but not oftener than once in twenty-four hours, and not
second or third time. Two or three exhibitions of this kind
are generally observed to be followed by slowness and irregularity
pulse, when I have immediately desisted.” Dr. T. Williams
es, that a man, in a state of intoxication, took two ounces of tinc-
of foxglove in two doses, in quick succession, without the slight-
inconvenience.

The third degree of the operation of foxglove, or that resulting
the use of fatal doses, is characterized usually by vomiting,
ing, and gripping pain in the bowels; slow, feeble, and irregular
se, great faintness, and cold sweats; disordered vision; at first
dness, extreme debility; afterwards insensibility and convulsions,
th dilated insensitive pupils.
If we compare the effects of foxglove with those of other medicinal
ents, we find they approximate more closely to those of tobacco
an of any other cerebro-spinal. These two agents especially
their power of enfeebling the action of the heart and arte-
(see p. 176). Green tea agrees with foxglove in its property
preventing sleep. Considered as a diuretic, foxglove is, in some
pects, comparable with squills. I have already pointed out the
ularities attending the operation of each of these.
Uses.—We employ foxglove for various purposes, as,—1stly, to
duce the frequency and force of the heart’s action; 2dly, to pro-
te the action of the absorbents; 3dly, as a diuretic; and 4thly,
times on account of its specific influence over the cerebro-
ystem.
In the following remarks on the uses of foxglove in particular diseases, I refer to the administration of this remedy in the dose which it is ordinarily employed. I have no experience of its medicinal effects, when given in the enormous quantities mentioned by Dr. Clutterbuck.

1. In fever.—Digitalis is occasionally useful in fever to reduce the frequency of the pulse, when the excitement of the vascular system is out of proportion to the other symptoms of fever, such as the increased temperature, and the cerebral or gastric disorder. It can, however, be regarded, in the most remote way, as a curative means on the other hand, it is sometimes hurtful. Thus, not unfrequently it fails to reduce the circulation; nor, occasionally, it has the reverse effect, accelerates the pulse, while it increases the cerebral disorder and perhaps irritates the stomach. In estimating its value as a remedial agent for fever, we must not regard it as a sedative (I refer now to the vascular system) merely; it is an agent that exercises a specific influence over the brain; and, therefore, we must be able to lay down correct indications and contra-indications for its use in disordered conditions of this viscera, we ought to be acquainted with the precise nature of the influence of the remedy; and, on the other, with the actual condition of the brain in the case in which we wish to ameliorate. Now as we possess neither of these data in reference to fever, our use of foxglove is, with the exception of the sedative influence over the circulation, empirical; and experience has fully shewn us it is not generally beneficial. But, I believe where the frequency of pulse bears no relation to the local or constitutional symptoms of fever, foxglove may be serviceable.

2. Inflammation.—Foxglove has been employed in inflammatory diseases, principally on account of its power of reducing the frequency of the pulse, though some have referred part of its beneficial operation to its influence over the absorbent system. Inflammation of a chronic kind, may be going on in one part of the body, extent sufficient to produce complete disorganization, and utility to cause the death of the patient, without the action of the arterial trunks (i.e. of the systemic circulation) being remarkable increased. In such cases, digitalis is, for the most part, of little use. Again, in violent and acute inflammation, accompanied with excitement of the general circulation, especially in pleurisy, or in ulcerated foxglove is, in some cases, hurtful; in others, it is a trivial and important remedy; and we, therefore, rely, in our treatment, on bleeding, and other powerful antiphlogistic measures; and foxglove serviceable at all, can only be used after the other means.

As a remedy for inflammation, foxglove is principally useless. In less violent cases, particularly when accompanied with increased frequency of pulse, and occurring in subjects not able to submit to copious evacuations of blood. Moreover, it has more influence in inflammation of some parts of the body (as the arachnoid membrane, the pleura, the pericardium, and the lungs) than of others. In tric and enteric inflammation, it would appear to be objectionable on account of its irritant properties; while its specific influence...
cause of dropsical effusion), to its promoting the functions of absorbent vessels, and particularly to its diuretic effects. Dr. Withering correctly observed, that "it seldom succeeds in men of great strength, of tense fibre, of warm skin, of florid complexion, those with a tight and cordy pulse." "On the contrary, if the feeble or intermitting, the countenance pale, the lips livid, cold, the swollen belly soft and fluctuating, or the anasarous pitting under the pressure of the finger, we may expect diuretic effects to follow in a kindly manner." In those with ascites, blood-letting and purgatives will often be found preparatives for foxglove. In some forms of dropsy foxglove is serviceable than in others. Thus, anasarca, ascites, hydrothorax, and phlegmasia dolens, are sometimes benefited by it; ovarian dropsy and hydrocephalus are not relieved by it. A diuretic effect is greatly promoted by combining other diuretics, especially squills (as in the Pilula Digitalis et Scilla, Ph. homoe甶), or the saline diuretics (as the acetate of potash). A mixture of vegetable bitters (as infusion of gentian or calumba) with foxglove, forms, I think, a valuable form of exhibition in many cases. Infusion of common broom (Cytisus scoparius) may be advantageously conjoined with foxglove, where a diuretic is required. In old cases of general dropsy, inous swellings from debility, and in anasarca following scarlet fever, together with weakness, there is still left an excited arterial state of the arterial system, chalybeates (as the tinctura quinclidii) may be conjoined with foxglove, with the happiest

Hemorrhages.—In acute hemorrhages, from internal organs,
of a low diet, repeated blood-letting, and the employment of foxglove. There are, perhaps, no diseases in which the effects of foxglove are more marked, than in those of the great vessels. In *aneurism of the aorta*, our only hope of cure is by the coagulation of the blood in the aneurismatic sac, and consequent removal of the distensive pressure of the circulation. To effect this, we endeavour to retard the movement of the blood in the sac, by diminishing the quantity of blood in the system, and by reducing the force and velocity with which it circulates. Blood-letting and digitalis are, in these cases, very important, and under their use cases now and then recover. Again, *dilatation* of the cavities of the heart, our objects are to restore, if possible, the cause (usually obstruction in the pulmonic or aortic system), to strengthen the muscular fibres of the heart, and to reduce preternatural excitement of the vascular system. Digitalis aids us in attaining the latter object. In *simple hypertrophy*, *trophic dilatation*, we have to reduce the preternatural size of the heart’s parietes, and this we do by removing, when done, any obstruction to the circulation, by using a low diet, repeated blood-letting, and by the employment of foxglove. Dr. Davies says Dr. Davies, excepting the abstraction of blood, digitalis is of impulsion of the heart so completely and so certainly as to make us “I have been,” adds he, “in the habit of using it for severe for these affections, and have rarely seen it fail in producing temporary relief.” “The enlarged and flaccid heart,” observes Dr. Holland, “though, on first view, it might seem the least for the use of the medicine, is, perhaps, not so. At least reason to believe, that, in dropsical affections, so often with this organic change, the action of digitalis, as a diuretic, peculiarly of avail.” In some disordered conditions of the heart and great vessels—as in angina pectoris, nervousness of the heart, and augmented arterial impulsion, for also at times beneficial. In patients affected with an insidious or otherwise irregular pulse, I have several times observed the use of digitalis produce regularity of pulsation;—a circumstance also noted by Dr. Holland. Besides the preceding, there are rare affections of the heart in which foxglove may be found serviceable either by its sedative influence over the circulation, or by its action of relieving dropsical effusion through its diuretic property.

6. In *Phthisis.*—Digitalis has been declared capable of curing consumption, and numerous cases of supposed or
which sometimes accompanies them. Furthermore, the influence of this remedy over the cerebro-spinal system may then contribute to the beneficial operation of foxglove. But the nature of this influence not having as yet been accurately ascertained, while the pathology of the above-mentioned diseases is in considerable obscurity, it follows that the therapeutic employment of depletion and purgation. It has been used with success, by Dr. Currie, and by Fanzago. In insanity, Hallaran recommends foxglove to reduce vascular action, and by Fanzago. In

it is, I conceive, less likely to be serviceable, because this is less frequently accompanied with the vascular excitement, which foxglove is most successful. Accordingly, while in some cases it has proved serviceable in others it has either been useless or has only given temporary relief.

Various other diseases.—Besides the preceding, there are other maladies against which foxglove has been employed with occasional benefit, as scrofula and asthma. For other diseases by foxglove I must refer the reader to the works of Murray.

Administration.—The ordinary dose of foxglove, in powder, is ss. to gr. iss. repeated every six hours.

Notes.—In a case of poisoning by foxglove, or its preparation, the poison from the stomach by the stomach-pump or by vomition should not have already commenced, assist the relief of vomiting, when it is established, by the use of diluents; and counteract depressing influence of the poison on the circulation by the ammonia and brandy; and keep the patient in a recumbent posture, to guard against syncope. I am acquainted with any antidote for foxglove; perhaps infusion of nutgalls or green
1. Infusum Digitalis, L. E. D. Infusion of Foxglove.—(Foxglove leaves, dried, 3j. [3iij. E.]; Spirit of Cinnamon, 3fj. [f3ij. E.; 3ss. B.]) Boiling [distilled, L] Water, Oj. [f3xviiij. E.; Oss. wine-measure, D.] Macerate the foxglove leaves in the water for four hours, in a vessel lightly covered, and strain [through linen or calico, E.]; then add the spirit of cinnamon.)—I believe this, when properly made, to be the most effectual of the preparations of foxglove. The dose of it is from f3ss. to f3j. repeated every six hours. I have known it given to the extent of f3ij.

2. Tinctura Digitalis, L. E. D. Tincture of Foxglove.—(Foxglove leaves [rejecting the larger ones, D.] dried [in moderately fine powder, E.]; coarsely powdered, D. 3iv. [3ij. D.]; Proof Spirit, Oj. [Oj. wine-measure, D.] Macerate for fourteen days [seven, D.], and strain. "This tincture is best prepared by the process of percolation, as directed for the Tincture of Capsicum. If forty fluidounces of spirit be passed through, the density is 944 [0.944], and the solid contents of a fluidounce amount to twenty-four grains. It may also be made by digestion," E.)—The usual dose of this preparation, for an adult, is from mxx. cautiously increased to mxxxl., repeated every six hours. I usually begin with mxxx. The largest dose I have employed is f3j.; but, as I have already stated, it has been given to the extent of one ounce! The colour of this preparation is somewhat affected by exposure to strong solar light.

 Succus Digitalis.—The preserved juice of foxglove may be employed as a substitute for the tincture. The mode of preparing it has been already explained (see p. 365). Mr. Bentley informs me, that from 1 cwt. 2 qrs. 26 lbs. of digitalis gathered in May, he procured 49 pints of juice.

3. Extractum Digitalis, L. E. Extract of Foxglove.—(Fresh Foxglove leaves, lb. j. Bruise them, sprinkled with a little water, in a stone mortar; then press out the juice, and evaporate it, unstrained, to a proper consistence, L.—This extract is best prepared from the fresh leaves of digitalis, by any of the processes indicated for extract of Conium," E.)—Recently introduced into the pharmacopeias of London and Edinburgh. Its preparation requires very great care and attention, or the virtues of the plant may be destroyed during the process.—Dose, gr. j. cautiously increased.

4. Pille Digitalis et Scille, E. Pills of Foxglove and Squill.—(Digitalis; Squill, of each, one part; Aromatic Electuary, two parts. Beat them into a proper mass with conserve of red roses; and divide the mass into four-grain pills).—A valuable diuretic compound. Used in dropsies.—Dose, one or two pills.


Sex. Syst. Pentandria, Monogynia.
(Folia, D.)

History.—This plant is, according to Sprengel, the φλόρας ἑφίαν of Dioscorides.  

TANY. Gen. Char.—Calyx campanulate, five-partite, nearly
Corolla with a very short tube; the limb flat, expanded,
that rotate, five-partite; the lobes rounded, nearly equal, or the
ones equal. Stamens five, inclining; the lower ones longer; all
the filaments either all, or the three upper, barbate; anthers
nearly adnate, and (by the confluence of the cells) unilocular.
simple, thick at the apex. Stigma entire or bifid. Capsule
or somewhat globose; the valves bifid at the apex (Macleight).
Char.—Leaves deciduous, crenate, woolly on both sides. Stem
Cluster dense. Flowers almost sessile (Smith).—Corolla
yellow; stamens red; stigma green.
—Indigenous: on banks and waste ground. Biennial. Flowers
July and August.

DESCRIPTION.—The leaves (folia verbasci) have a mucilaginous,
sh taste, and a very slight odour. They communicate their
s to water.

COMPOSITION.—Morin analyzed the flowers of Verbascum
mus, and obtained a yellow volatile oil, a fatty acid, free mali
phoric acids, malate and phosphate of lime, acetate of potash,
illitizable sugar, gum, chlorophyll, and yellow resinous colour-
ter.

PHYSIOLOGICAL EFFECTS.—Emollient, demulcent, and, supposed,
feebly narcotic. Fishes are stupified by the seeds of

US.—In the form of decoction (prepared of 3ij. of the leaves and
f water) mullein has been used in catarrhs and diarrheas: the
sylv. Dr. Home found it serviceable in the latter complaint.
Fomentations and cataplasms made of great mullein have
have used as applications to hemorrhoidal tumors and indurat

BROPHULA’RIA NODO’SIA LINN. D.—KNOTTY-ROOTED FIGWORT.

Sex. Syst. Didynamia, Angiosperma.
(Folia, D.)

STORY.—The earliest notice of this plant occurs in the work of

TANY. Gen. Char.—Calyx five-parted or more frequently five-
nearly equal. Corolla globose, with a short five-lobed limb, the
uts of which are rounded, and the uppermost united into an
lip. Stamens didynamous, inclining, with one-celled, trans-
thers; a fifth rudimentary stamen with a lamelliform anther
present. Stigma emarginate. Capsule roundish, often acumi-
with the valves entire, or just bifid (Lindley).
**Sp. Char.**—Leaves heart-shaped, acute; three-ribbed at the base. **Stem** sharp-edged. **Root** tuberous. (Smith).—**Corolla** dull green, with a livid purple lip.


**Description.**—The fresh leaves (folia scrophulariae nodose) have a fetid odour: their taste is bitter, and somewhat acrid. Water extracts the virtues of the plant: the infusion is darkened by the sesquichloride of iron, but is unchanged by the influence of nutgalls.

**Composition.**—The whole plant (root and herb) was analysed in 1830 by Grandoni. He obtained **brown bitter resin** 0·31, extractive having the odour of benzoic acid 1·58, **chlorophyll** 0·23, **sugar** 0·18, mucilage 0·16, **inulin** 0·16, **malic acid** 0·15, **pectic acid** 0·15, **acetic acid** 0·18, **fibre** 19·80, **water** 70·31, sulphate and carbonate of potash 0·20, **alumina** 0·07, **odorous matter** and loss 0·31.

**Physiological Effects.**—But little known. Judging from the taste, the leaves possess acrid properties. When swallowed they occasion vomiting and purging. They are said to be diuretic and narcotic.

**Uses.**—Rarely employed. In the form of a fomentation they are sometimes applied to piles and other painful tumors. The infusion is used in skin diseases. The tuberous root was formerly esteemed in scrofula.

**UNGUENTUM SCROPHULARIAE, D.**; Ointment of Scrophularia
(Fresh leaves of Scrophularia nodosa; Prepared Hog's Lard, of 1 lb. 1 nj.; Prepared Mutton Suet, lb. j. Boil the leaves in the fat until they become crisp, then strain by expression.)—Recommended by Dr. W. Stokes for the cure of a disease of children, commonly termed "burnt-holes," but which he calls *Pemphigus gangrenosus [inflammation of the escharotica?]*. It has also been used in tinea capitis, impetigo, and other cutaneous affections.

**OTHER MEDICINAL SCROPHULARIAE.**

1. **Grat'Iola officinalis**, or Hedge Hyssop, is cathartic, diuretic, and emetic, and acting in large doses as an acrid poison. It has been used in visceral obstructions, liver affections, dropsies, scrofula, and venereal diseases.—Dose of the **infusion** (prepared with 5 Johnson of the dried herb and 1 pint of boiling water), 1 or 2 glasses, 3 times a day.

2. **Ver'onica Beccar'ina**, or Brooklime, is considered antiscorbutic. It may be eaten as a salad.

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4 Dr. Montgomery, Observ. on the Dumb. Pharm.
5 Thomson, Lond. Dispensar.
THE COMMON HENBANE.

*Cupressia officinalis*, or Common Eye-bright, is nearly inert, though it is a popular remedy for diseases of the eyes.

XXXVIII.—SolanaceÆ, Lindley.—The Night-Shade Tribe.

*Solanæ*, Justus.

**Tribal Character.**—*Calyx* five-parted, seldom four-parted, persistent, inner. *Corolla* monopetalous, hypogynous; the limb five-cleft, seldom four-, regular, or somewhat unequal, deciduous; the stamens plaited or imbricated. *Stamens* inserted upon the corolla, as many as the segments of the calyx, with which they are alternate; *anthers* bursting longitudinally, rarely or at the apex. *Ovary* two-celled, rarely four or many-celled, with two or more placentae; *style* continuous; *stigma* simple. *Pericarp* with two or many cells, either a capsule with a double dissepiment parallel with the valves, or a berry with the placenta adhering to the dissepiment. *Seeds* crouous, sessile; *embryo* straight or curved, often out of the centre, lying in the *albumen*; *radicle* next the hilum.—*Herbaceous* plants or *shrubs*, with alternate, undivided, or lobed, sometimes collateral; the floral parts double, and placed near each other. *Inflorescence* variable, often if the *axil*; the *pedicels* without bracts (Lindley).

**Properties.**—Not uniform. 1. *Narcotics* (cerebro-spinatus, Pereira, p. 174) are found in the genera Hyoscyamus, Atropa, Datura, Nicotiana, Solanum, Mandragora; of these some are also acrids (acrid-narcotic solanace). 2. *Acridics* are procured from the genus Capsicum. 3. *Bitter-tonics* are found in the genus Solanum (as S. Pseudoquinoa and crispum), and Cestrum (C. nigrum). 4. *Nutrients* are obtained from the genus Solanum (as S. Lycocrum, Melons, and tuberculosis). The heat used in preparing some of these may, perhaps, volatilize or decompose any noxious matters they contain. The generalization of some late French writers with respect to the identity of the operation of the narcotic Solanace, do not appear to be founded in fact. Hyoscyamus, Belladonna, and Stramonium, are acrids; using dilatation of the pupil, and in producing delirium. Hyoscyamus, in moderate doses, sometimes occasions sleep, though this has been doubted. Tobacco depresses the muscular and vascular systems.


*Sex. Syst.* Pentandria, Monogynia.

(Folia et Semina, L.—Leaves, E.—Folia. D.)

**History.**—This plant is the *Υοσκυάμος μέλας* of Dioscorides. The *μέλας* of Hippocrates is probably *Hyoscyamus albus*.

**Manny. Gen. Char.**—*Calyx* tubular, five-cleft. *Corolla* funnelform; limb spreading, oblique, five-lobed, unequal. *Stamina* five. *Capitae*. *Capsule* ovate, compressed and furrowed on each apex circumcisise or operculate (Bot. Gall.)

**Char.**—Leaves sinuate, clasping the stem. *Flowers* sessile.

Stem spindle-shaped. *Stem* bushy. *Leaves* sessile, soft and plant, lobed, downy, and viscid, exhaling a powerful and oppres-
sive odour, like all the rest of the plant. Flowers numerous

the bosoms of the crowded upper leaves, almost entirely sessile,

elegant straw colour, pencilled with dark purple veins.

Hab.—Indigenous: waste ground, banks, and commons. Fl

in July.

There are two varieties of this species; one biennial, the

annual. Both are cultivated at Mitcham.

Botanists are not agreed as to the duration of Hyoscyamus niger. Li
Andr. Murray, Persoon, Woodville, Lindley, and T. F. L. Nees von Es
Weyhe, Woller, and Funke (editors of the Beschreibung officineller Pflan
clare it to be biennial; whereas Hudson, Withering, Smith, Hooker, R
and T. F. L. Nees von Esenbeck and Ebermaier state that it is annual. L
Geiger, and J. L. Wheeler, on the other hand, regard it as both annu
biennial. Herbalists are well acquainted with two kinds of Hyoscyamus,
for the London market, and distinguished as the annual and biennial vari
On carefully comparing them I cannot discover any essential specific dif
t between them. The biennial variety is usually branched, and is a s
plant than the annual one.

Hyoscyamus agrestis Kitaibel is distinguished from the common Hyos
niger by the following characters:—it is annual, has a simple stem, its
are less deeply incised and less hairy, and its corolla is not so strongly
with violet veins, or even is entirely yellow. The last-mentioned chara
longs also to Hyoscyamus pallidus Kitaibel. It would appear, however, fr
observations of Brandt and Ratzeburg, who have carefully examined th
original specimens in Wildenow’s herbarium, that H. agrestis is only a
minor of Hyoscyamus niger, and that H. pallidus belongs also to th
species. Hyoscyamus abus has petiolated leaves, which are subcordate
and bluntly toothed.

Since the two preceding paragraphs were in type, I have received a lett
Sir W. J. Hooker, in which he states that he has native specimens of H.
and pallidus in his Herbarium; and he adds, “I have no hesitation in
that they are identical with H. niger; and niger ought to be marked ‘or biennial.’”

DESCRIPTION.—Mr. Houlton says the plant is fit for med
purses in the second year only of its duration. It shou
gathered when in full flower. The herb (herba hyoscyami),
fresh, has a strong, unpleasant, narcotic odour, a mucilage
slightly acid taste, and a clammy feel. By drying it almost w
loses these properties. One hundred pounds of the fresh herb
about fourteen pounds when dried. The leaves (folia hyosc
when fresh, are pale, dull green. The seeds (semina hyoscyam
small, compressed, uniform, roundish, finely dotted, of a yell
grey colour, and have the odour of the plant, and an olegg
bitter taste.

COMPOSITION.—The seeds of Hyoscyamus niger were analy
1816, by Kirchoff; and, in 1820, by Brandes. The extract
herb was analyzed by Lindbergson.
COMMON HENBANE.

<table>
<thead>
<tr>
<th>Brandes's Analysis</th>
<th>Lindesay's Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 2</td>
<td>Narcotic extractive soluble in water and alcohol.</td>
</tr>
<tr>
<td></td>
<td>Bitter extractive.</td>
</tr>
<tr>
<td>1 4</td>
<td>Gummy extractive.</td>
</tr>
<tr>
<td>3 2</td>
<td>Malates, phosphates, sulphates, and muriates of magnesia.</td>
</tr>
<tr>
<td>6 3</td>
<td>Extract of the herb.</td>
</tr>
<tr>
<td>0 3</td>
<td></td>
</tr>
<tr>
<td>2 5</td>
<td></td>
</tr>
<tr>
<td>6 5</td>
<td></td>
</tr>
<tr>
<td>2 4</td>
<td></td>
</tr>
<tr>
<td>2 6</td>
<td></td>
</tr>
<tr>
<td>0 6</td>
<td></td>
</tr>
<tr>
<td>2 6</td>
<td></td>
</tr>
<tr>
<td>2 0</td>
<td></td>
</tr>
<tr>
<td>2 4</td>
<td></td>
</tr>
<tr>
<td>0 8</td>
<td></td>
</tr>
<tr>
<td>1 4</td>
<td></td>
</tr>
</tbody>
</table>

Hyoscyamus. — This term has been applied to a vegetable secured from the seeds and herbs of Hyoscyamus niger by Brandes, elements have been confirmed by Geiger and Hesse, as well as by Mein, Chevallier, as well as Brault and Poggiale, have failed to procure it. Properties assigned to it are almost identical with those of Atropine, from differs in being more soluble in water. It is crystallizable, it is secreted, yields ammonia. Reisinger says, that a drop of a of one grain of this substance in ten grains of water caused dilatation of, but did not give rise to irritation of the eye. A solution of double ighth acted as an irritant.

Pyreumatic Oil of Henbane (Pyro-Hyoscyamina). — This was obtained by the destructive distillation of henbane. Its chemical proce identical with those of the empyreumatic oil of foxglove. It proved ful narcotic poison.

Physiological Effects. a. On Vegetables. — Water holding in an extract of henbane proved poisonous to Hyoscyamus niger.

In Animals. — Its effects on herbivorous animals are slight, to horses, in large quantities, it causes merely dilatation of the spasmodic movements of the lips, and frequency of pulse. Its effects appear to be analogous to those on man. It does not cause any local irritation. Its constitutional effects are, on of pupil, weakness of the posterior extremities, staggering, sensibility.

In Man. — In small and repeated doses henbane has a sedative annulling effect. This is especially observed in persons with great nervous irritability, and with a too active condition of the sensorial functions. In such it frequently causes calm with a tendency to sleep. It frequently allays irritation and atural sensibility existing in any organ. It does not quicken se, check secretion, or cause constipation. Large doses some induce quietude and sleep. Fouquier, however, denies this.

3. de Pharm. t. xxii. p. 124.
7. Mig. also Michel, quoted in Meyen's Report on use of Vap. Physiology during the year 1837, translated by W. Francis, p. 138.
He says, henbane causes headache, giddiness, dimness of sight, dilatation of pupil, a greater or less tendency to sleep, and painful delirium. In some cases these symptoms are followed by thirst, nausea, griping, and either purging or constipation; and in a few instances febrile heat and irritation of skin are induced. But I have frequently seen sleep follow its use, though its hypnotic properties are neither constant nor powerful. It more frequently fails to occasion sleep, those accustomed to the use of opium. Very large doses are apt to be followed by delirium rather than by sleep. Its power of alleviating pain and allaying spasm is greatly inferior to that of opium. In poisonous doses it causes loss of speech, dilatation of pupil, disturbance of vision, distortion of face, coma, and delirium (typhomania of some authors) generally of the unmanageable, sometimes of the furious kind, and paralysis, occasionally with convulsive movements. Irritation of the stomach and bowels (manifested by nausea, vomiting, pain, and purging) is occasionally induced. One author says hyoscyamus renders the hair grey, while another states that it darkens it.

In its operation on the body, henbane presents several peculiarities. From opium it is distinguished by the sedative, rather than stimulant, effects of small doses; by its not confining the bowels; by the dimness of sight; and, when swallowed in large doses, by its provoking dilatation of the pupil, and by its being more apt to occasion delirium. The last-mentioned peculiarity is noticed by Dr. Cullen. Furthermore, in some individuals, opium causes headache, and distressing symptoms, which henbane is not so apt to produce. Potassium stramonium, to which it is in several respects closely allied, is distinguished by the very rare occurrence of any symptom of gastro-intestinal irritation after the ingestion of large doses. Sundelin says, "that it wants the resolvent operation and the stimulant influence over the vascular system which belladonna possesses." Vogt ranks hyoscyamus between belladonna and hydrocyanic acid. But, with every respect for the opinions of so profound a writer, I cannot concur in the propriety of this arrangement. I have never seen, from the use of hydrocyanic acid, the same tranquillizing and soothing influence over the mind and external sense which I have repeatedly witnessed from the use of small doses of hyoscyamus; and the effects of poisonous doses of these two agents more strikingly display the difference of their operation; for, with hydrocyanic acid causes insensibility and convulsion, henbane produces delirium and paralysis.

Uses.—Hyoscyamus is said to alleviate pain and irritation in various organs, to promote sleep, to procure quietude, and to obviate spasm. For any of these objects it is generally inferior to, and less ef
COMMON HENBANE.

sently to be relied on than, opium. Yet it is, on various occasions, referred to the latter; as where opium causes headache, or other distressing cerebral symptoms, or where it occasions constipation. Aim, the stimulant influence of small doses of opium over the vascular system, and the tendency of this narcotic to lock up the secretes and excretions, form objections to its use in the maladies of child; in such, therefore, hyoscymus is frequently preferred. Fouler, whose observations with respect to the effects of henbane I have already had occasion to refer to, can find in this narcotic no useful property; and he thinks it ought to be banished from the Materia medica.°

The following are the principal purposes for which it is ordinarily employed in this country:—

1. _As an anodyne_ where opium disagrees, or is from any circumstance objectionable. It may be used in neuralgia, rheumatism, st. periostitis, the milk abscess, painful affections of the urino-genital organs, scirrhus, and carcinoma.

2. _As a soporific_ it is available in sleeplessness, accompanied with restlessness and mental irritability, and where opium, from its colant or other properties, proves injurious. Sometimes, where it fails to cause actual sleep, it proves highly serviceable by producing a calm and tranquil state conducive to the well-doing and comfort of the patient.

3. _As an antispasmodic_ it occasionally proves serviceable in spastic affections of the organs of respiration (e. g. spasmodic asthma), of the urino-genital apparatus (e. g. spasmodic stricture and ec of the sphincter vesica). Notwithstanding the favourable reports of Storck to the contrary, it is rarely calculated to be of any value in epilepsy.

4. _As a sedative_, to allay irritation and preternatural sensibility. Troublesome cough it sometimes proves useful by dulling the sensibility of the bronchial membrane to the influence of the cold. In nephritic and vesical irritation, and in gonorrhoea, it is sometimes a useful substitute for opium. In the irritation of teething it is capable from its power of relieving pain and convulsion. Its advantages over opium, in the disorders of children, have been already noticed.

5. _To dilate the pupil_ the extract may be used as a substitute for belladonna, than which it is less powerful.

6. _As a topical sedative and anodyne_, fomentations of the herb, or extract, are sometimes applied to painful glandular swellings, stable ulcers, hemorrhoids, and parts affected with neuralgia. In irritation of the rectum or bladder it is sometimes used per anum.

Administration.—The powder of the leaves is rarely employed; it is from three to ten grains. The extract and tincture are the preparations commonly used.

Notes.—The treatment of a case of poisoning by henbane is the same as that by opium.

4. **Tinctura Hyoscyami, L. E. D. Tincture of Henbane.**—Henbane leaves, dried, [in moderately fine powder, \( E. \)] 3\(_\text{v} \); Proof Spiritus \( Oij. \) [wine-measure, \( D. \)] Macerate for fourteen [seven, \( D. \)] days, strain. "This tincture is best prepared by the process of percolation as directed for tincture of Capsicum; but it may also be obtained though with greater loss, by the process of digestion," \( E. \).—It costs \( f_{\frac{3}{5}} \) to \( f_{\frac{3}{5}} \).

** Succus Hyoscyami.**—The **Preserved Juice of Henbane** (see p. 365) can be substituted for the tincture. Mr. Bentley informs me that he obtained the following quantities of juice from henbane leaves:

<table>
<thead>
<tr>
<th>Date</th>
<th>3 oxt. of leaves</th>
<th>2 oxt. of leaves</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 24th.</td>
<td>42</td>
<td>22</td>
</tr>
<tr>
<td>July 26th.</td>
<td>30</td>
<td>18</td>
</tr>
<tr>
<td>Aug. 3rd.</td>
<td>25</td>
<td>15</td>
</tr>
</tbody>
</table>

2. **Extractum Hyoscyami, L. E. ; Succus spissatus Hyoscyami. Extract of Henbane.**—(Fresh Henbane leaves, lb. j.) Bruise them sprinkled with a little water, in a stone mortar; then press out the juice, and evaporate it, unstrained, to a proper consistence, \( L. \).—"An extract is to be prepared from the fresh leaves of hyoscyamus by the processes directed for Extract of Conium," \( E. \).—The *Dr. College* orders it to be prepared from the fresh plant of henbane the manner directed for the *Succus spissatus Aconiti*.—The average produce of extract is stated by Mr. Brande\(^*\) to be from 4 to 9 from 112 lbs. of the fresh herb. Mr. Squire\(^*\) states the following products (obtained by a common screw press and water) from 112 lbs. of matured hyoscyamus, gathered dry and in good order; the season, however, being rather more rainy than the average:

<table>
<thead>
<tr>
<th>Weight</th>
<th>Yielded of Juice</th>
<th>Yield Extras</th>
</tr>
</thead>
<tbody>
<tr>
<td>lbs.</td>
<td>lbs.</td>
<td>lbs.</td>
</tr>
<tr>
<td>The leaves, the very fine summits of the stalks, the flowers and seed-vessels already formed, weighed</td>
<td>70</td>
<td>42</td>
</tr>
<tr>
<td>The stalks weighed</td>
<td>35</td>
<td>17(_\frac{1}{4} )</td>
</tr>
<tr>
<td>Waste leaves and dirt</td>
<td>3(_\frac{1}{4} )</td>
<td>-</td>
</tr>
<tr>
<td>Lost by evaporation, during the two hours occupied</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>by picking</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>112</td>
<td>50(_\frac{1}{2} )</td>
</tr>
</tbody>
</table>

The quality of the extract met with in the shops is extremely variable. This arises principally from the unequal care with which it has been prepared. The dose is from gr. v. to 5j. Occasional very much larger doses have been taken without any injurious effect. It is said to be a valuable addition to the compound extract of colocynth, whose operation it renders milder, though not less efficacious. It is sometimes used as a topical application to inflamed tender parts: thus, alone, or in the form of ointment, it is applied to painful hemorrhoids; spread on linen it forms a plaster, which has been used in neuralgia, rheumatic pains, painful glandular swellings, &c.

My friend Dr. Wm. Lobb and nearly a dozen other persons in 1841 enucleated symptoms like those of poisoning by belladonna, from the employment of several grains of an extract sold by a most respectable country ch
d\(^*\) Pharmaceutical Transactions, p. 97.
at of hyoscyamus. The greater part of the extract sold by this chemist had been most carefully prepared by himself, but not having made sufficient for the use's consumption, he purchased some in London, and the extract used on these occasions might have been that which was bought. The extract employed had an unusually greenish colour, and the hyoscyamus odour. The effects produced by difficulty of swallowing, a sensation as if the parts about the throat had been powdered with dust, impaired vision, eyes bloodshot, pupils dilated, tearing of conjunctiva, stranguary, cessation of cough and expectoration which had been previously troublesome. The vision was greatly improved by the use of a gripper. The third day the symptoms had disappeared, but great prostration of strength supervened. In some of the patients an eruption like that of scarlet appeared, with intense redness of the palms of the hands.

2. AT'ROPA BELLADON'NA, Linn. L. E. D.—COMMON DWALE;

DEADLY NIGHTSHADE.

Sec. Syst. Pentandria, Monogynia.

(Folia, L.—Leaves, E.—Folia et radix, D.)

HISTORY.—Some persons have suggested that this plant may be the μανδραγόρα of Theophrastus, the fruit of which, this ancient botanist says, "is black, racemose, and, to the taste, vinous." But the name noticed under this name by Dioscorides, had yellow fruit, and universally admitted to be the Mandragora officinalis. The earliest doubt as to the name of belladonna occurs in the work of Tragus (A.D. 52), who calls it Solanum hortense nigrum. It has been supposed that it was this plant which produced such remarkable and fatal effects on the Roman soldiers, during their retreat from the Britains. Buchanan relates, that the Scots mixed the juice of the plant with the bread and drink, which, by their truce, they were supplied by the Danes, which so intoxicated them, that the Scots killed the greatest part of Sweno's army while asleep. Shakspeare is supposed to allude to it under the name of the insane root.

BOTANY. Gen. Char. — Calyx campanulate, five-cleft. Corolla campanulate, twice the length of the calyx, five-lobed, equal. Filaments five, filiform. Berry globose, seated in the calyx (Bot. Gall.)


Root fleshy, creeping. Whole plant fetid when bruised, of a dark yellowish aspect, indicative of its deadly narcotic quality. Stems herbaceous, three feet high, round, branched, leafy, slightly downy. Leaves lateral, mostly two together of unequal size, ovate, acute, entire, smooth. Flowers imperfectly axillary, solitary, stalked, racemose, dark full purple in the border, paler downwards, about an inch long. Berry of a shining violet black, the size of a small cherry, sweetish, and not nauseous (Smith).

Hab.—Indigenous: hedges and waste ground, on a calcareous soil. Flowers in June.

DESCRIPTION.—The root (radix belladonnae), when fresh, is one or two inches thick, and sometimes a foot or more long: it is branchy, internally white, externally gravelish or brownish-white.
Its taste is slight, sweetish; its odour is feeble. It may be collected in the autumn or early in the spring. The flowering stems (belladonna) are collected in June or July; they are then deprived of leaves (folia belladonna), which are to be carefully dried. When fresh, they have a feeble, bitterish, sub-acid taste.

COMPOSITION.—The leaves of belladonna were analyzed, in 1809, by Vauquelin; a dried herb, in 1810, by Brandes. Besides these there have been several less complete examinations of this plant by other chemists, which have yielded more or less interesting results.

**Brandes’s Analysis.**

<table>
<thead>
<tr>
<th>Substance</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supermalate of Atropia</td>
<td>1.51</td>
</tr>
<tr>
<td>Pseudo-toxin with malate of atropia and potash salts</td>
<td>16.05</td>
</tr>
<tr>
<td>Wax</td>
<td>0.70</td>
</tr>
<tr>
<td>Chlorophyll</td>
<td>5.84</td>
</tr>
<tr>
<td>Phytocolla (nitrogenous substance insoluble in alcohol)</td>
<td>6.90</td>
</tr>
<tr>
<td>Gum</td>
<td>8.33</td>
</tr>
<tr>
<td>Starch</td>
<td>1.75</td>
</tr>
<tr>
<td>Albumen</td>
<td>10.70</td>
</tr>
<tr>
<td>Lignin</td>
<td>13.70</td>
</tr>
<tr>
<td>Salts</td>
<td>7.47</td>
</tr>
<tr>
<td>Water</td>
<td>25.50</td>
</tr>
<tr>
<td>Loss</td>
<td>2.05</td>
</tr>
<tr>
<td>Dried herb of Belladonna</td>
<td>100.00</td>
</tr>
</tbody>
</table>

1. **Atropia (Atropina seu Atropium).**—The most improved processes for extracting this vegetable alkali are those of Mein and Thomson, and Richter. The first, 12 oz. of belladonna root yielded not quite 12 grains of pure alkali. This vegetable alkali crystallizes in transparent silky prisms. It is soluble in alcohol, ether, and very slightly so in water. The solution of the leaves of belladonna in boiling water causes the blue colour of redened limus paper, is precipitated white on a solution of mutgalls, yellow by chloride of platinum, and yellow by chloride of copper. The precipitate caused by the latter assumes a crystalline appearance. At a temperature above 212° F., it is converted into vapour, which is deposited like varnish. Heated in the open air, it readily becomes empyreumatic and dissolves in acids, with which it unites to form salts. The hydrochlorate and nitrate are crystallizable. Three analyses of it have been made by Liebig; according to the latest, its composition is C_{27}H_{27}N O_{6}; hence its atomic weight is 459. Atropia is a powerful poison. An imponderable quantity is sufficient to cause dilatation of the pupil. Given to dogs and other animals, it causes vomiting, dilatation of the pupil, and stupor. A tenth of a grain is fatal, even to the human subject, dryness of the mouth, constriction of the throat, difficulty of swallowing, stupor, dilatation of pupil, and headache.

2. **PSEUDOTOXIN.**—A substance obtained by Brandes from the water of belladonna. It is brownish-yellow, soluble in water, insoluble in alcohol and ether, is coloured green by the salts of iron, and is totally precipitated from its watery solution by the salts of lead and by tincture of galls.

3. **BELLADONNIN.**—Under this name, Luebekind has described a vegetable alkali, which, he says, is distinct from atropia. It is crystal and has an ammoniacal odour. It consists of carbon 28.5, hydrogen 22.8, nitrogen 32.1, oxygen 17.0. The crystals contain three equivalents of Water. It causes extreme heat in the throat and constriction of the larynx.

4. **ATROPIC ACID.**—This name has been given by Richter to a volatile, partially volatile, and a fat-soluble acid, distinguished from benzoic acid by its not precipitating the gravis of iron.

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* Ann. de Chim. lxv. 222.
* Ibid. lxxii. 32.
* Gmelin’s Handb. d. Chem. ii. 2905.
* Pharm. Centr.-Blatt f. 1835, S. 711.
* Org. Chem. i. 274.
* Pharm. Centr.-Blatt f. 1835, S. 613.
* Geb. in Hesse, ibid. f. 1835, S. 84.
Physiological Effects. a. On Vegetables.—An aqueous solution of extract of belladonna is poisonous to plants.

b. On Animals generally.—Belladonna proves poisonous to animals and birds: but much less so to herbivorous than to carnivorous animals. Eight pounds (Troy) of the leaves have been eaten by a horse without any ill effects. Mr. Anderson tells me that the jackdaws eat the seeds at the Chelsea Garden. A pound of ripe cherries has been given to an ass with very little effect. Given to dogs, belladonna causes dilatation of pupil, plaintive cries, efforts to urinate, weakness of the posterior extremities, staggering, frequent urination, a state like intoxication, and death. Forty or fifty grains of the watery extract, injected into the jugular vein of dogs, have proved fatal. Flourens thinks that the tubercula quadrigemina in the parts of the nervous centres on which this poison specifically acts. His inferences were drawn from experiments made on birds. The topical action of belladonna is that of an acrid, though not a very violent one.

c. On Man.—In the first degree of its operation, belladonna diminishes sensibility and irritability. This effect (called by some sedative) is scarcely obvious in the healthy organism, but is well seen in morbid states, when these properties are preternaturally increased. A very frequent and sometimes the earliest obvious effect of belladonna is dryness of the mouth and throat, frequently attended with thirst. The other secretions and the circulation are oftentimes not affected, though occasionally they are augmented. Mr. Bailey asserts that the effects of belladonna are not the stomach nor bowels, nor any of the secretions or excretions, those of the salivary glands excepted. The asserted influence of belladonna over the organic functions is to be shown by its power of inducing, in some cases, resolution of swellings and tumours of various kinds, as will be presently noticed.

In the second degree of its operation belladonna manifests, both in healthy and morbid conditions, its remarkable influence over the rebro-spinal system. It causes dilatation of the pupils, obscurity of vision, or absolute blindness (amaurosis), visual illusions, suffused eyes, occasionally disturbance of hearing (as singing in the ears), numbness of the face, confusion of head, giddiness, and delirium, which at times resembles intoxication, and may be combined with or followed by sopor. These symptoms are usually preceded by a febrile condition, attended with a remarkable affection of the mouth, throat, and adjacent parts. Besides dryness of these parts, it causes difficulty of deglutition and of articulation, a feeling of...
constriction about the throat, nausea, and sometimes actual vomiting, and, now and then, swelling and redness of the face. The pulse is usually hurried and small. The cutaneous, renal, and mucous symptoms are frequently augmented. An exanthematosus eruption that of scarlet fever, has been noticed; and irritation of the mucous organs has in some instances occurred.

In some cases very severe effects have been induced by the application of the extract to abraded surfaces. The continued application of it to the sound skin has also been attended with similar effects.

In the third degree of its operation, belladonna produces effects similar to the preceding, but in a more violent form. The following are the symptoms experienced by above 150 soldiers, who were poisoned by the berries of belladonna, which were gathered at a point near Dresden:—"Dilatation and immobility of the pupil; absolute insensibility of the eye to the presence of external objects; or at least confused vision; injection of the conjunctiva with blood; protrusion of the eye, which in some appeared as if it were dull, and in others ardent and furious; dryness of the lips, tongue, palate, and throat; deglutition difficult or even impossible; nausea, not followed by vomiting; feeling of weakness, lipothymia, syncope, difficulty or impossibility of standing; frequent bending forward of the trunk; continual motion of the hands and fingers; giddiness; with a vacant smile; aphonia or confused sounds, uttered with a probable ineffectual desire of going to stool; gradual restoration of health and reason, without any recollection of the preceding state.

In comparing the operation of belladonna with that of other bro-sinants (narcotics, auct.), the most remarkable symptoms which attract our attention are the dilatation of the pupils, with insensibility of the irides to light, disturbance of vision, diminished fecundation, giddiness, staggering, the delirium (extravagant, pleasing, or far from agreeable); followed by sopor, and the remarkable affection of the mouth and throat (dryness of the throat, difficulty of deglutition and of articulation). Convulsions are rare, and, when they occur, are slight. Drowsiness or sopor occurs subsequently to the delirium. Local irritation is not well marked.

These characters distinguish the effects of belladonna from those of any other substance, except henbane (see p. 1224), stramonium (see p. 1238), and perhaps from some other solanaceous species.

When applied to the eyeball, belladonna causes dilatation of the pupil, without necessarily affecting the other eye or disturbing the vision. Segalas has rendered it probable that absorption or inhibition of the eyeball is essential to this effect. But the action on the iris depends, according to Müller, not on the operation of the belladonna on the central nervous system, but on certain local effects on the iris, which may be produced by the aqueous humor or the vitreous body, or by the pupilmuscles.
as of the nervous system, but on its topical, paralyzing influence to the ciliary nerves. When, however, belladonna is swallowed, it is obvious that the irides can become affected through the general system only, and in this case the dilatation of the pupil is accompanied with disturbance of vision. The pneumogastric nerve is obviously concerned in producing the affectation of the mouth and the difficulty of deglutition and articulation.

The disorder of the intellect and of the external senses caused by belladonna proves that the influence of this agent is not limited to the excito-motor system, but is extended to those portions of the nervous centres which are the seat of the intellect and of sensibility.

Uses.—Belladonna has been employed to allay pain and nervous irritation (erectionus nervosus) of some authors; to diminish the visibility of the retina to the impression of light; to produce dilatation of the pupil; to counteract that condition of brain which is accompanied with contraction of the pupil; and to lessen rigidity and spasmodic contraction of muscular fibres. These uses obviously arise out of the ascertained physiological effects of the remedy. There are others, however, which may be regarded as altogether empirical: such as its employment to resolve or discuss scirrhous tumours.

The indications and contra-indications for its use are not sufficiently established to induce us to place much confidence in them. My own experience leads me to believe that it is not a remedy fitted for phlegmatic constitutions, or for febrile and acute inflammatory cases; and I am not disposed to admit the observations of Dr. Graves, nearer to be mentioned, as offering any valid objections to these statements.

1. To allay pain and nervous irritation.—As an anodyne in most external pains no remedy hitherto proposed is equal to opium; but as agent totally fails us in many of those external pains known as neuralgia, prospalgie, or tic douloureux. In such, belladonna occasionally succeeds in abating, sometimes in completely removing, pain; while it totally fails to give relief in the internal pains for which experience has found opium so efficacious. It is remarkable, therefore, that while both these cerebro-spinants (narcotics, auctor) agree in lessening pain, they totally disagree as to the cases in which they excelle, and for which they are individually applicable. In the atonement of neuralgia, belladonna is employed both internally and externally. I believe that, to be successful, it requires, in many cases, to be persevered in until dryness of the throat, dilatation of pupil, or some disorder of vision, are produced. Just as in many diseases in which mercury has been found a most efficient remedy, it is necessary to continue the use of this mineral until the mouth be affected, and often even to use it for some time afterwards. Of the success of belladonna in the treatment of neuralgia, we have abundant evidence

For some interesting observations on the associated functions of the retina and iris, consult Agar's Observations on the Structure and Functions of the Spinal Cord, p. 73, et seq.
in the published cases of Mr. Bailey, and of several other practitioners. My own experience of the use of this remedy leads me to regard it as very much inferior to aconite as a local remedy for disease.

Besides neuralgia there are many other painful affections as which belladonna is used as a local anodyne. Such are arthritic pains, painful ulcers, glandular enlargements which are tender to touch, &c. Dr. Osborne says, that given internally it causes a very considerable cessation of the migratory or flying pains of rheumatism without producing any effect on the fixed pains.

2. As an antispasmodic.—To relieve rigidity and spasm of the contraction of muscular fibres, belladonna sometimes proves serviceable as a topical remedy. In rigidity of the os uteri, during labor, during puerperal convulsions, the extract or an ointment of belladonna (see unguentum belladonna) has been applied to the parts. Though the practice has been followed by Chaney and adopted by Velpeau, Conquest, and others, yet it has not been much in favor with British practitioners. It cannot be regarded as a substitute for, but only an adjuvant to, depletion; and its use is not, as it is said, devoid of danger: for, not to insist on the possibility of absorption and the consequent injurious effects thereof, it is obvious that the long-continued friction of the tender womb, and the removal of lubricating mucus, may dispose to inflammation. In spasmodic contractions of the urethra, and of the sphincters of the bladder and rectum and in spasmodic contraction of the uterus, the topical use of the extract (smear on a bougie, applied to the perineum or other point, employed by way of a clysma) has in some cases appeared to be very effective. In strangulated hernia it has been employed to produce relaxation of the abdominal muscles.

In a case of angina pectoris, unconnected with organic disease, application of a belladonna plaster to the chest (before the ulcer caused by tartar emetic ointment had healed) produced all the signs of poisoning; but when these had subsided, all symptoms of the angina had totally disappeared.

Considerable relief has been gained in several cases of haemoptysis by the use of belladonna. Its occasional efficacy depends, probably, on its lessening the necessity of respiration, and also on its power of obviating spasm of the bronchial tubes, decreasing the susceptibility of the bronchial membrane to irritation.
of the exciting causes of the paroxysms. But like all other
specifics for this peculiar disease, it frequently fails to give
any relief.

3. In Maladies of the Eyes.—Belladonna is applied to the eye for
two purposes: the first, and the most common, is to dilate the pupil;
the other is to diminish the preternatural sensibility of the retina to
the impression of light. Dilatation of the pupil is sometimes produced,
in certain diseases of the eye, in order to enable us to examine the
condition of the refractive humours, and thereby to ascertain the
nature and extent of the malady; as in cases of incipient cataract,
which might otherwise be occasionally confounded with glaucoma or
anamnestic. In the operation of cataract by solution or absorption
(extrabonyx), the full dilatation of the pupil by belladonna is essential.  

In iritis, dilatation of the pupil is important, in order to prevent, or in
acute cases to rupture, adhesions of the uvea to the capsule of the
crystalline lens. Some surgeons consider it an objectionable remedy
during the early stage of the disease. In prolapsus iridis benefit is,
under some circumstances, gained by the use of belladonna; as,
where there is opacity of the cornea covering the pupil, the dilatation
of the aperture, so as to get its circumference beyond the opaque spot,
is attended with an improvement of vision. These are some of the
cases in which dilatation of the pupil by belladonna is advisable. It
is usually effected by applying the extract (see extractum belladonnae)
in the parts around the eye, or to the conjunctiva. The dilatation
usually takes place within a few minutes, and sometimes continues
for twenty-four hours.

Belladonna is sometimes employed in inflammatory and other affec-
tions of the eye, to diminish the morbid sensibility of this organ to the
influence of light.

4. As a resolvent or discutient.—In enlargement and induration of the
lymphatic glands, in scirrhus and cancer (or diseases which have been
supposed to be such), belladonna has gained no slight repute from its
supposed resolvent or discutient properties. That it may give relief
by its anodyne powers we can easily understand, but that it has any
real resolvent or discutient properties in the diseases just enumerated,
may be reasonably doubted, notwithstanding the favourable reports
of Gataker, Cullen, Blackett, and others. Bromfield and
others have reported unfavourably of it, and no one, I think, now
places any reliance on it.

5. As a prophylactic against Scarlatina.—The introduction of
belladonna into practice as a preventive of scarlet fever, is owing to
the absurd homeopathic axiom of ‘similia similibus curantur;’ for as
this plant gives rise to an affection of the throat, and sometimes to a
scarlet rash on the skin, its power of guarding the system against the reception of scarlet fever has been assumed; and the assumption has been endeavoured to be established by an appeal to experience. Bayle has collected from various publications 2,027 cases of persons who took this medicine, and were exposed to the contagion; of these, 1,948 escaped. Oppenheim gave it to 1,200 soldiers, and only two became affected. To the authorities here referred to may be added Hufeland and Koreff, who admit, from their own personal observations, the efficacy of the remedy, though they have not specified the number of cases in which they have tried it. But bearing in mind the well-known capriciousness evinced by scarlet fever (indeed by other contagious disorders) in regard to the subjects of attacks, and the large number of those who, though exposed to influence, escape, the best evidence hitherto adduced in favour of the notion must be admitted to be inconclusive. While, therefore, facts brought forward in favour of the existence of this prophylactic power are only negative, those which can be adduced against it positive. For I conceive twenty cases of failure are more conclusive against the opinion here referred to, than one thousand of non-occurrence are in favour of it. Now Lehman, Barth, Wendt, Mubrecht, Hoffmann, Bock, and many others that I could refer to, declare has failed in their hands to evince its prophylactic powers. In our country we have no extended series of observations to quote; but cases which I am acquainted with are decidedly against the efficacy of the remedy. A remarkable failure is mentioned by Dr. Signer of a family of eleven persons who took the supposed specific, every individual contracted the disease.

6. In Fever, with contraction of the pupil.—Dr. Graves has recently proposed the use of belladonna in those cases of fever with cerebral disease which are attended with contraction of the pupil. It is unreasonable, he observes, "to suppose that the state of which accompanies dilatation of the pupil is different from that which accompanies contraction; and if belladonna has an effect in reducing that cerebral state which is attended with dilatation, it is going too far to infer, that its administration may do much towards counteracting the opposite condition; neither is it unphysiologically to conclude, that if a remedy be capable of counteracting, or preventing, one very remarkable effect of a certain morbid state of brain, it may also counteract other symptoms connected with same condition." This line of argument, it must be admitted, is

* Bibl. Therap. t. ii. p. 94.
* Ibid.
* Ibid. S. 80.
dic asthma and old catarrhs. In hydrophobia, notwithstanding the prophylactic powers of this medicine, there is no valid for believing in its efficacy. I tried it in one case without success. In epilepsy, mania, hysteria, chorea, and some other maladies of the nervous system, occasional benefit has resulted by the use of Belladonna. In ileus it has been most successfully used in the form of a lotion. As a substitute for tobacco, which is objectionable on account of the horrible sickness and great depression which it causes.

_Instillation_—The dose of the powder for an adult is one dram, which should be gradually increased until dryness of the dilatation of pupil, or some head symptoms, are produced. For children the dose at the commencement should be one-eighth of a dram. For internal as well as external use the extract or tincture is commonly employed. For external use an infusion of the leaves is sometimes used as a fomentation, or is made into a poultice with bread or linseed meal.

_Notes._—Similar to those for opium. After the use of evacuants vegetable acids have appeared to give great relief. Decoction of the roots of green tea might probably prove serviceable.

TRACTUM BELLADONNAE, L. E.; _Succus spissatus Belladonnae_. Extract of Belladonna.—(Fresh Belladonna leaves, lb. i. Bruise the leaves with a little water, in a stone mortar; then press out the juice, unstrained, to a proper consistence, L. Edinburgh College directs the expressed juice to be filtered, and evaporated, in the vapour-bath, to the consistence of firm syrup.)—The Dublin College directs it as the _Succus spissatus Aconiti_, D.)—1 cwt. of fresh belladonna yields from 4 to 6 lbs. of extract. Dose gr. i. to gr. v.
effects of the remedy are produced. Mr. Bailey observes, that he first began with one grain, and repeated it every four hours until relief followed; but further experience induced him to commence with three times that quantity, and, if a repetition were necessary, to give it in diminished doses afterwards. Spread upon leather the extract is frequently used as a plaster to relieve neuralgic and other pains (see Emplastrum Belladonae). Diluted with water to the consistence of cream, it is applied to the eyebrow to produce dilatation of the pupil; or an aqueous solution of the extract is dropped between the lids. Mixed with lard or spermacteli ointment it is used as a topical anodyne and antispasmodic in various diseases (see Unguentum Belladonae). A bougie smeared over with the extract and oil, is sometimes used with benefit in stricture. A drachm or two of the extract, either alone or in the form of ointment, may be applied to the os uteri to diminish rigidity. In irritation of the bladder, urinary organs, or rectum, elysters holding in solution the extract are sometimes used. Rubbed into the perineum or over the track of the urethra, the extract or ointment is useful in preventing chordee, and alleviating spasm of the neck of the bladder.

2. Emplastrum Belladonae, L. E. D.; Plaster of Belladonna.—(Extract of Belladonna, 3iss. [3ij. D.]; Plaster of Resin, 3iiij. [See Plaster, 3ij. D.].) Add the extract to the plaster, melted by the heat of a water-bath, and mix. —Anodyne and antispasmodic. Applied for the relief of neuralgic, rheumatic, and other pains. It is said to relieve the pain of dysmenorrhea when applied to the sacrum. In spreading it, care must be taken not to employ a very hot portion or the properties of the extract will be injured.

3. Unguentum Belladonae, Ointment of Belladonna.—(Spermacteli Ointment [or Lard] 3ij.; Extract of Belladonna, 3ij. to 3iiij. Mix.—Though not contained in any of the British pharmacopoeias, it is very useful preparation; and may be used as an anodyne and antispasmodic in some of the before-mentioned cases.

4. Tinctura Belladonae, Tincture of Belladonna.—(Belladonna leaves, dried, 3ij.; Proof Spirit, 13xvj. Macerate for twenty [fourteen days, and strain. Bailey.) —Is not contained in the British pharmacopoeias. Mr. Bailey’s formula here given contains the same proportions of leaves and spirit as those used in the preparation of Tinctura Hyoscyami, L.—Dose, $\frac{1}{10}$xx. to $\frac{1}{10}$xl. Mr. Blackett prepared a saturated tincture of belladonna by macerating, for fourteen days, 3xvi. extract of belladonna in lb. j. of proof spirit; then straining. To this dose of this is $\frac{1}{10}$ij. or $\frac{1}{10}$iiij. gradually increased: in the form of lotes a drachm of it was added to eight ounces of liquid.

Succus Belladonna.—The Preserved Juice of Belladonna (see p. 365) may be substituted for the tincture. Mr. Bentley informs me that from 2 cat. of belladonna leaves gathered towards the end of June he procured 36 imperial quarts of juice.
TORON 1 STRAMONIUM, L. E. D.—COMMON THORNAPPLE.

Sex. Syst. Pentandra, Monogynia.
(Folia et Semina, L.—Herb, E.—Herba et Semina, D.)

ORY.—Some writers consider this plant to be the στοϊχνον of Dioscorides;—an opinion scarcely tenable, as this ancient Cologist describes his plant as having a black flower and black Datura. Stramonium is mentioned by Fuchs in 1542.

ANY. Gen. Char.—Calyx large, tubular, ventricose, five-angled; re-cleft, caducous; base orbiculate, peltate, persistent. Corolla funnell-shaped; tube long; limb five-angled, five-plicate, five-lobed.

Stamens five. Stigma two-lamellar. Capsule bristly or ovate, two-celled; cells two- or many-parted with a prominently prominent beak (Bot. Gall.)

har.—Fruit spinous, ovate, erect. Leaves ovate, smooth, sinuate.

lilly, smooth, fetid herb. Stem much branched, forked, spreading. Leaves from the forks of the stem, large, unequal at the variously and acutely sinuated and toothed, simple-ribbed, of a dull-green. Flowers axillary, erect, white, sweet-scented, usually at night, about three inches long. Fruit as big as a truffle, in its outer coat very prickly. Seeds black (Smith).


scription.—The herb (herba stramonii) should be collected when the plant is in flower. The leaves (folia stramonii) are then to be fully dried. In the fresh state their odour, when bruised, is pleasant and narcotic; their taste nauseous and bitter. By drying the odour is lost, but the bitter taste remains. The seeds (semina stramonii) are small, compressed, kidney-shaped, roughish, dark brown or blackish, dull, and odourless: they have a bitter, nauseous, somewhat acrid taste.

composition.—The herb was analyzed, in 1815, by Promnitz; the seeds, in 1820, by Brandes.

<table>
<thead>
<tr>
<th>Promnitz’s Analysis</th>
<th>Brandes’s Analysis</th>
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<tbody>
<tr>
<td>Wet active (containing the Datura)</td>
<td>Malate of datura with some uncrystallizable sugar</td>
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<tr>
<td>0.12</td>
<td>1.80</td>
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<tr>
<td>Dry active</td>
<td>Fixed oil with some chlorophyll</td>
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<tr>
<td>0.60</td>
<td>16.05</td>
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<tr>
<td>Extractive</td>
<td>Wax</td>
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<td>0.58</td>
<td>1.40</td>
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<td>Resin</td>
<td>Resin insoluble in ether</td>
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<td>0.54</td>
<td>0.90</td>
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<tr>
<td>Plastic and vegetable salts of lime</td>
<td>Extractive</td>
</tr>
<tr>
<td>0.23</td>
<td>0.60</td>
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<tr>
<td>Magnesia</td>
<td>Gumy extractive</td>
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<tr>
<td>91.25</td>
<td>6.00</td>
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<tr>
<td>Clay fibre</td>
<td>Gum and Bassorin with some salts</td>
</tr>
<tr>
<td>5.15</td>
<td>11.30</td>
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<tr>
<td>Fresh Herb of Stramonium</td>
<td>Albumen and phytocola</td>
</tr>
<tr>
<td>1.28</td>
<td>6.45</td>
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<tr>
<td></td>
<td>Glutendin</td>
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<td></td>
<td>5.30</td>
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<tr>
<td></td>
<td>Malates of datura, potta, and lime, and acetate of potash</td>
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<tr>
<td></td>
<td>0.60</td>
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<tr>
<td></td>
<td>Woody fibre</td>
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<td></td>
<td>23.35</td>
</tr>
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<td>Water</td>
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<td>15.10</td>
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<tr>
<td></td>
<td>Loss</td>
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<td>1.25</td>
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Seeds of Stramonium...... 100.00

* Lib. iv. cap. 76.
* Ibid.
1. **Datura** (Daturina or Daturium).—A vegetable alkali said to exist in stramonium. The properties assigned to it by Geiger and Hesse are the following:—It crystallizes in colourless, odourless, brilliant prisms, which have at first a bitterish, then a tobacco-like flavour. It requires 280 parts of cold, or 72 parts of boiling water, to dissolve it: it is very soluble in alcohol, less so in ether. It most of its properties it agrees with hyoscyamia. It strongly dilates the pupil and has a poisonous action on animals.

2. **Empyreumatic Oil of Stramonium** (Pyrodatura?;)—Resembles tar in the aqueous fluid which distills along with its acid. This arises from the wort part of the plant having been employed. The oil itself does not differ, in its physical and chemical properties, from the empyreumatic oil of foxglove, below (p. 1200) described.

**Physiological Effects.** a. **On Vegetables.**—A branch of stramonium was killed by immersing it in a watery solution of the extract of its own species.

b. **On Animals generally.**—Its influence on herbivorous animals is much less than that on man. Five ounces of the expressed juice given to the horse causes merely slight drowsiness and gaping. Two pounds and a half of the seeds killed a horse in fifty-two hours. From Orfila’s experiments with it on dogs it does not appear to act powerfully as a local irritant. Its effects were very similar to those caused by belladonna.

g. **On Man.**—The symptoms produced on man closely resemble those caused by belladonna. In small but gradually increased doses it diminishes sensibility, and thereby frequently alleviates pain; it does not usually affect the pulse; it slightly and temporarily dilates the pupil, and has no tendency to cause constipation, but rather laxation. Though it allays pain it does not usually produce sleep. In larger doses it causes thirst, dryness of the throat, nausea, listlessness, nervous agitation, dilatation of the pupil, obscurity of vision, headache, disturbance of the cerebral functions, perspiration, occasionally relaxation of bowels, and in some cases diuresis. It has a direct tendency to induce sleep, and hence it cannot be called soporific. But indirectly, by alleviating pain, and thereby producing serenity and ease, it often disposes to sleep. In fatal doses the leading symptoms are flushed countenance, delirium (usually maniacal), dilatation of the pupil, dryness of the throat, loss of voice, difficulty of deglutition, convulsions, and, in some cases, palsy. A very interesting fatal case of poisoning by 100 seeds, is related by Mr. Duffin. The patient (his own child) was two years and a quarter old. In addition to the preceding symptoms there were hot, perspiring skin, flushed, slightly swollen face, pulse almost imperceptible, but, as far as could be felt, it was natural in regard to frequency, and coldness of the inferior extremities. The anterior fontanelle was neither tense, hot, nor in the slightest degree raised by the cerebral pulsations; so that there did not seem to be any action

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*Pharma. Central-Blatt für 1855, p. 83.
5. Toxicol. Gén.
COMMON THORNAPPLE. 1239

ermination of blood to the brain. During the continuance of the
na the pulse became extremely rapid. Death occurred twenty-
years after swallowing the seeds.

Vogt\footnote{Pharmaeologia. Ed. i. 3. 164.} says, stramonium is probably distinguished from bella-

1. Its effects are more similar to those of acrid vegetables, especially of Hel-

leborus.

1. It operates more strongly, but more in the manner of the acrid substances,
on the nervous system, especially on the central organs, viz. the ganglia,
spinal cord, and brain.

2. Its secondary effects on the irritable system are not so marked; for most
observers have failed to detect any alteration of pulse, and a slow pulse is
more frequently mentioned than a quick one.

3. It operates on the organic life more strongly. It more strongly and
directly promotes all the secretions, especially the secretion of the skin.

have inferred, from numerous observations, that it
possesses an anodyne property, which it frequently evinces where opium
and belladonna fail.

USES.—A more extended experience of this plant is requisite to
able us to speak with much confidence of its employment. The
ularity of its effects with those of belladonna would lead us to
pect a similarity of uses. Like the last-mentioned plant it has
en successfully employed to diminish sensibility, and thereby to
der external pain. Some of the other uses made of it require a
be impartial examination ere we can form any just estimate of
r value. The indications and contra-indications for its employ-
et are probably similar to those of belladonna. In persons dis-
ed to apoplexy it is a very dangerous remedy.

In neuralgia (tis douloureus, sciatica, &c.) it has been employed
ith considerable success, by Lentin\footnote{Bibl. Ther. t. ii.}
Begbie\footnote{Med.-Chir. Trans. vols. vii. and viii.}
. It is given internally in the form of extract. Its external application
scarcely been tried. In rheumatism it has frequently proved ser-
able from its anodyne qualities\footnote{Ed. Med. and Phys. Journ. vol. xxv. p. 51.}. In enterodynia (that is, spas-
ic pain of the bowels unconnected with inflammatory action or
presence of irritating substances), Dr. Elliotson\footnote{Lancet, 1826-7, vol. xii.; and 1827-8, vol. ii.}
found it most

In some cases of spasmodic asthma, smoking the herb has given
least temporary relief\footnote{Medical and Phys. Journ. vol. xxv. p. 51.} : but the practice requires very great
ation, as it has proved highly injurious, and in some instances
d. Dr. Bree\footnote{Lancet, 1826-7, vol. xii.; and 1827-8, vol. ii.} tried it in 82 asthmatic cases: in 58 of these
had no permanent effect, and in the remaining 24 it acted
injuries. General Gent, who was instrumental in introducing this practice, fell a victim to it. Aggravation of the dyspnœa, paralytic tremblings, epilepsy, headache, and apoplexy, are some of the effects said to have been induced in the cases above referred to. In persons disposed to head affections, and in aged persons, it is, therefore, a highly dangerous practice.

The diseases in which stramonium has been principally used are: mania and epilepsy. Bayle has collected from the works of Schemalz, Razoux, Reef, Meyer, Odhelius, Durande, Maret, Bergeding, Schneider, Bernard, and Amelung, fifty-five cases of the latter malady, treated by stramonium: in all of these cases a considerable majority of cases are said to have been cured or relieved by it. Without denying the occasional benefit of stramonium in these diseases, I believe the cases in which it is not viceable to be very rare, while those in which it is calculated to be injurious are very common. Dr. Cullen observes, that he has no doubt that narcotics may be a remedy for certain cases of mania; epilepsy; but he very justly adds, "I have not, and I doubt if any other person has, learned to distinguish the cases to which a remedy is properly adapted."

Stramonium has been used to dilate the pupil and to diminish the sensibility of the retina to the influence of light; but for both of these purposes belladonna is preferred by British oculists. Wentieth of a grain of the powdered leaves, or 3 minims of the tincture of the powdered leaves, and 3 minims of lard, has been used as an anodyne application to irritable ulcers and to painful hemorrhoids. The application of the leaves to burns has been attended with dangerous results.

Administration.—The dose of the powdered leaves is one grain of the seeds half a grain. These doses are to be repeated twice a day, and to be gradually increased until some obvious effect is produced.

1. EXTRACTUM STRAMONII. L. E. D. Extract of Thornapple (Thornapple seeds, 3 xvi. [lb. D.]; Boiling distilled water, 1 gal. Macerate for four hours in a vessel slightly covered, near the fire; afterwards take out the seeds, and bruise them in a stone mortar; turn them, when bruised, to the liquor. Then boil down to four parts and strain the liquor while hot. Lastly, evaporate to a proper consistence. L. D.—The directions of the Edinburgh College are as follows:—Take of the seeds of stramonium, any convenient quantity; grind them well in a coffee-mill. Rub the powder into a thick mass with proof spirit; put the pulp into a percolator, and transmit the spirit till it passes colourless; distil off the spirit, and evaporate what remains in the vapour-bath to a proper consistence.)—Of the above modes of preparation, that of the Edinburgh College is doubtless the best.
as yielding a more efficient preparation. The product, according to the London and Dublin process, is about 12 per cent. states, that 16 ozs. of the seeds yield 2 ozs. 2 drs. by maceration in dilute alcohol: this is about 14 per cent. The dose of extract of stramonium, at the commencement, is about a quarter of an ounce; which should be gradually increased until some obvious effect is produced.

2. TINCTURA STRAMONII, Ph. United States. Tincture of Thornapple.—(Stramonium seeds, bruised, 3iv.; Proof Spirit, 3xxxij. Marinate for fourteen days, and filter through paper).—Dose 1x. to 1x. twice or thrice a day, gradually increased until it occasions some obvious effect on the system. This preparation is applicable to the cases for which stramonium is used.

ANTIDOTES.—The same as for belladonna.

4. NICOTIA'NA TABAC'UM, L. E. D.—VIRGINIAN TOBACCO.


HISTORY.—The inhalation of the fumes of burning vegetable sub- stances, both for causing inebriation and for medicinal purposes, seem to have been very anciently practised. Herodotus tells us, that the Pharaoh's intoxicated themselves by this means; and both Dios- krides and Pliny declare the efficacy of smoking Tussilago in stinate cough.

Humboldt says, that the tobacco plant has been cultivated, from the immemorial, by the natives of Oronoko. It does not appear, however, to have been known to Europeans prior to the discovery of America; though it is not improbable that the Asiatics were acquainted with it long before that time, as Pallas, Rumphius, and Goerlo, have supposed. But it is not probable, I think, that Europeans learned the use of it from the Asiatics, as Ulloa has endeavored to show.

When Columbus and his followers arrived at Cuba, in 1492, they, for the first time, beheld the custom of smoking cigars. Hernandez de Toledo introduced the plant into Spain and Portugal; and, from the latter place, Joan Nicot sent the seeds or the plant to France, about 1559-60. In 1586, on the return of Sir Francis Drake, with the colonists, from Virginia, the practice of smoking was introduced into England; and, being adopted by Sir Walter Raleigh and other settlers, soon became common.

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1 Blicher, Observ. on the Dub. Pharm.; United States' Dispensatory.
2 C. eii. cap. 126.
3 Newth, xxxvi. cap. 16, ed. Valp.
5 See Narrative, vol. ii. p. 287; also the Narrative of Don Juan Nicot, son-in-law of Columbus, Hist. del Amor, cap. 27, in Barcia, Hist. prim. de las Ind. vol. i. p. 24.
6 Min's Poem.
Various attempts, by writings, impostors, or bodily punishments, made in Europe to restrict or put down its use. It is said, the wards of a hundred volumes were written to condemn its enactment; and not the least curious of these is the celebrated "Confutation to Tobacco" of James I. Despite, and partly, perhaps, a consequence of these attempts, the use of tobacco rapidly spread and is now universal throughout the world.

The generic appellation Nicotiana is obviously derived from the name of an individual above referred to. The origin of the specific name Tabacum is less satisfactorily ascertained. It is probable, however, that the word is derived from tabac, an instrument used by the natives of America in smoking this herb; though some derive it from Tobago, others from Tabasco, a town in New Spain.


Sp. Char.—Leaves sessile, oblong-lanceolate, acuminate, the ones decurrent. Throat of the corolla inflate-ventricose; limb acuminated segments (Bot. Gall.)

Fig. 251. Fig. 252.

Nicotiana Tabacum. Nicotiana rustica.

A viscid herb. Root branching, fibrous. Stem three to six high, erect, round, hairy, branching at the top. Leaves very pale green, with glandular short hairs. Bracts linear;

† Works, p. 214, fol. 1616.

Hab.—America. Extensively cultivated in most parts of the world, especially the United States of America. Virginia is the most celebrated for its culture. North of Maryland the plant is rarely seen. In England the cultivation is restricted; not more than half a pole being allowed “in a physic or university garden, or any private garden for physic or chirurgery.”

Nicotiana Rustica, Common Green Tobacco, is cultivated in several parts of the world. It yields a milder tobacco, and is said to have been preferred by Sir Walter Raleigh. Syrian and Turkish Tobaccos are prepared from it. “Mr. D. informs me,” observes Dr. Royle, “that it also affords the tobacco of Salona (the ancient Thessalonica); probably also that of Latakia (Laodicea), which is much esteemed.”

Nicotiana Repanda is said to yield the small Havana cigars (Royle).

Nicotiana Persica yields the delicate and fragrant tobacco of Shiraz (Isfahan).

Culture.—In Virginia and Maryland the seeds are thickly sown in beds of finely-prepared earth. When the young plants have five to six leaves, exclusive of the seminal leaves, they are transplanted to fields during the month of May, and set three or four feet apart in rows. During the whole period of growth the crop requires constant attention, and to promote the development of leaves, the tops are pinched off, by which the formation of flowers and seed is prevented. The harvest is in August. The ripe plants are cut off above the roots, dried under cover, stripped of their leaves, tied in bunches, packed in hogsheads, &c.

Commerce.—The duty (besides an additional 5 per cent. on the 3d) on tobacco, the produce of British possessions in America, is 44 per lb.; of other parts, 3s.—on snuff, 6s. per lb.—on cigars, and other kinds of manufactured tobacco, 9s. These exorbitant duties lead to extensive smuggling. In 1840 120,884 cwt. of tobacco, and 169,777 lbs. of cigars, paid duty.

An extensive manufacturer of Tobacco has supplied me with the following facts as to the consumption of tobacco in this country:—

“In the year 1839, the revenue on tobacco was about £3,600,000. Of this, it has been estimated 12/13 are drawn from the working classes, 1/13 from the richer classes. Of the latter, one half (or 5/12 of the whole amount) is contributed by Foreign and British manufactured cigars.”


Consumption of Tobacco per Head of Population, calculated from the
lbs. on which duty was paid.

<table>
<thead>
<tr>
<th>Year</th>
<th>Rate of Duty</th>
<th>Consumption per Head</th>
</tr>
</thead>
<tbody>
<tr>
<td>1801</td>
<td>7 3/4 England</td>
<td>17 5/8</td>
</tr>
<tr>
<td></td>
<td>1 9/75 Ireland</td>
<td></td>
</tr>
<tr>
<td>1811</td>
<td>2 9/8</td>
<td>19 1/4</td>
</tr>
<tr>
<td>1821</td>
<td>4 0</td>
<td>11 5/8</td>
</tr>
<tr>
<td>1831</td>
<td>3 0</td>
<td>12 5/8</td>
</tr>
<tr>
<td>1841</td>
<td>3 17/66</td>
<td>8 3/4 12 2/3</td>
</tr>
</tbody>
</table>

Hence the consumption is materially affected by the rate of

DESCRIPTION.—Tobacco (folia tabaci seu nicotianae) as met
commerce, has a brownish colour, a strong narcotic but peculiar
and a bitter, nauseous taste. The darker-coloured tobaccos
strongest. For medicinal purposes Virginian tobacco in leaf
be employed. When this cannot be procured, shag may be
ated. The following are the principal commercial kinds:

1. AMERICAN.—The Virginian is one of the strongest kinds, and is, not fit for cigars, but is adapted for pipes and snuff, and for medicinal
is imported in leaves or heads contained in hogsheads. Its colour
mottled brown; the leaves feel unctuous. The Maryland is paler, y
weaker, and adapted for smoking: the pale cinnamon is the best, the se
commonest. The Kentucky is intermediate between the two preceding
paler and weaker than the Virginian. The Carolina is less frequently m
and is of inferior quality. The Havanna is most esteemed for smoke
colour is yellowish-brown; its odour is musky or spicy. It is imported i
The Cubas is an excellent kind; it is darker than the Havanna. Be
kinds, as well as the Columbian, are remarkable for the light yellow
the leaves. The Columbian is imported in heads and leaves, and is r
esteemed for cigars; for which it is more used than any other kind. It
brown, but not mottled like the Virginian. The Varinas is brought n
rolls and in hands. It is spotted like the preceding. It is a mild 1
suitable for smoking only. The Porto Rico is allied to the Varinas.
in rolls. The St. Domingo is imported in leaves; it is deficient in O
Orinoko comes in leaves.

2. EUROPEAN.—The only European tobacco extensively consumed
country is Amersfoort, a Dutch tobacco. It is very mild and deficient i
The darker kind is the strongest, and is much esteemed for snuff; while th
weaker kind is employed in the manufacture of the commoner S
Several German, Hungarian, and Ukrainian tobaccos are occasionally m
3. ASIATIC.—East Indian tobacco has never obtained a high reputa t
from the inattention to its cultivation. The Manila is dark colours m
much esteemed for cheroots. The Shiraz, the Salomica (the ancient T
the Latakka (Laodicea), are other valued Asiatic kinds. Turkey to
and yellowish. It occurs in small, short, broad leaves. It is a weak a
and is cut for smoking.

MANUFACTURED TOBACCO.—Under this head are included ferent forms of tobacco prepared for chewing and smoking, taking as snuff.

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* Sinsheim, Die Rausch. u. Schaugtaubk.-Farbrikation. 1826.
1. **Chewing and Smoking Tobaccos.**—Manufacturers distinguish chewing tobaccos and those used in pipes into two kinds, called respectively cut and roll tobacco. For smoking in the pipe cut tobacco is principally used in England,—the roll, in Scotland and Ireland. Cigars and cheroots form a third kind.

2. **Cut Tobaccos.**—Among these **shag** deserves the first notice. It is prepared by moistening (with _liquor_) and compressing leaves of tobacco (Virginia and Kentucky kinds principally) deprived of their midribs, by cutting the compressed mass with knife-edged chopping stamps. **Burns** is a lighter coloured and milder smoking tobacco. It derives its name from its being formerly prepared by returning shag for cutting. **Bird’s-eye** is prepared like shag, with the exception that it contains the midribs of the leaves, the slices of which have been removed to the eyes of birds. **Maryland** is another kind of cut tobacco. **Canaster** or **Kanaster** is a favourite kind. It received its name from **Canstra** (a Spanish word, signifying _a basket_), because it was packed in baskets. It is prepared from Varinas tobacco. **Oronoko**, **Irkey**, **Persian**, and **Varinas**, are also cut tobaccos.

3. **Roll or Twist Tobaccos.**—These are prepared by twisting tobacco into a kind of rope, which is moistened with liquor, and usually made up into cylindrical or barrel-shaped rolls, which are subjected to pressure before they are considered fit for sale. **Pigtail**, **cro-head**, **Bogie**, **Allou**, **Cavendish**, and **Irish Twist**, are roll tobaccos, chewing and smoking.

4. **Cigars.**—These are small rolls of tobacco, permeable to air, and suited for smoking. **Cigars** were originally derived from the New World. They are distinguished from Cheroots by their pointed extremity called the **curl** or **twist**. The **Havannah Cigars** are in great request by smokers. Cigars, however, are extensively made in London. Cheroots were originally derived from the East. They are characterized by their truncated extremities. **Manilla Cheroots** are much liked by smokers. Cheroots, however, like cigars, are extensively manufactured in London.

5. **Snuffs.**—In the manufacture of snuff, tobacco, cut in small pieces, is first fermented by placing it in heaps and sprinkling it with water as a solution of salt; the latter prevents the tobacco becoming mouldy. The heaps soon become hot and evolve ammonia. The extent to which this process is allowed to proceed, varies with different kinds of snuff. The usual time is two or three months,—seldom less than one month. The fermented tobacco is then ground in mills, or powdered with a kind of pestle and mortar. The Scotch and Irish are prepared for the most part from the midribs; the Strasburgh, French, and Russian snuffs, from the soft part of the leaves. The things, sometimes termed **thirds**, are usually reground. Sal ammoniac is occasionally added to snuffs.

The immense varieties of snuffs found in the shops are reducible to two kinds, dry and moist snuffs.

6. **Dry Snuffs.**—These derive their characteristic property from being dried at a high temperature. **Scotch**, **Irish**, and **Welsh**, are well known high-dried snuffs. The _latter_ contains lime, the particles of
which may be usually distinguished by the naked eye; hence its desiccating effect on the pituitary membrane. Spanish snuff is a dry snuff.

β. Moist Snuff: Rappees. It is sometimes said that pearls added to these snuffs to keep them moist, but several respectable manufacturers assure me this is not usual. The rappees of the two may be divided into three classes:


γ. Scented Rappees. — Ex. Prince's Mixture and Princess, etc.

It is said that tobacconists employ, in the preparation of tobacco, a solution of sea-salt, (sp. gr. 1.107), which is termed the same liquor, but I am assured that this is not generally the case. In liquor, it is further stated, is sometimes coloured by treacle or liquor.

Composition. — The juice of the fresh leaves of tobacco was analysed in 1809 by Vauquelin. Subsequently this chemist analysed manufactured tobacco. In 1821 Hermbstädt discovered nicotine. In 1827 the leaves were analysed by Posselt and Reinmann, and in 1831 by Dr. Conwell.

Vauquelin's Analysis.

<table>
<thead>
<tr>
<th>Substance</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nicotina</td>
<td></td>
</tr>
<tr>
<td>Alumbrum</td>
<td></td>
</tr>
<tr>
<td>Red matter, soluble in alcohol and water</td>
<td></td>
</tr>
<tr>
<td>Acetic acid</td>
<td></td>
</tr>
<tr>
<td>Suprimalate of lime</td>
<td></td>
</tr>
<tr>
<td>Chlorophyll</td>
<td></td>
</tr>
<tr>
<td>Nitrate of potash and chloride of potassium</td>
<td></td>
</tr>
<tr>
<td>Sal ammoniac</td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td></td>
</tr>
</tbody>
</table>

Expresed juice of the leaves.

The leaves contained, in addition to the above, woody fibre, oxalate and phosphate of lime, oxide of iron, and silica. The two latter substances were obtained from the ashes.

Manufactured tobacco contained the same principles; and in addition, carbonate of ammonia and chloride of calcium, perhaps produced by the reaction of sal ammoniac and lime, which are added to tobacco to give it pungency.

<table>
<thead>
<tr>
<th>Substance</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nicotina</td>
<td></td>
</tr>
<tr>
<td>Concrete volatile oil</td>
<td></td>
</tr>
<tr>
<td>Hitter extractive</td>
<td></td>
</tr>
<tr>
<td>Gum with malate of lime</td>
<td></td>
</tr>
<tr>
<td>Chlorophyll</td>
<td></td>
</tr>
<tr>
<td>Alumnum and gluten</td>
<td></td>
</tr>
<tr>
<td>Malic acid</td>
<td></td>
</tr>
<tr>
<td>Lignin and a trace of starch</td>
<td></td>
</tr>
<tr>
<td>Salts (sulphate, nitrate, and malate of potash, chloride of potassium, phosphates and malate of lime, and malate of ammonia)</td>
<td></td>
</tr>
<tr>
<td>Silica</td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td></td>
</tr>
</tbody>
</table>

Fresh leaves of tobacco.

1. Nicotina (Nicotin). — Exists not only in the leaves, but also in the seeds of tobacco. It is obtained by infusing the leaves in water acids with sulphuric acid, concentrating the infusion, and distilling with lime or nesia. The distilled product is a solution of ammonia and nicotine, and is saturated with sulphuric acid, and evaporated to dryness: the sulphate of nesia is then to be dissolved out by ether, and decomposed by hydrate of baryta. Nicotina is obtained by spontaneous evaporation. To obtain it pure, it is distilled by an oil-bath at the temperature of 288° F. The following are its leading properties:—It is a colourless, liquid, volatile alkali, with the odour of tobacco, and an acid, burning taste. It restores the blue colour of red...
and renders tumeric brown. At 375° F, it boils, and at the same time decomposes. By exposure to the air it becomes brown and thick, flaky combustible with the aid of a wick. It is soluble in water, ether, and the oils (fixed and volatile). It combines with acids and forms the sulphate, phosphate, oxalate, and tartrate, are crystallizable; the acetate its atomic weight is about 210. The acetate of nicotine yields a white precipitate with a solution of bichloride of mercury, and a yellow precipitate with chloride of platinum. The precipitates (which are salts) lead to a suspicion that ammonia was present in the nicotine salt, with water the yellow precipitate obtained by chloride of platinum is dissolved into the platinum-bichloride of ammonium. Mr. E. Davy found that it acted as a narcotic poison on insects. The following are the quantities that were yielded by 1000 parts of various kinds of tobacco:——Cuba, 6-64; id., 8-28; Virginia, 10-00; Ile de Vilain, 11-20; Lot, 7-48; North, 11-23; armen, 8-20; for smoking, 9-86.

**CRETE VOLATILE OIL OF TOBACCO** (Nicotianin, Hermbstädt; Tobacco, Gmelin).—Obtained by submitting tobacco, leaves, with water, to distill. Six pounds of the leaves yielded eleven grains of oil, which swims on the surface of the liquor. This oil is solid, has the odor of tobacco, and a bitter taste. It is volatile, insoluble in water and the dilute acids, but soluble in ether and potash. According to Zanderer, fresh tobacco leaves yield no oil, which, therefore, would appear to be developed by the drying of the leaves under the influence of air and water. Nicotianin excites, in the tongue and throat, a sensation similar to that caused by tobacco smoke. Hermbstädt, in a grain of it, and experienced, soon after, giddiness, nausea, and ineluctable vomiting. Applied to the nose, it causes sneezing.

**EMPERUSTRICUM OIL OF TOBACCO**.—Is rather less solid than the empyreumatic oil of fox-glove (see p. 1209); but it is undistinguishable from the latter by taste or smell. It is produced, in part at least, by the decomposition of the constituents of tobacco. It has been suggested, that this oil is "the cursed lebon," alluded to by Shakespeare, who also called it a "discomfort.

**TOBACCO SMOKE.**—The constituents of tobacco smoke, according to Raab, are carbonate of ammonia, acetate of ammonia, nicotine, empyreumatic oil, aqueous matter (soot), moisture, and several gases. Unverdorben obtained, by distillation of tobacco, water, oil, and resin. These products consisted of volatile oil, an oleaginous acid, an empyreumatic acid (Brandisäure), resin, of a powder insoluble in potash and acids, a small quantity of odorin, a base in water (nicotin?), fuscin, red matter soluble in acids, and two extractives, one forming a soluble, the other an insoluble, compound with lime.

**PHYSIOLOGICAL EFFECTS.** a. **On Animals generally.**—In the case of tobacco causes nausea, vomiting, sometimes purging, universal delusion, staggering, convulsive movements, and stupor. Five grains of rappee introduced into the stomach of a dog, secured by a ligature on the oesophagus, caused death in nine minutes. In another experiment, two drachms applied to the wound of the animal in an hour. Sir B. Brodie found that the infusion of tobacco, thrown into the rectum, paralyzed the heart, and caused death in a few minutes. But if the head of the animal be previously red, and artificial respiration kept up, the heart remains unaffect...
fected; proving that tobacco disorders this organ through the median of the nervous system only. In the herbivora the effects of tobacco as of other vegetable poisons, are much less marked: vomiting does not occur. Schubarth gave four ounces of the leaves to a horse, a
three times, within two hours. The pulse became irregular, the slower, afterwards quicker: respiration and the pupils were scarcely affected. For two days the stools and urine were more frequent. Moiroud observed no remarkable effect from the exhibition of a decoction of four ounces of tobacco to a horse.

It is remarkable that the empyreumatic oil of tobacco does not possess the same power of paralysing the heart. Applied to the tongue of a cat, one drop caused convulsions, and in two minutes death: on opening the body, the heart was beating regularly with force. Its operation, therefore, is analogous to that of hydrocyanic acid. Dr. Morries says, it has less tendency to induce convulsions than the empyreumatic oils of foxglove, henbane, or thornapple.

β. On Man.—In small doses, tobacco causes a sensation of heat in the throat, and sometimes a feeling of warmth at the stomach; the effects, however, are less obvious when the remedy is taken in liquid form, and largely diluted. By repetition it usually operates as a diuretic, and less frequently as a laxative. Accompanying the effects are oftentimes nausea and a peculiar feeling usually described as giddiness, but which scarcely accords with the ordinary acceptation of this term. As dropical swellings sometimes disappear under the use of these doses, it has been inferred that the remedy promotes the operation of the absorbents. In larger doses it provokes nausea, vomiting, and purging. Though it seldom gives rise to abdominal pain, it produces a most distressing sensation of sinking in the pit of the stomach. It occasionally acts as an anodyne, or at times as a stimulant. Though its most remarkable effects are languor, feebleness, relaxation of muscles, trembling of the limbs, great anxiety, and tendency to faint. Vision is frequently enfeebled; ideas confused; the pulse small and weak; the respiration somewhat laborious; the surface cold and clammy, or bathed in a cold sweat, and, in extreme cases, convulsive movements are observed. In excessive doses the effects are of the same kind, but more violent in degree. The more prominent symptoms are nausea, vomiting, and in some cases, purging, extreme weakness and relaxation of the muscles, depression of the vascular system (manifested by feeble pulse, pale face, cold sweats, and tendency to faint), convulsive movements, followed by paralysis and a kind of torpor, terminating in death.

Taken in the form of snuff its principal effect is topical. It causes increased secretion of nasal mucus, and, in those unaccustomed to its

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* Brodie, op. cit.
VIRGINIAN TOBACCO.

Getting into the throat it produces a feeling of acridity and nausea. From some kinds of rappee I have experienced great prostration of strength. Lanzoni in a man fell into a state of somnolency, and died on the twelfth day, in consequence of taking too much snuff. However, may be entertained, I think, that cases may arise from snuff. The habitual use of snuff blunts the sense of smell and alters the tone of voice; unacquainted with any other well-ascertained effects, en ascribes loss of appetite and dyspepsia to it; and Dr. B. says, that "the severe and peculiar dyspeptic symptoms produced by inveterate snuff-taking are well known; and that, in some cases, terminate fatally with malignity of the stomach and liver." I have known several snuff-takers who, after many years' use of this substance, inclined it with impunity; but Dr. Cullen thinks that when the mucus is considerable, the ceasing or suppression of mucus from snuff, is ready to occasion the very disorders of both the stomach and bile, and that it had formerly relieved. It not appear to be any good grounds for the supposed effects of the manufacture of snuff on the workmen. Sir W. commends the introduction of a tobacco leaf into the nostrils to relieve affections of the eyes and head.

The snuff of tobacco by those unacquainted to it, gives rise to re-described effects of large and excessive doses. A very case, which had almost terminated fatally, is related by Dr. Hall. It was that of a young man, who, for his first time, took two pipes. Gmelin mentions two cases of death, in the one of seventeen, in the other of eighteen, pipes of snuff, the practice, when employed moderately, produces remarkable soothing and tranquillizing effect on the present, that has made it so much admired and adopted by all classes and by all nations civilized and barbarous. I am not with any ill effects resulting from the practice of smoking. A similar observation is made by Dr. Yet Dr. Prout says it "disorders the assimilating power in general, but particularly, as I believe, the assimilation principle. I have never, indeed, been able to trace an element of oxalic acid to the use of tobacco; but that some and equally poisonous principle (probably of an acid nature, -

\[\text{On Poisons.}\]
\[\text{ed. ii. 974.}\]
\[\text{Nature and Treatment of Stomach and Urinary Diseases, p. 25. Lond. 1840.}\]
\[\text{On, op. cit.}\]
\[\text{p. 356, fol. 179.}\]
\[\text{Med. and Surg. Journ.} \text{vol. xii. p. 41.}\]
\[\text{by Christison.}\]
\[\text{p. 774.}\]
ture) is generated in certain individuals by its abuse, is evident
from their cachetic looks; and from the dark, and often greenish ye
tint of their blood." There do not appear to be any good grounds for supposing that smoking is a prophylactic against contagious
etiologic diseases—an opinion at one time entertained.

The practice of chewing tobacco is principally confined to those
cases and is less frequently submitted to our observation, so that we
are not so competent to speak of its effects, which, probably, are si
to those caused by smoking.

The application of tobacco to abraded surfaces is a very dan
grous practice, and has in some instances been attended with vio
cent fatal results. Mr. Weston has related a case, in which
expressed juice of tobacco was applied to the head of a boy
eight years, for the cure of tinea capitis. Death took place in two
hours and a half after the application.

In the form of clyster, tobacco has frequently proved fatal,
times from the use of inordinate doses by ignorant persons,
occasionally in the hands of the well-informed practitioner. De
has witnessed the smoke proof fatal. Sir A. Cooper has seen
drachms, and even one drachm, destroy life. In a case relating
Sir Charles Bell death probably occurred from the same cause.
Dr. Copland saw half a drachm in infusion prove fatal. Mo
cently a decoction of 12 grs. of tobacco in six ounces of
water used as an enema proved fatal.

The operation of tobacco resembles that of Lobelia inflata
(Lobeliaceae). With foxglove tobacco agrees in several cir
stances, especially in that of enfeebling the action of the vas-
system (see p. 1210); though its power in this respect is inferior
to foxglove. In its capability of causing relaxation and
pression of the muscular system, and trembling, tobacco sup
foxglove; as it does also in its power of promoting the secre
From belladonna, stramonium, and hyoscyamus, it is distinct
by causing contraction of the pupil, both when applied to the
and when taken internally in poisonous doses; and also by the
ence of delirium and of any affection of the parts about the
Vogt and Sundelin have considered the effects of tobacco
ously allied to those of aconite; but to me the resemblance appears
very slight (see Ranunculaceae). The power possessed by the
mentioned substance of paralysing the sentient nerves, suffici
distinguishes it from tobacco.

USES.—The principal remedial value of tobacco consists in
power of relaxing muscular fibres, whereby it becomes a va

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\(^a\) Op. supra cit. p. 25.
\(^c\) Christison, op. cit.
\(^d\) Oeuvres Chir. I. ii. p. 211.
\(^e\) Anatomy and Treatment of Hernia, p. 24.
\(^f\) Surgical Observations, part 2. p. 189.
\(^i\) Pharmakodynam.
\(^j\) Handb. d. spec. Heilwittelt.
As a purgative, but especially as an antispasmodic
and emetic, it is exceedingly serviceable in alvine ob-
struction. As a sedative to the vascular system it has not been
employed. I tried it somewhat extensively a few years since, as a
treatment for blood-letting in inflammatory affections. But, while
a sedative to the vascular system it has not been
employed. I tried it somewhat extensively a few years since, as a
treatment for blood-letting in inflammatory affections. But, while
I could induce patients to persevere in its use, I did not
antispasmodic and emetic, that it was with
I could induce patients to persevere in its use, I did not
antiphlogistic powers at all proportionate, and eventually I
abandoned its employment. As an anodyne, diuretic, or emetic, it
is inferior to many other articles of the Materia Medica.

Colic, ileus (Volvulus), Strangulated Hernia, and Constipa-
tion, the efficacy of tobacco in these diseases depends principally
on its purgative property. These effects are usually accompanied by nausea and
vomiting. The remedy is applied in the form of a calomel tablet, consisting of the
infusion, or of the smoke. The latter was at one time more efficacious. Heberden
says, it causes less vomiting than the infusion. It probably extends farther up the in-
them than the liquid enema, and, therefore, acts on a larger
area.

But the difficulties and inconvenience of applying it, and
the uncertainty of its effects, have led, for the most part, to the discon-
tinuance of its use. In ileus the tobacco clister has been recom-

dended by Sydenham, by Heberden, by Abercrombie, and by
other distinguished authorities. The earlier it is resorted to
the better chance it has of success. Indeed, when employed in the
beginning stage of the disease, it sometimes hastens the fatal termi-
nation of the disorder by exhausting the already depressed vital powers. As it is
usually necessary to repeat the injection, it is of importance to

Dr. Abercrombie uses only fifteen grains of
infused in six ounces of boiling water for ten minutes; and
lets this in an hour if no effect have been produced. I have
not in my experience employed a scruple, and have not experienced any dange-
rous effects from its application; and it is possible that, in persons
who are accustomed to the use of tobacco, a somewhat larger dose might
be tolerated; but I have never met with any cases in which a scruple
of it produced the full effect on the system that was desired. In
strangled hernia the tobacco clister has frequently effected the
reduction of the protruded parts when the operation appeared almost im-
necessary; and every surgical writer speaks in the highest terms of

A tense hernial tumor sometimes becomes soft and relaxed
due to the diminished force of circulation produced by tobacco. Not-
withstanding these facts, this remedy is much less frequently resorted to
formerly. Three circumstances have, I suspect, led to the
gradual abandonment of its use:—first, the dangerous, if not fatal, conse-
quences which have sometimes resulted from its employment; se-

* Comment. on the Hist. and Cure of Diseases, p. 270, 3d ed. 1826.


* On Diseases of the Abdominal Viscera.
condly, the frequency of its failure and the consequent loss of time, by which the chance of recovery is diminished; thirdly, the operation for hernia being much less dreaded now than formerly, for experience has fully proved that death rarely (Mr. Pott says only once in fifty times) results from it. In colic from lead, and in obstinate constipation from spasmodic constriction, the tobacco clyster has sometimes proved most beneficial. Of the application in lead evil of compresses, soaked in a strong decoction of tobacco to the abdomen, as recommended by Dr. Graves, I have no experience. The practice is, of course, calculated to be beneficial, but is less certain and speedy in its effect than tobacco clysters.

2. In Ischuria and Dysury.—When retention of urine arises from spasm of the neck of the bladder or from spasmodic stricture, tobacco by its powerfully relaxing properties, is an agent well calculated to give relief. Mr. Earle has published several cases illustrative of its efficacy. In dysury, also, tobacco proves serviceable; it abates pain, relaxes the urinary passages, promotes the secretion of urine, and, diminishing the sensibility of the parts, facilitates the expulsion of calcareous matter.

3. Tetanus.—The relaxing influence over the muscular system possessed by tobacco, suggested the employment of this remedy in tetanus. Its effects have been, like those of most other medicines in this disease, unequal. Sir J. Macgrigor says, that, in the advanced state of the malady the tobacco clyster had no effect. Mr. Earle, however, thought it afforded temporary alleviation in a case in which he tried it. Since then several cases have been successfully treated with tobacco. Dr. O'Beirne obtained most marked relief by its use. He employed it in the form of clyster (containing a scruple of tobacco) which was repeated twice or thrice or oftener daily during eight days; and it was observed, that if by design or accident the remedy was discontinued, the spasms recurred with force. Mr. Anderson employed a decoction of the fresh leaves in the form of enema, with both with good effect. Mr. Curling has collected accounts of sixteen cases (including those of Earle, O'Beirne, and Anderson, above referred to) treated by tobacco; of these nine recovered; and, of the seven of the fatal cases, the remedy had not a fair trial; while in the eighth organic disease of the brain was found. Mr. Curling observes, that "more has now been advanced in proof of the efficacy of tobacco than can be adduced in favour of any other remedy yet resorted to. "I have not," he adds, "succeeded in finding a single case in which, being fully and fairly tried before the constitution has given way, it has been known to fail."

4. Other Spasmodic Diseases.—The success attending the use of...
in tetanus, has led to its employment in hydrophobia, but without avail. In a case of periodical epilepsy, Dr. Currie treated the return of the disease by the application of a tobacco cataplasm to the scrotum, the cordis, half an hour before the expected spasm. In a very bad case of spasm of the rima glottidis, which followed a powerful depletion by the lancet, Dr. Wood applied with a tobacco cataplasm to the throat. In spasmodic asthma, either smoked or taken internally, in nauseating doses, has been occasionally to give relief. My own observation is unable to the use of tobacco smoke, which I have repeatedly to bring on convulsive cough and spasmodic difficulty of breathing in persons afflicted with chronic catarrh. Dr. Sigmund's tincture of tobacco has been sold and used to a great extent, the name of tincture of lobelia, and that it proved successful in asthmatic asthma. In rigidity of the os uteri, a tobacco clyster to produce relaxation, while it caused alarming constitutional symptoms.

Dr. Fowler, who published a number of cases of anasarca cited which had been relieved by it. Whatever benefit may be obtained, in these cases, by the use of tobacco, should be less, I suspect, rather to the sedative powers of this agent, than to its action on the kidneys. In small doses it is an uncertain remedy, and in larger doses it causes such distressing nausea and distension, that practitioners have long since ceased to use it in cases. The ashes of the tobacco plant have also been used as a topical remedy.—Dr. Vetch recommends the infusion, as a diuretic and sedative topical application, in gouty and rheumatic inflammation of the joints, testicle, and sclerotic coat of the eye, and diaphoretic inflammation. Bergius recommends a fomentation of tobacco leaves in phimosis and paraphimosis. An infusion of tobacco has been used in porridge and other skin diseases, as in some obstinate ulcers. The smoke, applied to the hair, popular means of destroying lice, and has been used in the clyster, to destroy ascarides. Dr. Sigmund says, tobacco hastens the growth of the hair. Toothache has been relieved by tobacco smoke.

In addition to the preceding, there are various other diseases at which tobacco has been employed. Thus in soporose affections and asphyxia, tobacco clysters have been employed; but they

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* United States Dispensatory.
* Dr. Dewees, Comp. Syst. of Midwif. p. 379. 1825.
* See also Garnett, in Duncan's Med. Comment, for 1797, Dec. 11, vol. vi.
* Mat. Med. i. 222.
are more likely to do harm than good. Tobacco has also been used as an anthelmintic.

**Administration.**—Tobacco is rarely administered in solid form. Five or six grs. of snuff have been taken as an emetic, and to have operated as effectually as two grains of emetic tartar. Internal administration the wine of tobacco is generally employed. Dr. Fowler used an infusion (prepared with an ounce of vinegar added to a pound of boiling water), which he gave in dosages of sixty to a hundred drops. The best time for administering this is found to be two hours before dinner, and at bed-time. The tobacco enema is the infusion prepared according to the Pharmacopoeia. The tobacco-smoke elystrum (elystrum e fumo tabaci) is applied by means of a proper apparatus, formerly kept by the instruments. Various extemporaneous methods of employing it have been described. For external use tobacco is used in the form of cataplasm (made with leaves and water and vinegar), infusion (the tobacco water shops), smoke, and ointment: all these, however, require great care in their use, especially when applied to abraded surfaces.

**Antidotes.**—If the poison have been swallowed, let the contents of the stomach be withdrawn as speedily as possible. No effective antidote has as yet been demonstrated; but the vegetable astrin- gents (infusion of nutgalls, green tea, &c.) deserve examination. In narcotic poisoning, the vegetable acids and coffee may be administered. Other parts of the treatment must be adapted to circumstances. If the depression of the vascular system is extreme, ammonia or brandy may be administered with good effect, and friction may be employed: even acupuncture of the heart (!) has been suggested. Artificial respiration should not be omitted, when other means have failed. If apoplectic symptoms present themselves, blood-letting may, perhaps, be requisite, as in the case related by Dr. H.

1. **Enema Tabaci, L. E.; Infusum Tabaci, D.; Tobacco Clyster,** (Tobacco, 3 j. [grs. xyv. to 5 j., E.]; Boiling Water, Oj. [Oj. for measure, D.; fâvijij. E.]) Macerate for an hour [half an hour and strain].—The want of uniformity in the formulae of the Colleges is greatly to be regretted; and I cannot but think the latitude permitted by the Edinburgh College, in the quantity of tobacco employed, is highly objectionable, and calculated to lead to serious errors in dispensing. The tobacco elystrum is used, as I have already stated, in ileus (volvulus), strangulated hernia, obstinate constipation, retention of urine, &c. It is not to be forgotten that two drachms, one drachm, and even half a drachm of tobacco,—may be infused in water, have proved fatal, as I have mentioned. The cautious practitioner, therefore, will not use more than 15 or 20 grains.

2. **Vinum Tabaci, E.; Wine of Tobacco.—** (Tobacco, 3ijss.; St. Oij. Digest for seven days, strain, express strongly the resid
Woody Nightshade.

The liquor. Sedative and diuretic. Employed in dropsy, &c. Rarely used.—Dose from 1/10 to 1/9.

**Tinctura Tabaci**, Ph. United States; Ointment of Tobacco.—Tobacco, cut in pieces, 3 j.; Lard, lb. Boil the tobacco in lard over a gentle fire, until it becomes friable; then strain the liniment.—Employed as an application to irritable ulcers and diseases, especially tinea capitis; but its use requires great caution.

**La'num Dulcamara**, Linn., L. E. D.—Woody Nightshade; Bitter-Sweet.

*Sex. Syn.:* Pentandria, Monogynia.

*(Caulis, L. — Twigs, E. — Caules, D.)*

**Tory.**—Sprengel considers this plant to be the *Citocatai* of the Hildegard, of Bilgen, who died A. D. 1180. But the derivation of the word *Citocatai* (cito and cacare) negatives, in my opinion, this supposition. The first undoubted notice of Dulcamara is in the work of Tragus.

**Tory.**—**Gen. Char.**—Calyx permanent, five- to ten-parted. Corolla; the tube very short; the limb four- to six-divided, ling. Anthers four to six, oblong, dehiscing at the apex by pores. Berry roundish, two- to six-celled. Embryo spiral (Bot. Char.—Stem shrubby, zigzag, without thorns. Upper leaves woody. Stem twining, branched, rising (when supported) to height of many feet. Leaves acute, generally smooth; the lower ovate, or heart-shaped; upper more or less perfectly halbered; all entire at the margin. Clusters either opposite to the leaf or terminal, drooping, spreading, smooth, alternately subdivided. Bracts minute. Flowers elegant, purple, with two round spots at the base of each segment. Berries oval, scarlet, a.—Indigenous. In hedges and thickets, especially in watery situations. Flowers in June and July.

**Description.**—The annual stems (caules seu stipites dulcamarae) collected in the autumn, after the leaves have fallen. When fresh they have an unpleasant odour, which they lose by drying. Their

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1 United States Dispensatory.
2 Hist. R. I. Herb; vol. 1, p. 227.
3 Sprengel, op. cit. p. 219.
taste is at first bitter, afterwards slightly acid and sweet. The epidermis is greenish-gray, the wood light, and the pith very light and spongy.

Composition.—The stems have been analyzed by Pfaff. In parts of air-dried stems lost 17.4 parts of water when completely dried. From 100 parts of perfectly dried stems, Pfaff obtained:—bitter sweet extractive (picroglycicon) 21.817, vegeto-animal matter 3.125, gummy extractive 12.029, gluten with green wax 1.4, resin containing benzoic acid 2.74, gummy extractive, starch, sulphate and vegetable salts of lime 2.0, oxalate and phosphate of lime with extractive 4.0, and woody fibre 62.0. (Excess 9.111). Desfosses discovered solanina in the stems.

1. Picroglycicon, Pfaff (Dulcarin, Desfosse).—Crystalline, has both a bitter and a sweet taste, is fusible, soluble in water, alcohol, and acetic ether, and not precipitated from its solution by either infusion of nutgalls or metallic salts. Pelletier thinks that it is sugar combined with solanina.

2. Solanina.—Resembles sulphate of quina, but its needle-like crystals are finer and shorter. It restores the blue colour of litmus paper reddened by an acid. It dissolves in acids, and is precipitated from its solution by the common alkalis. Some of the salts (as the acetate and hydrochlorate) have a greenish appearance when evaporated to dryness; others (as the phosphate and sulphate) are crystallizable. According to Blanchet it consists of Carbon 62.11, Hydrogen 8.92, Nitrogen 1.64, Oxygen 27.33. If this analysis be correct, solanina and the other vegetable alkalis in the small quantity of nitrogen which it contains. A grain of solanina, dissolved in dilute sulphuric acid, killed a rabbit in six hours: four grains of the sulphate caused, in an hour, paralysis of the legs, and, in eight hours, death. Soubeiran says it does not dilate the pupil like the other alkalis of Solanaceæ.

Physiological Effects.—Not very obvious. Its decoction operates as a diaphoretic and diuretic. It is said also to promote secretion from the mucous surfaces, and to diminish sensibility. Excessive doses dulcamara is stated to have acted as an acute narcotic. Chevallier says, a young man experienced narcosis from carrying a bundle of the plant on his head. But the accuracy of all these observations has been called in question by Jos. Faucon by Dunal, and by Fages. The first gave the decoction, the latter the extract and fruit, in very large doses, without any obvious effects.

Uses.—Dulcamara has been thought serviceable in chronic pulmonary catarrhs, in rheumatic and gouty complaints, in chronic diseases, and in various cachectic conditions of the system, in which sarsaparilla has been found beneficial. As a remedy for leprosy, it was introduced to the notice of British practitioners by Dr. Crichton. For this disease it has been declared a most effectual remedy by

* Journ. de Pharm. t. vii. p. 414.
* Soubeiran, Tracté de Pharm. t. ii. p. 52.
* Journ. de Pharm. t. vii. 416.
* Otto, Pharm. cent. Blatt für 1834, S. 455.
* Dict. des Drog. t. ii. p. 228.
* Orfila, Traité, Gén.
COMMON CAPSICUM.

eman; while Rayer speaks of its good effects in eczema and asthma. In the few cases in which I have tried it, it proved useless.

COCOCTUM DULCAMEE, L. E. D.; Decoction of Bittersweet.—camara, sliced [chopped down, E.], 5x. [§]; Water [dis-
$I.$], Ojss [f $x x i v. E.; wine measure, D.]. Boil down to a
and strain).—Diaphoretic and diuretic. The usual dose, stated
oks, is f $x s s. t o f j$. But I have given f $x i v$. for a dose. Rayer
given four ounces of the root in decoction in twenty-four hours.

CAP'SICUM AN'NUUM, Linn. L. E. D.—COMMON CAPSICUM ;
CHILLY.

Sex. Syst. Pruntandria, Monogynia.

L.—Fruit of Capsicum annum and other species; Capsicum or Chilies, E.—Capsicum seminibus, D.

ISTORY.—The Piperitis or Siliquastrum of Pliny is declared by
angel to be undoubtedly Capsicum annum. But confidence in
opinion is greatly diminished by the doubt entertained as to this
being a native of Asia. Of course, if it be exclusively a native
merica, there is no reason for supposing that Pliny could have
acquainted with it. The term capsicum (καψικον) occurs first in
arius.

OTANY. Gen. Char.—Calyx five-toothed, persistent. Corolla
five-cleft. Anthers converging, two-celled, dehiscing by fis-
s. Berry juiceless, papery, hollow, two- to four-celled, many-
ed, naked. Seeds naked. (Nees von Esenbeck.)

Char.—Peduncles solitary. Fruit oblong, pendulous. Petioles
oth. Stem herbaceous. (Willdenow.)

Herbaceous annual, one to two feet high. Leaves ovate or oblong,
inate, long-stalked, almost entire, sometimes hairy on the veins
ernath. Flowers white. Berry either scarlet or yellow, variable
hape, being oblong, round, or cordate.

Am.—America. A doubtful native of the East Indies. Cultivated
England.

DESCRIPTION.—The dried fruit, sold by druggists as chillies, is flat,
less shrivelled, oblong, blunt or pointed at one end, while the
x or stalk are usually attached at the other end. The length of
berry (independent of the stalk) is two or three inches, the breadth
half to three-quarters of an inch; the colour yellowish or reddish-
the taste hot and pungent, the odour none. The epidermis is
gh and leathery: the seeds are flattened and whitish. The recent
, called capsicum or chillies, grown in this country, and sold for

* Synopsis of Cutan. Diseases.
* Treat. on Dis. of the Skin, by Dr. Willis, p. 91.
* Roxburgh, Fl. Ind. vol. 1, p. 373; Boyle, Illust. p. 1
pickling, is, when ripe, yellow or red, but it is frequently gathered green: its size and shape are variable: the oblong varieties are one to three or four inches long: the round variety (cherry chill) about as large as a cherry.

Composition.—The fruit was analysed, in 1816, by Maurer; the same year by Bucholz; and in the following year by Bracnonet. Bucholz's Analysis.

<table>
<thead>
<tr>
<th>Substance</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acid soft resin (capsicum)</td>
<td>4.0</td>
</tr>
<tr>
<td>Wax</td>
<td>7.6</td>
</tr>
<tr>
<td>Bitter aromatic extractive</td>
<td>5.6</td>
</tr>
<tr>
<td>Extractive with some gum</td>
<td>23.0</td>
</tr>
<tr>
<td>Gum</td>
<td>9.2</td>
</tr>
<tr>
<td>Albuminous matter</td>
<td>3.2</td>
</tr>
<tr>
<td>Woody fibre</td>
<td>28.0</td>
</tr>
<tr>
<td>Water</td>
<td>12.8</td>
</tr>
<tr>
<td>Loss</td>
<td>6.2</td>
</tr>
</tbody>
</table>

Fruit of Capsicum annuum without seeds 1000

Bracnonet's Analysis.

<table>
<thead>
<tr>
<th>Substance</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acrid oil</td>
<td></td>
</tr>
<tr>
<td>Wax with red colouring matter</td>
<td></td>
</tr>
<tr>
<td>Browning starchy matter</td>
<td></td>
</tr>
<tr>
<td>Peculiar gum</td>
<td></td>
</tr>
<tr>
<td>Animalized matter</td>
<td></td>
</tr>
<tr>
<td>Woody fibre</td>
<td></td>
</tr>
<tr>
<td>Salts (citrate of potash, nitrate of potassium, chloride of potassium)</td>
<td>3.4</td>
</tr>
</tbody>
</table>

Capsicum, Bucholz (Acrid Soft Resin; Acrid Oil, Bracnonet).—Obtain by digesting the alcoholic extract in ether, and evaporating the ethereal spirit. It is a thick liquid, of a yellowish-red or reddish-brown colour, which, on being heated, and, at a higher temperature, is dissipated in a thin grain of it, volatile in a large room, causes all who inhale it to cough and sneeze. By exposure to air and light, it solidifies and is decolorized by chlorine. It is slightly soluble in water and in vinegar; it is much more in alcohol, ether, oil of turpentine, and the caustic alkaline, and baryta it forms a solid aeric combination.

Physiological Effects.—Capsicum belongs to the spicy pungent family, p. 1811, and is more closely allied, by its effects, to the peppers p. 1039 than to any other article of the Materia Medica. However, it is considered to be more related to the pyrethrum family, its active principle is more fixed, and its operation is more pungent and violent than mustard or horseradish.

Its hot and fiery taste is familiar to every one. Applied to the skin, capsicum proves rubefacient and vesicant. Swallowed in small doses, it creates a sensation of warmth in the stomach, and induces languid habits proves a valuable stimulant, and a promoter of digestive functions. Taken in somewhat larger quantities, it produces a glow over the body, excites thirst, and quickens the pulse. The latter effect, however, is not in proportion to its local effect. Applied to the peppers, it is said to exercise a stimulant influence or rectification of urino-genital organs. In excessive doses, we can easily believe vomiting, purging, abdominal pain, and gastric inflammation, ascribed to it by Vogt, may be induced by it, though I am acquainted with any cases in which these effects have occurred. Richter mentions, in addition to the symptoms just mentioned, paralytic and altered condition of the nervous influence, an attack of the head, drunkenness, and giddiness, as being produced by excessive doses.

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COMMON CAPSICUM.

s.—Capsicum is more employed as a condiment than as a medicine. It is added to various articles of food, either to improve flavour, or, if difficult of digestion, to promote their assimilation, or prevent flatulence. The inhabitants of tropical climates use it to stimulate the digestive organs, and thereby to counteract the laxing and enervating influence of external heat (see pp. 83).

It is principally valuable as a local stimulant to the throat, and stomach. Its constitutional not being in proportion to its topical effects, it is of little value as a general or diffusible stimulant. Administered internally capsicum has long been esteemed as a medicine of cyanane maligna. It was used, in 1786, with great success by Mr. Stephens and by Mr. Collins. It promoted the action of the sloughs, and soon improved the constitutional symptoms. Mr. Headby also employed it both internally and by gargle. Its use has been extended to scarlatina anginosa. Gargle, in relaxed conditions of the throat, its efficacy is until the powder or tincture may be applied by means of a hair pencil to a relaxed uvula. It is a very useful gasulant in enfeebled, languid, and torpid conditions of the system. Thus, in the dyspepsia of drunkards, as well as of gouty persons, it has been found useful in various diseases, attended with diminished susceptibility of stomach, capsicum is an exceedingly powerful remedy, the operation of which it exerts by raising the dormant sensibility of this viscus: as in intermittent fevers, low forms of fever, dropsies, &c. Dr. Wright in high terms of it as a remedy for obviating the black vomit or symptom of the fever of tropical climates, at one time considered a capsiicum cataplasm may be used with advantage to occasion defecation, in any cases in which a rubefacient counter-irritant is required; as in the coma and delirium of fever, in chronic rheumatism, &c.: unless kept on for a long period it does not vesicate.

INSTRUCTION.—The powder of capsicum is usually given in from gr. v. to gr. x., made into pills with crumbs of bread. The tincture will be mentioned presently. The infusion of capsicum may be administered in doses of fss. But, in malignant roat and scarlatina, capsicum has been employed in much doses. Stephen's pepper medicine consisted of two tableds of small red pepper [Capsicum frutescens], or three of the Cayenne pepper, and two tea-spoonfuls of fine salt, digested in a pint of boiling water. To the liquor, strained when cold, a pint of very sharp vinegar is added. A table-spoonful of this is given to an adult every half hour. The capsicum gargle is prepared by infusing 3ss. of capsicum in a pint of boiling water;
or by adding $\frac{1}{2}$ of the tincture to $\frac{3}{4}$ of the infusion of
or, in some cases, Stephen’s pepper medicine may be use
gargle.

**Tinctura Capsici, L. E. D.; Tincture of Capsicum.** — (1)
sum, bruised [or, if percolation be followed, in moderate
powder, E.], 3x.; Proof Spirit, Oij. [wine measure, D.]
Disfourteen [seven, E.] days, and strain [strain, squeeze the res
and filter the liquors. This tincture is best prepared by per
which may be commenced so soon as the capsicum is made
pulp with a little of the spirit, E.].—Dose $\frac{m}{x}$ to $\frac{f}{3}$. E,
in the low stage of typhus and scarlet fevers, and in gangren
throat, and to prevent the nausea which oil of turpentine in
casion (see p. 1056). Properly diluted, it may used as a gas
above mentioned.

**OTHER DIETETICAL, MEDICINAL, OR POISONOUS SOLANA**

1. Hyoscy’amus al’bus is endowed with properties similar to those of
for which it has sometimes been employed in medicine $\dagger$.

2. Mandrag’ora officinalis, the Mandrake, is an acro-narcotic poi
swallowed it purges violently $\ddagger$. The roots, from their fancied resem
the human form, were called anthropomorphism, and were supposed to
barrenness $\ddagger$. The root of Bryonia dioica is sold at the herb-shops a
stitute for mandrake.

3. Several species of Dat’ta are employed in the East: their effects
are analogous to those of D. Stroma’nium. In 1802 General Gent in
D. fel’osa into this country as a remedy for asthma. It was employed by
it $\S$. Waitz $\ddagger$ says, that half an upright capsule acted violently on a
1811 Dr. Christie $\ddagger$ directed attention to D. fastu’osa. Mr. Skipton $\ddagger$
decoration of the root of this plant; and Dr. Adams $\ddagger$ used a tinct
pared as tincture of digitalis, Ph. L.). D. Mo’tel and D. Tat’ula appear to
similar properties. Both species have been employed, especially in the
cause intoxication for criminal and licentious purposes $\ddagger$. Schubarth $\ddagger$
a pound of the bruised leaves of D. Tatula to a horse without effect; one
ounces of the half-ripe fruit caused dejection, increased secretion
of appetite. D. arbo’rea operates like stramonium $\ddagger$.

4. Sola’num ni’grum, or Black Nightshade, possesses narcotic prop
its activity is not very great. It contains solanina $\ddagger$. It has been emp
medicine as a resolvent $\ddagger$.

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$\ddagger$ Brandt and Ratzeburgh, Deutsch. phar. Gifkgewächse. S. 79.
$\ddagger$ Matthioli, Com. Dioscor.
$\ddagger$ Ibid. vol. vii. p. 158.
$\ddagger$ Ibid. p. 370.
$\ddagger$ Wibmer, ap. cit. p. 300.
$\ddagger$ Ibid. p. 285.
$\ddagger$ Brandt and Ratzeburgh, Deutsch. phar. Gifkgewächse. S. 53; Orfila, Toxicol. Gén.
$\ddagger$ Gataker, Obs. on the Use of Solanum, 1727; Bronfield, Account of the English No

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[Note: The page number 1260 is repeated at the top of the page.]
SOLANACEÆ.

Solanum tuberosum, or the Potato, is, next to the Cereals, the most important vegetable for dietetical purposes. It was introduced into England, from America, in 1586, by Sir Walter Raleigh. The part employed as food is produced by the subterranean stems, and is called a tuber; the parts on it, called eyes, are buds, which, with another portion of the tuber, are used for multiplying the species, under the name of sets. The tissue of potatoes is cellular; each cell containing from ten to twelve grains of starch. Both in the cells and in the intercellular spaces is an albuminous liquid. By boiling, the cells are separated, the starch grains absorb the albuminous liquid, swell up, and completely fill the cells; while the albumen coagulates, and forms irregular fibres, which are placed between the starch grains.

Potatoes in which these changes are complete, are called mealy, while those in which the liquid is only partially absorbed, and the coagulation imperfectly effected, are denominated doughy or watery. Potatoes have been repeatedly subjected to chemical examination. The most important labours are those of Einhof, Lampadius, and Vanquelin. The principal constituents of potatoes are starch, starchy fibrin, albumen, gum, acids, salts, and water. The relative proportions vary with the season, the varieties of the potato, &c. Otto has discovered solanin in the potato, especially in the bud—a fact which explains the cause of the ill effects which have been observed to arise from the use of germinated potatoes by cattle.

Payen and Persoz found diastase in the neighbourhood of the bud of the potato. Potato starch (English Arrow-Root, off. Amylum Solani tuberosi) consists of particles of varied shapes and sizes; the normal form is probably ovate. Their size varies from one-sixth hundredth to one-thirtieth of a line in diameter. They are characterized by concentric rings observed on their surface, and which Fritzsche regards as indications of concentric layers, of which he asserts these grains to be composed. The hilum is circular. The cracks observed on some of the larger grains proceed usually from the hilum (see p. 935, fig. 173). The particles of the fucula of Canna coccinea (see p. 1014, fig. 190) present similar rings, but are much larger. Sago is made of po-
Potato starch. It has already been described (see p. 935). Potato starch has been analyzed by Berzelius and Guérin-Vary. According to the latter, one hundred parts of potato starch consist of 2:12 parts of matter insoluble in water (tegumentary or of 38:13 of soluble amido, and 59:75 of amylo : the amido consists of C14 H22 O11 the amylo of C10 H5 O6. The quantity of starch obtained from potatoes with the kind used, as well as with the season: one hundred pounds of potatoes yield in August about 10 lbs., in September 14 lbs., in October 14 lbs., November 17 lbs., in March 17 lbs., in April 13 lbs., in May 10 lbs. Sometimes manufactured from potatoes. By fermentation potatoes yield a liquid (potato wine) of good quality. By distillation this yields potato oil from which a volatile oil (oil of potatoes) has been extracted (see p. 348). Extract, obtained from the stalks and leaves of potatoes, was declared by Latham to possess narcotic properties, in doses of two or three grains; in cases adduced are not satisfactory. Furthermore, his experiments were rejected by Dr. Worms with very different results: for 100 grains produced no harmful effects. The observations of Nauche, however, tend to confirm Latham's statements. The tubers (potatoes), when boiled, are a valuable article of food for men and animals. Those of good quality are not only perfectly nutritious, but highly nutritious, and easy of digestion. In the raw state they have been found less nutritious for animals, while on man they are said to produce flatulent hypogastic and to excite, slightly, the nervous system. Proper cooking is probably useful in two ways: by rendering the starch digestible and, secondly, by extracting some noxious matter. Nauche found the decoction of potatoes endowed with medicinal properties; and Otto, as already mentioned, detected solanin in them. Potatoes have been praised as useful antiscorbutics.

6. Caricium frutescens, Linn. yields the capsules sold by druggists as pepper or bird pepper (baccar capersi), as I have satisfied myself by comparing commercial article with the East Indian Solanaceae belonging to the L. Society. These capsules do not exceed an inch in length, and are about three lines broad; their colour is orange red; their odour aromatic and pleasant. Their properties are similar to those of chillies (see p. 1257), that they are much hotter and more fiery. Their powder is Cayenne Pepper, extensively employed as a condiment. Cayenne Laxatives and Essence of cayenne (an alcoholic tincture) are kept in the shops.

ORDER XXXIX.—BORAGINACEÆ, Lindley.—THE BORAGINEAE, JUSTICE.

The plants of this Order are harmless, and, for the most part, inert. The prevailing constituent is mucilage. Nitre is also found in some species. Colouring principle (anchohsc acid Cu H12 O6) of Anchusa tinctoria, or Alkanese, solves in fatty substances, and hence is employed to colour unguents and lip salve and hair oil. It becomes blue on the addition of an alkali.
SIDER XL.—CONVOLVULACEÆ, R. Brown.—THE BINDWEED TRIBE.

**SCAMMONY**.

**Convulvul, Jesseni.**

**Tritial Character.**—**Calyx** five-sepaled. **Sepals** persistent, equal, or unequal, in one-three rows; often becoming enlarged. **Corolla** monopetalous, pogonous, regular; the **lilmb** five-plicate, or five-lobed; contorted in aestivation. **Stamen** five, inserted into the corolla. **Anthers** often contorted after ejection of the pollen. **Nectary** annular, often conspicuous. **Ovary** single, one to four-celled; or two to four ovaries. **Cells** one to two-seeded. **Style** entire or bifid. **Stigma** bilobed. **Fruit** dehiscing by the valves; rarely inversely. **Seeds** inserted into the base of the ovaries: **testa** black. **Cotyledons** foliaceous, corrugated. **Radicle** incurved, inferior. Generally twining stems, with alternate, simple, entire, or lobed leaves. **Pedicels** glabrate, often filled with a milky purgative juice.

**Sertes.**—The roots contain a milky purgative juice, which owes its essential properties to resin.

**CONVOL'VULUS SCAMMO'NIA, Linn., L. E. D.—THE SCAMMONY.**

**Sex. Syst.** Pentandria, Monogynia.

(Gummi-resina, L. D.—Gummy-resinous exudation from incisions into the root, E.)

**History.**—A purgative substance called σκαμμώνια, was known to the Greeks long before the time of Hippocrates. The father of medicine, who frequently employed it, says that it evacuates both urds and downwards, bile and mucus, and expels flatus. There is some reason to believe that the ancients did not procure scammony from the same plant which yields ours. Dierbach supposes they procured it from **Convulvulus sagittifolius**, Sibthorp. But Sibthorp refers the scammony of Dioscorides to the **Convulvulus ciliatus**.

The term scammony deserves notice, that the term scammony is applied by pharmacists to purgative resinous substances obtained from **Convulvulae** and **Asclepiadaceae**. At present I confine myself to the scammony procured from **Convulvulae**. The other kind will be described hereafter (see **Asclepiadaceae**).

**Botany. Gen. Char.**—**Sepals** five. **Corolla** campanulate. **Style** two, linear-cylindrical, often revolute. **Ovary** two-celled, four-ovuled. **Capsule** two-celled, two-seeded (Bot. Gell.)

**p. Char.**—**Leaves** sagittate, truncate behind. **Peduncles** rounded, at three-flowered.

**Root** perennial, tapering, three or four feet long, with an acrid juice. **Stems** numerous, twining, herbaceous, smooth. **Leaves** long petioles, acuminate, with pointed lobes at the base. **Peduncles** solitary, scarcely twice so long as the leaves. **Bracts** awl-shaped. **Sepals** obovate, truncate, with a reflexed point, coloured at the edge. **Corolla** pale yellow, with purple stripes. **Stamina** shorter than the...
corolla; *anthers* erect, sagittate. *Style* as long as the stamens; *stigmas* white.

**Hab.**—Hedges and bushy places in Greece and the Levant.

**Preparation.**—The method of procuring scammmony is, according to Dr. Russel, as follows:—Having cleared away the earth from the upper part of the root, the peasants cut off the top in an oblique direction, about two inches below where the stalks spring from it. Under the most depending part of the slope they affix a shell, or some other convenient receptacle, into which the milky juice flows. It is then left about twelve hours, which time is sufficient for drawing off the whole juice: this, however, is in small quantity, each root affording but a few drachms. This milky juice from the seven roots is put together often into the leg of an old boot, for which a more proper vessel, when in a little time it grows hard, and the genuine scammmony. It is, however, very probable that the process now mentioned is not the only one employed, but that other, similar to those described by Dioscorides and Mesue, are also sorted to. Moreover, various substances are added to scammony, while yet soft. Dr. Russel says, wheat-flour, ashes, or fine sand are used for this purpose; and, I may add, chalk.

**Description.**—Scammmony is usually imported from Smyrna. Occasionally it comes by way of Trieste. Still more rarely it is brought from Alexandretta. It comes over in boxes and drums, which are frequently lined with tin. The finest kind is called *virgin or * chryma scammmony. Other varieties are denominated *seconds*, *thirds*, &c. Formerly the term *Aleppo scammmony* was applied to the finest, and that of *Smyrna scammmony* to the inferior kinds. No such distinction now exists in English commerce. The *scammmony in shells*, or the *Antioch scammmony*, described by Martius, are unknown by the names to our principal dealers; nor is any distinct kind known as *Smyrna scammmony*. I am informed by a Turkey merchant, who formerly resided at Smyrna, that scammmony is brought into Smyrna in the soft state, on camels. Here it is mixed with various impurities by persons (Jews), who are denominated scammmony makers, who adulterate it, and thereby lower its value to suit the market. Formerly the demand in London was principally for second and third qualities; but now virgin scammmony is more in request, and is met with in much greater abundance.

The characters of good scammmony are as follows:—It readily fractures between the fingers, or by the pressure of the nail; its sp. gr. is about 1.2; its fracture is dark, glistening, and resinous; its fractured surface should not effervesce on the addition of hydrochloric acid; the decoction of the powder, filtered and cooled, is not rendered blue by tincture of iodine; 100 grains, incinerated with nitrate of ammonia, yield about three grains of ashes (according to my experiments); sulphuric ether separates at least 78 per cent. of resin (principally) dried at 280° F.

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1 *Med. Obs. and Inq. vol. xii. 1718.*

2 *Pharmacogn.*
Fracture glistening, almost resinous, if the specimen be old and dry: mucic acid does not cause effervescence on its surface: the decoction of its powder, filtered and cooled, is not rendered blue by tincture of iodine. Sulphuric acid separates at least eighty per cent. of resin dried at 280°. Ph. Ed.

1. *Virgin Scammony* (Lachryma Scammony; *superior Aleppo scammony*, Guib.)—It usually occurs in amorphous pieces; but a careful examination of some large lumps has led me to believe that they are portions of a mass, which, when in the soft state, had a round form. The whitish-grey powder, which covers some of the pieces, effervesces with hydrochloric acid; and I have no doubt, therefore, that the masses have been rolled in chalk. Virgin scammony is friable, easily reduced to small fragments between the fingers, by the pressure of the nail, and has, according to my experiments, sp. gr. of 1·210. Its fractured surface is resinous, shining, unshrinkable; presents small air cavities, and numerous grey semitransparent splinters, or fragments, when examined by a magnifying glass, and does not effervesce on the addition of hydrochloric acid, when rubbed with the finger moistened with ether, water, or saliva, readily forms a milky liquid. If we examine thin fragments, or inters, by transmitted light, we observe them to be semi-transparent at the edges, and of a grey-brown colour. In the same piece we sometimes find some portions shining and blackish, as above described, while others are dull-greyish. This difference depends, probably, as Dr. Russel has suggested, on different methods of drying. Virgin scammony readily takes fire, and burns with a yellowish flame. The odour is peculiar, somewhat analogous to old cheese: its taste is slight at first, afterwards acrid. The decoction of its powder, when filtered and cold, is not rendered blue by tincture of iodine. When incinerated in a crucible, it leaves a minute portion only of ash.

2. Scammony of second quality. (Seconds, Commerce.)—A few years since this kind was considered to be of the first quality. It includes two sub-varieties:

α. *Second Scammony in amorphous pieces.*—In its external appearance, brittleness, odour, and taste, it resembles virgin scammony, in which it is distinguished by its greater sp. gr. (according to my experiments being 1·463), its fracture being dull, or very slightly shining; and by its colour, which is greyish. Hydrochloric acid causes effervescence when applied to a fractured surface. The decoction, when filtered and cold, is not rendered blue by tincture of iodine. This kind has been adulterated with chalk, but not with flour.

β. *Second Scammony, in large regular masses.*—This kind is imported either in boxes or drums, into which it seems to have been introduced when soft, and to have hardened subsequently: hence its form is that of the package in which it was imported. A sample of a circular cake (about twelve inches diameter, and several inches thick) presents a dull-greyish fracture. Its sp. gr., according to my experiments, is 1·359. Hydrochloric acid, applied to the surface, causes effervescence. The decoction, filtered and cooled, is rendered blue by iodine. This sub-variety, then, has been adulterated with chalk and flour.
I have sometimes met with this kind of scammony having a soft or cheesy consistence.

3. Scammony of third quality. (Thirds, Commerce.)—Under the name I have received scammony in the form of circular flat cakes, about five inches in diameter, and one inch thick. They are heavy, dense, and much more difficult to fracture than the preceding kind. The fractured surface, in some samples, is resinous and shining; in others dull; it has air cavities, and numerous small white spots (chalk); its colour is greyish to greyish-black. The sp. gr. varies in different samples, from 2.76 to 1.543. Hydrochloric acid, applied to a recently fractured surface, causes effervescence. The decoction, filtered, and cooled, is rendered blue by tincture of iodine. Hence both flour and chalk have been used for adulteration. I have received portions of five cakes of this variety of scammony, on which we marked the actual quantity of chalk which had been intermixed in each sample. In 100 parts of the cakes the proportions of chalk were respectively as follows:—13.07, 23.1, 25.0, 31.05, and 37.4. These numbers were furnished by the importer to one of our most respectable wholesale druggists, from whom I received them.

The foregoing are the usual kinds of scammony found in commerce. I possess four other varieties:

a. Fictitious Scammony. (Scammonium Smyrnense factitium, Gray).—I bought this as Smyrna Scammony, under which name I formerly described it. It is circular flat cakes, about half an inch thick. It is blackish, and has, externally, a slaty appearance; it breaks with difficulty; its fracture is dull and bluish. Its sp. gr. is 1.412. Moistened and rubbed it evolves the smell of guaiacum. Boiled with water it yields a turbid liquor (which is not rendered blue by iodine), and deposits a blackish powder; the latter, boiled with alcohol, yields a solution which becomes greenish-blue on the addition of nitric acid, showing the presence of guaiacum.

B. Indian Scammony.—From my friend, Dr. Royle, I have received a sample of scammony met with in the Indian bazaars. It is light, porous, of a greyish colour; gritty under the teeth, as if containing a considerable quantity of sand, and having a balsamic olibanum-like odour.

γ. Trebizon Scammony (?).—In 1832 a substance was imported from Trebizon under the name of scammony, which was unsaleable here. The sample received of it is a portion of cake apparently round, flat below, and convex above. Its colour is light-greyish or reddish-brown; when moistened the surface becomes glutinous and odorous; its taste is sweet, nauseous, and somewhat bitter. In its external appearance it has more resemblance to benzoin than scammony.

B. French or Montpellier Scammony.—This is the produce of Cynanchum angustifolium. (See Asclepiadaceae.)

Commerce.—In 1839 the quantity of scammony on which duty (2s. 6d. per lb.) was paid, amounted to 8,551 lbs.

Composition. a. Of the Root.—The dried root of Convolvulus Scammonia was analyzed, in 1837, by Marquart, who obtained from it the following substances:—Resin 4.12, sugar, convolulin, and extractive 13.68, resin and wax 0.55, gum 5.8, extractive 2.4, starch 7, extractive soluble in hot, but not in cold, water 1.4 [salts and woody fibre 65.05]. The resin, the wax, and a portion of the gum, are cur

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* Pharm. Centralblatt für 1837, S. 667.
in the milky juice of the latex vessels (vasa laticis); while the gum, extractive, and salts dissolved in water, constitute the of the cells; and in this juice the starch globules float.

MIN.—This is analogous to that of the scammony of commerce.

CONVOLVLUS.—A substance supposed by Marquart to be a vegetable alkali, is feebly as a vegetable alkali, and is precipitated from its watery solution of nutgalls. Marquart thinks it probably exists in jalap.

Of Scammony.—Bouillon, Lagrange, and Vogel, analyzed two one called Aleppo, the other Smyrna scammony. Marquart ed twelve kinds; of these, eight he considers to be the proof Convulvulus Scammonia, while the remaining four, which, he re in commerce called Smyrna scammony, he regards, though t any sufficient proof, as the produce of Periploca Secamone,

Marquart’s Analyses.

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<td>Alpha resin, with traces of wax.</td>
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<td>0'75</td>
<td>1'35</td>
<td>Beta resin.</td>
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<td>five with salts</td>
<td>4'50</td>
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<td>Extractive taken up by alcohol.</td>
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<td>tith salts</td>
<td>0'20</td>
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<td>Gum, with sulphate of lime.</td>
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<td>s and woody fibre.</td>
<td>1'75</td>
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<td>porous alumina, chalk, and</td>
<td>1'50</td>
<td>3'5</td>
<td>Colouring matter.</td>
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<td>sate of magnesia</td>
<td>3'75</td>
<td>2'75</td>
<td>Wooden fibre, oxides, extractive, &amp;c.</td>
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<tr>
<td>sate of lime</td>
<td>3'30</td>
<td>3'5</td>
<td>Inorganic salts, silica, &amp;c.</td>
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Aleppo Scammony... 100'00 100'0

Smyrna Scammony... 100

OF SCAMMONY (see 1269).

Physiological Effects. a. On Animals generally.—The experi- of Orfila lead us to infer that scammony is not poisonous. have," says he, "frequently administered four drachms of it to who had the esophagus afterwards tied, and have only observed ; evacuations." On horses and other herbivorous animals its tion is very uncertain. Gilbert states, that six drachms killed ep in twenty days, without having caused purging. Viborg half an ounce given to a dog caused several loose stools: the dose had no effect on a badger. It is probable, however, that the experiments now referred to, adulterated scammony was ryed.

* Toxicol. Gen.
β. On Man.—The effects of pure scammony are those of a powerful and drastic purgative. As the greater part of the commercial drug is largely adulterated, practitioners are, I suspect, scarcely acquainted with the operation of the genuine article, which appears to me to possess nearly double the activity of that usually found in commerce. As the evacuant powers of scammony depend on its local irritation, it operates more energetically when there is a deficiency of intestinal mucus, and is then very apt to grip; and vice versa, when the intestines are well lined with secretion, it passes through with much less effect. In its operation scammony is closely allied to jalap, that which it is more active, while its odour and taste are less nauseous. It is less irritant than gamboge.

Uses.—Scammony is, of course, inadmissible in inflammatory conditions of the alimentary canal, on account of its irritant qualities. It is well adapted for torpid and inactive conditions of the abdominal organs, accompanied with much slimy mucus in the intestines. It is principally valuable as a smart purgative for children, on account of the smallness of the dose necessary to produce the effect, the slight taste, and the energy, yet safety, of its operation. When used in them, it is generally associated with calomel. Where a milder purgative is required, it may be conjoined with rhubarb, sulphate of potash, and an aromatic. It may be employed to open the bowels in constipation; to expel worms, especially of children; to act as a hydragogue purgative, on the principle of counter-irritation, as in affections of the head and dropsies; and for any other purpose for which a active cathartic may be required.

Administration.—For an adult the usual dose of commercial scammony is ten grs. to a scruple; but of virgin scammony from ten to fifteen grs. In order to diminish its irritant and griping qualities, it should be finely divided. For this purpose it may be intimately mixed with some bland powder (as gum, starch, sugar, &c.), or made into an emulsion with milk.

1. Pulvis Scammonii Compositus, L. D.; Compound Powder of Scammony.—(The London and Dublin Colleges direct it to be prepared with Scammony; Hard Extract of Jalap, of each 3ij.; Ginger 3ss. Rub them separately to very fine powder; then mix them.—The Edinburgh College directs it to be made of equal parts of Scammony and Bitartrate of Potash, triturated together to a very fine powder).—The effects of scammony and of extract of jalap being very similar, little or no advantage can be obtained by the intermixture of these substances. The ginger is intended to correct the griping of the other ingredients. The bitartrate of potash, used by the Edinburgh College, can do little more than serve to divide the scammony. Compound powder of scammony is cathartic, and is used as a smart purge for children, especially where much mucous slime is contained in the bowels, and in worm cases.—The dose of the London and Dublin preparation for an adult is from grs. x. to 3ij.; for children under a twelvemonth old, from grs. iii. to grs. v. The dose of the Edinburgh preparation for an adult is from grs. xv. to 3ss.
2. Pulvis Scammonii Cum Calomelane; Powder of Scammony & Calomel.—(Scammony, ʒj.; Calomel; Sugar, of each ʒss. Mix.) Though this preparation is not contained in any of the British Pharmacopoeias, yet the frequency of its employment in the diseases children is a sufficient apology for its introduction here.—Dose, for adult, grs. x. to grs. xx.; for children, from grs. iv. to grs. x. according to the age of the patient.

This preparation may be employed as a substitute for the old vis Basilicus or Royal Powder, which consisted of equal parts of amony, calomel, cream of tartar, and antimoniac acid.

Confection Scammonii, L.; Electuarium Scammonii, D.; Confection Scammony.—(Scammony, powdered, ʒss.; Cloves, bruised; ginger, powdered, each ʒj.; Oil of Caraway, ʒss.; Syrup of Roses, such as may be sufficient. Rub the dry ingredients together to fine powder, and preserve them; then, whenever the Confection is to be used, the syrup being gradually poured in, rub again; lastly, oil of Caraway being added, mix them all, L.—The Dublin age orders the syrup to be dropped on the powders, the oil of Caraway then added, and all mixed together).—A warm or aromatic antartic. Dose, for an adult, ʒj. to ʒj.; for children, grs. iii. to x. It is seldom employed.

Extractum sive Resina Scammonii, E.; Extract or Resin of Scammony.—(Take any convenient quantity of Scammony in fine order; boil it in successive portions of proof spirit till the spirit dissolves any thing; filter; distil the liquid till little buter passes over. Then pour away the watery solution from the n at the bottom; agitate the resin with the successive portions of ling water till it is well washed; and, lastly, dry it at a temperat: not exceeding 240°.) It is brownish, and in thin layers transparent; when heated it evolves a peculiar, not disagreeable, odour; fusible and combustible. It is soluble in alcohol, ether, and oil arsene. Its alcoholic solution is feebly acid; the addition of ter causes a white precipitate (hydrate of resin). Precipitates affumiccamoniates?) are also produced by alcoholic solutions of acetate of lead and the acetate of copper. Caustic potash deepens colour of the solution. Scammony resin may be decolorized by mal charcoal, without having its purgative qualities affected. Composition, according to Mr. Johnston, is C₅₀ H₃₃ O₈₀. It is remarkable for containing the largest quantity of oxygen of any resin herto analyzed” (Johnston). When pure or virgin scammony can obtained, the resin is an unnecessary preparation. Scammony resin a drastic cathartic.—Dose, grs. viij. to grs. xij. When administered it should be intimately divided, either by some bland powder, still better by an emulsion.

* Marquart, op. cit.
* Journ. de Pharm. t. xiii. p. 599.
* Phil. Trans. for 1840, p. 341.
5. MISTURA SCAMMONII, E.; Mixture of Scammony.—[Resin of Scammony, gr. viij.; Unskinned milk, fijijij. Triturate the resin with a little of the milk, and gradually with the rest of it till a uniform emulsion is formed].—This is an imitation of Planche’s purgative potion, except that two drachms of sugar and three or four drops of cherry-laurel water are omitted. It is one of the most advantageous purgative draughts that can be taken.

2. IPOMÈA PURGA, Wenderoth, E.—THE JALAP IPOMÈA.

Ipomea Jalapa, Nuttall, L.—J. Schiedeana, Zuccarini.

Sex. Syr. Pentandria, Monogynia.

(Radix, L. D.—Root, E.)

History.—De Paiva thinks that Jalap was known to Dodoens in 1552, to Monardes in 1568, and to Clusius in 1574. But Balsam (who calls it Bryonia Mechoucanca nigricans) says it was brought from India, under the name of Chelapa, or Celapa, about eleven years before the time he wrote (the date of the preface to his work is 1680); that is, about 1669 or 1670. Its name seems to be derived from Xalapa, a town of Mexico.

The Convolvulus Jalapa described and figured by Woodville and Desfontaines, and adopted by the Dublin College as the source of the commercial jalap, is now well known to yield none of this drug. The real jalap plant was first described by Mr. Nuttall; but the name (Ipomea Jalapa) he gave to it had been already applied by Pursh to another plant. In the same year Dr. Schiede and Dr. Wenderoth noticed it; and in 1832 it was described and figured by Zuccarini.


Root perennial, tuberose, irregularly ovate-conical, terminating inferiorly in some subcylindrical fibrous branches; covered by a very thin, dirty, blackish epidermis; internally white and fleshy. Stem herbaceous. Leaves alternate, petiolate. Tube of the corolla purplish violet (red lake).

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1 Volgels’s Arzneimittell, Bd. 1, S. 117.
2 See some remarks on this subject in Pharm. Central-Blatt für 1834, S. 925-6.
3 Prodrumm, p. 135.
7 Linna. v. 3, Juli, 1830, p. 473.
8 Ibid. viii, 515.
—In the woods of the Mexican empire, near Chicanquiao, at a height of nearly 6,000 feet above the level of the sea, Jalapa is the chief market for the root, from whence it is exported to Europe by way of Vera Cruz.

**Description.**—The dried tubers (radix jalapa) found in commerce exceed a pound each in weight. They vary in size, from that of a nut to that of a nut. When entire they are usually more or less, and pointed at the two opposite extremities. The larger are frequently incised, apparently to facilitate desiccation. They are covered with a thin, brown, wrinkled cuticle. They should be hard, and difficult to powder. When broken, good tubers present a deep yellowish-gray colour, interspersed with deep concentric circles. The slices vary in their shape, colour, and properties. Those of inferior quality are light, whitish, and they usually appear to be quarter segments of transverse tubers; they are called spurium jalap, or, from their shape, cocked-up. The light or fusiform jalap, called in Mexico male jalap, by Guibourt, is said to be the produce of Ipomea Orizana.

Jalap is very apt to become worm-eaten; but the insects attack it and devour the amylaceous matter, and leave the resin. Worm-eaten jalap is well adapted for the preparation of extract.

**Price.**—Jalap is imported, in bales, from Vera Cruz direct, by way of New York, or other places. In 1839, duty of 1 lb. was paid on 37,211 lbs.

**Position.**—Jalap was analyzed, in 1817, by Cadet de Gassicourt, and more recently by Gerber. Other less complete analyses were made by Henry, by Ledanois, and by Nees v. Esenbeck and Marquart. In 1835 Cannobbio analyzed a variety of Jalap (jalappone).

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<tr>
<th>Gerber's Analysis</th>
<th>Henry's Analysis</th>
<th>Nees v. Esenbeck and Marquart's Analysis</th>
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<tr>
<td>Root of Ipomea Purpurea</td>
<td>Commer- cial Jalap</td>
<td>False Jalap</td>
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<td>Extractive</td>
<td>22.6</td>
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<td>Resin</td>
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<td>Woody fibre</td>
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<td>Resin and mallus of potash</td>
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<td>Carbonates of calcium and potash</td>
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*Hist. des Drog. i. 522.*
*Pelletier, Journ. de Chim. Méd. t. x. p. 10.*
*Journ. de Pharm. t. iii. p. 493.*
*Bull de Pharm. t. ii. p. 87.*
*Pharm. Central-Blatt für 1831, S. 695.*
*Ibid für 1833, S. 304.*
Jalap Resin.—Obtained by mixing the alcoholic tincture of jalap (by percolation or digestion) with water. The precipitated resin is to be with warm water, and then dissolved in alcohol. By evaporation it yields the resin. Planche \(^7\) has proposed another process. By digestion of animal charcoal the alcoholic solution of the resin is rendered nearly colorless, and by evaporation yields an almost colourless resin (resina jalapae albus). Jalap resin is soluble in alcohol, but insoluble in water. It with milk, it does not form an emulsion, but its particles unite into a solid. By this it may be distinguished from sammony resin \(^7\). It is insoluble in fixed and volatile oils. Its insolubility in oil of turpentine is a means of the mixing of some other resins, as of resin. \(^7\) Decolorized jalap resin is composed, according to Goebel \(^7\), of Carbon 36.62, Hydrogen 9.47, and 53.91; but Johnston \(^7\) declares this analysis to be incorrect, and gives the following formula for the resin, C\(^{50}\) H\(^{34}\) O\(^{18}\).

According to Buchner and Herberger \(^4\), jalap resin is composed of a positive basic substance, which they term jalapin, and of an electroresinous acid, soluble in alkalies. The latter I shall call jalapic acid.

\(a\). Jalapin.—Constitutes not quite nine-tenths of jalap resin. When a solution of acetate of lead is added to an alcoholic solution of jalap resin, decomposition occurs: acetate of jalapin remains in solution, while the lead precipitates. When the solution has been deprived of acetic acid, the lead, and alcohol, the jalapin remains. It is a transparent colourless substance, very soluble in alcohol, but insoluble in ether.—Is this the jalapin? Hume \(^8\)?

\(b\). Jalapic acid.—Constitutes thirteen one-hundredths of jalap resin, from the above-mentioned jalapate of lead by sulphuretted hydrogen. Brown, acrid, bitterish, slightly soluble in ether, and more soluble than jalapin.

Physiological Effects. \(a\). On Animals generally.—Jalap in powder, as well as the resin obtained from it, is a local . Its operation on the bowels is well seen in the carnivora. Gassicourt \(^7\) found that the resin applied to the pleura, pericardium, or intestinal canal of dogs, caused fatal inflammation. Two or three grains introduced into the stomach, the oesophagus being afterwards killed a dog in a few hours. It is remarkable, however, that the same experimenter observed no particular effect from the application of a drachm of the finely-powdered resin to the cellular tissues in the back. Moreover, 24 grains, with the yeck of an egg, injected to the jugular vein, had, he says, a very slight effect: indeed, at first it was observed, but the two following days the animal had some evacuations, and lost his appetite, though he soon recovered from death. In the herbibora it proves a very uncertain purgative. Herbert \(^7\) gave two ounces to a sheep, without observing any effect. Donné \(^b\) administered two or three ounces to horses, without any remarkable effect, except increased secretion of urine.

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\(^1\) Soubeiran, Traité de Pharm. t. ii. p. 28.
\(^3\) Planche, Journ. de Pharm. t. xviii. p. 181-5.
\(^4\) Pharm. Centr.-Blatt für 1832, 837; Land für 1838, S. 904.
\(^6\) Phil. Tracts. for 1840, p. 349.
\(^7\) Pharm. Centr.-Blatt für 1831, S. 284.
\(^8\) Med. and Phys. Journ. for April, 1824, p. 316.
\(^10\) MOIRROUD, Pharm. Vet. p. 269.
\(^11\) Ibid.
3. On Man.—In the human subject jalap acts as a powerful and
stic purgative, producing copious liquid stools, and when judi-
ously exhibited, is both safe and efficacious. Its objectionable effects
that while in the stomach it causes frequently nausea, and some-

sthes vomiting; while, after it has passed into the intestines, it often

es gripe.

it is tolerably certain in its operation; more so, indeed, than many

r purgatives. In the proper dose it may be given without the

hesitation to children, in any case requiring an active purge. It

an advantage over some other evacuants, that it does not stimulate the

stem, its effect being confined, principally, to the al-

itary canal—the peristaltic motion, secretions, and exhalations of

ch, it promotes; and it is said that constipation less frequently

eds its use than of some other purgatives.

y own experience of jalap would lead me to regard it as a per-

ily safe, though active cathartic. But Dr. Christison¹ says, that

ere and even dangerous effects have followed its incautious use

nds of the practical joker.” I am not acquainted with any

rs, in the human subject, in which its employment has been fol-

ed by serious consequences. It is a more drastic purgative than

a. To scammers it is closely allied, not only by its effects, but

by botanical affinities and chemical properties. It is much less

ant to the intestinal mucous membrane than gamboge; and, con-

is, is a much safer purgative. Vogt¹⁴ regards it as exceeding

last-mentioned substance, but as being inferior to aloeis, in its

ant influence over the abdominal and pelvic blood-vessels.

Sandelin¹⁵ observes that, while it is more irritant, it is less heat-

than aloeis or senna.

ses.—Daily experience proves the value of jalap, as an active

gative, in various diseases both of children and adults. Of course

ritant properties unfit it for exhibition in inflammatory affections

imentary canal, as well as after surgical operations about the

en and pelvis. Moreover, it is not an appropriate purgative

itation of, or hemorrhage from, the uterus; or in piles and stric-

t, and prolapsus of the rectum. On the other hand, its use is

ited in torpid and overloaded conditions of the intestinal canal,

ell as in constipation, attended with retention of the catamenia.

en the object is to relieve cerebral congestion and dropscial affec-

y a counter-irritant influence on the mucous membrane, jalap

ell adapted to fulfil it, both by the energy and safety of its

ation. The following are some of the cases in which it is em-

1. In Constipation.—When this condition is not dependent on, or

ected with, irritation or inflammation of the alimentary canal or

can organs, jalap is admissible. Its efficiency is much increased
association with calomel. It may be employed in febrile and in-

¹ On Poisons, p. 554.
flammatory diseases (those above-mentioned excepted), as well as chronic maladies.

2. As a Vermifuge.—The compound of jalap and calomel is most efficacious anthelminthic, and may be used with the most happy effects in children, especially where there is an excessive secretory mucous. “Jalap,” says Bremser, “is, without contradiction, verminous diseases, one of the best purgatives, and which, perhaps possesses, at the same time, greater anthelminthic virtues than others.”

3. In Cerebral Affections.—Jalap, in combination with calomel, used with the best effect, on the principle of counter-irritation, to relieve cerebral congestion. In inflammatory affections of the brain its membranes, or in hydrocephalus, it is a valuable purgative.

4. In Dropsies.—In dropsical affections it is frequently desirable to promote watery stools. Jalap, especially in combination with cream of tartar, may be used for this purpose with the best effect. Margrave calls it a panacea hydropicorum.

5. In Retention of the Catamenia, or of the Hemorrhoidal Flatus, jalap is one of the purgatives adapted, from their stimulant influence over the pelvic vessels, to promote these discharges.

Administration.—The dose of jalap, in powder, is, for an adult, from ten to thirty grains: a scruple usually acts smartly and safely, for children under twelve months old, the dose is from two to 3 grains. Fifteen grains of jalap and two or three grains of calomel, is an efficient, yet safe, purgative for an adult. It very readily produces salivation by repetition. From two to five grains of ipecacuanha sometimes substituted for the calomel. To children jalap is sometimes exhibited in gingerbread cakes. Purgative cakes of this kind are kept in the shops. The Biscuits purgatifs (Panes saccharati purganti) are composed of Jalap, 3xx.; Flour, 3ij.; 24 Eggs; and Sugar. This quantity is sufficient for 60 biscuits.1

1. Pulvis Jalapii E Compositus, L. E. D. Compound Powder of Jalap.—(Jalap, 3ij.; Bitartrate of Potash, 3vj.; Ginger, 3j.) Boil them separately to powder; then mix them, L. The Edinburgh and Dublin Colleges use the same proportions of jalap and bitartrate of potash, but omit the ginger.—Hydragogue purgative. Used in habitual costiveness, verminous diseases, and dropsies. —Dose for adult, 3ij. to 5ij.

2. Tinctura Jalapii, L. E. D. Tincture of Jalap.—(Jalap, bruised, 3vj. [3vj. D., in moderately fine powder, 3vij. E.]; Proof Spirit, 6x. [wine measure, D.].) Macerate for fourteen days, and strain, L. B. “This tincture may be prepared either by digestion or percolation as directed for tincture of cinchona,” E.) —An active cathartic. Rarely used alone; generally employed as an adjunct to purgative

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1 Traité sur les Vers Intest. p. 440.
3 Jourdan, Pharmacopée Universelle.
OTHER MEDICINAL CONVOLVULACEÆ.

8. Extractum Jalapæ, L. D. Extractum sive Resina Jalapæ, E. Extract of Jalap.—(Jalap root, powdered, lbiss. [lbj. D.]; Rectified spirit, Cong. j. [Oiv. wine measure, D.]; Distilled water, Cong. j. ang. j. wine measure, D.). Macerate the jalap root in the spirit for 7 days, and pour off the tincture. Boil down the residue in the former to half a gallon [two pints, D.]; afterwards strain the tincture and the decoction separately, and let the latter be evaporated, and the former distil, until each thickens. Lastly, mix the extract with the water until the mixture approaches a proper consistence, D. This extract should be kept soft, which may be fit to form pills, and hard, which may be rubbed to powder, L. The directions for the Edinburgh College are the following:—“Take any convenient quantity of jalap, in moderately fine powder; mix it thoroughly with a sufficient quantity of the rectified spirit to moisten it well; put it in twelve hours into a percolator; and exhaust the powder with rectified spirit; it off the greater part of the spirit, and concentrate the residuum by the vapour-bath to a due consistence.”—In this process the chol extracts the resin, and the water subsequently used by the London and Dublin Colleges takes up the gummy extractive: the chol tincture is distilled to save the spirit, while the aqueous portion is evaporated. The preparation of the Edinburgh College impure resin of jalap; whereas that of the London and Dublin Colleges is a mixture of resin with the gummy extractive. It was formerly, and indeed is now by many persons, supposed, that the abination of these ingredients was necessary for the full cathartic effect of jalap. It is, however, well known that the watery extract is not as a purgative, though it is said to be diuretic: the only advantage, therefore, that can attend the mixture of the two extracts (the dry and the alcoholic), is, that the resin is intimately divided, and thereby prevented from causing violent irritation and griping in any part of the intestinal tube. But it is obvious that the same advantage can be obtained by mixing the resin with some mild agent (almonds, sugar or saline matter, as sulphate of potash). Mr. Lind’s says, that jalap yields about 66 per cent. of extract; that is, 30 of alcoholic, and 30 of watery extract. According to this statement, therefore, the extract of the Edinburgh College possesses four times the activity of that of the London and Dublin Colleges.—The use of the resin (Ph. Ed.) is from grs. ij. to grs. vj., in a minute of division, as above directed; of the extract, Ph. L. and D., in grs. x. to 2j.

OTHER MEDICINAL CONVOLVULACEÆ.

besides the species already noticed, the roots of several others have been employed in medicine on account of their purgative properties; as the root called Choacan, and the root of Ipomeæ Turpæthum. Their use is now obsolete. 

Order XLI.—GENTIANACEÆ, Lindley.—The Gen
TRIBE.

Gentianæ, Jussieu.

Essential Character.—Calyx monophyllous, divided, inferior, pet
Corolla monopetalous, hypogynous, usually regular and persistent; divided, equal, its lobes of the same number as those of the calyx; five, sometimes four, six, eight, or ten; with an imbricated twisted sta
Stamens inserted upon the corolla; all in the same line, equal in all the segments, and alternate with them; some of them occasionally more Pollen three-lobed or triple. Ovary single, one- or two-celled, many-Style one, continuous; stigmas one or two. Capsule or berry, many-lobed with one or two cells, generally two-valved; the margins of the valves inwards, and in the genera with one cell, bearing the seeds; in the genera inserted into a central placenta. Seeds small; testa single, straight in the axis of soft fleshy albumen; radicle next the hilum.—Plants, seldom shrubs, generally smooth. Leaves opposite, entire, stipules, sessile, or having their petioles confluent in a little sheath, ciliate in some cases three- to five-ribbed; very rarely brown and scale-like; some terno-tate. Flowers terminal or axillary (Lindley).

Properties.—This order contains a bitter principle, which is especially abundant in the roots. On this substance depends the stomachic, tonic, febrifuge properties of the different species.

1. GENTIANA LUTEA, Linn. L. E. D.—Common or Yellow
GENTIAN.

Sex. Syst. Pentandria, Digynia.
(Radix, L. D.—Root, E.)

History.—Gentian is said to owe its name and introduction into medical use to Gentius, king of Illyria, who was vanquished by the Romans about 160 or 169 years before Christ. It is, therefore, noticed by either Hippocrates or Theophrastus, but is mentioned by Dioscorides*, who calls it Πεντάντα; and by Pliny †.

Botany. Gen. Char.—Calyx [four-] five-cleft. Corolla campanulate, or funnel-shaped at the base; the limb four-, six-cleft; segments entire or ciliated, sometimes with internodals of distinct smaller ones. Stamina five, inserted upon the tube of the corolla; anthers sometimes connate. Style two-parted; two. Capsule one-celled (Bot. Gall.)

Sp. Char.—Leaves broad, ovate, nervate. Flowers whorled, late. Calyx membranaceous, unilateral. Corolla rotate, five-crenate, acute (Bot. Gall.)

Root perennial, cylindrical or spindle-shaped, simple or slightly branched, ringed, wrinkled, externally brown, internally yellow, fleshy. Stem simple, erect, two to three feet high, roundish,

* Lib. iii. cap. 3.
† Hist. Nat. lib. xxv. cap. 51, ed. Valp.
YELLOW GENTIAN.

Leaves pale-green, opposite, ovate, or oval, pointed, entire, five- to seven-ribbed, plaited; lower ones on short, sheathing 
s; upper ones amplexicaul; those next the flowers becoming 
, yellowish-green bracts. Flowers on smooth peduncles of 
 six-lines long. Calyx yellow. Corolla yellow; segments 
 seven, lanceolate. Staminea as long as the corolla. Ovarium 
, with five greenish glands at the base. Capsule conical, two- 
 . Seeds numerous, roundish, albuminous, with membranous 
 .

—Alps of Austria and Switzerland; abundant on Mount 

SECTION.—The roots are collected and dried by the peasants of 
land, the Tyrol, Burgogne, and Auvergne. They are im- 
 into this country in bales, from Havre, Marseilles, &c. In 
 duty (4s. per cwt.) was paid on 470 cwt.

DESCRIPTION.—Gentian root (radix gentiana) is imported in cylin-

, usually more or less branched pieces, varying in length from a 
ches to a foot or more, and in thickness from half an inch to 
two inches. These pieces are marked by transverse annular 
es and longitudinal furrows. Externally the root is yellowish-

, internally it is brownish-yellow; its texture is spongy; its 
in the fresh state, peculiar and disagreeable; its taste is in-
bitter. The roots of other species of Gentiana are said to 
ently mixed with those of the official species; their effects, 
er, are analogous. Martius says, that the roots of G. pur-
have strong longitudinal furrows, and are of a darker brown 
ternally, but want the transverse wrinkles. The roots of 
onica are similar to those of purpurea. Both kinds are met 
 Bavaria, and serve in Switzerland for the preparation of a 

Gentiana punctata has roots which are just as bitter, but of 
 yellow colour; they are dug up in great abundance in Mo-

The roots of both the last mentioned species are dug up at, 
ported from, Salzburg; in the fresh state they are white when 

CHEMISTRY.—Gentian root was analyzed, in 1815, by Schrader ; 
7 by Bracconot ; in 1819 by Henry ; in the same year by 
min and Fœquequin ; and in 1821 by Henry and Caventou . 
 it was examined by Leconte . The constituents of gentian 
 according to Henry and Caventou, are— a volatile odorous 
, bitter crystalline matter (gentianin), fugaceous odorous princi-
ilate oil), yellow colouring matter, green fixed oil, gum, in-
itizable sugar, matter identical with bird-lime, a free organic 

* Pharmacogu. 
* Journ. de Physiq. lxxxiv. 322. 
* Journ. de Pharm. t. v. p. 97. 
acid, and woody fibre. But in 1837, H. Trommsdorff* and Lecou showed, that under the name of gentianin two substances had been confounded,—the one crystalline and tasteless; the other bit. The first has been called gentisin; the second gentianate. Furthermore, Lecou has shown, that the substance considered by H. and Caventou as identical with bird-lime, is a compound of wax and caoutchouc.

1. Oil of Gentian.—By distillation with water gentian root yields a small quantity of a butyric acid oil, which floats on water, has a powerful odour of gentian root, and is soluble in alcohol. A few drops of the melted oil given to a rabbit without causing any remarkable effects. I have received from Mr. Whipple two samples of this oil, the one green, the other white like milk. Three cts. of the root yielded only about 5 cts. of oil.

Planche2 states the distilled water of gentian caused nausea and a kind of intoxication.

2. Gentisin or Gentisic Acid.—Procured by washing the alcoholic extract of the root with water, and then treating with alcohol. The tincture obtained was evaporated, the extract treated by ether: the residue, by successive solutions and evaporations, yielded gentisin. It is pale yellow, crystallizable in needles, has a peculiar, but weak smell. When cautiously heated, it gives out some low vapours, which are condensed on the upper part of the tube. It is sparingly soluble in water, but dissolves in alcohol. With alkalis it unites to form salts. Its saturating power is about 438. Trommsdorff says, that a solution of gentisin is unaffected by acetate of lead, nitrate of silver, and most other salts. Gentisin is produced, in the alcoholic solution of gentian, most characteristic changes.

3. Bitter Principle of Gentian (Gentianate).—This has not hitherto been isolated. By digesting the alcoholic extract of gentian in water, an acidulous taste and a distinctly bitter solution is obtained. The acid may be thrown down by chloroform. When the excess of lead has been removed from the solution by sulphuric acid, a liquid is obtained, which, by evaporation, yields a sweet and pungent extract, from which ether removes an aromatic acid, an odoriferous resin, and wax. The bitter matter has not been separated from the sugar.

4. Pectin.—The existence of pectic acid (pectin) in gentian was ascertained in 1836, by Denis.3 To this substance is to be ascribed the gelatinization of the infusion of gentian, which, under certain circumstances, is not unfrequently observed.

5. Sugar.—To the presence of this matter in gentian is to be ascribed the possibility of the infusion of gentian to undergo the vinous fermentation, and form an alcoholic liquor (gentian spirit), much admired by the Swiss.

Chemical Characteristics.—The infusion of gentian is deep brown in colour by the caustic alkalies. Sesquichloride of iron communicates a deep olive-brown tint. The acetate and diacetate of lead give a precipitate of the sulphate of copper, and the nitrate of mercury, cause flocculent or gelatinous precipitates (metallic pectates?).

Physiological Effects.—Gentian is very properly regarded as pure or simple bitter; that is, as being bitter, but without possessing either astringency or much aroma. It has, therefore, the usual properties of medicines of this class, which I have before noted (p. 186).

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* Bull. de Pharmacie, t. vi. p. 351.
* Journ. de Pharm. t. xxii. p. 393.
* Biwald, in Filh’s Mat. Med. Bd. ii. S. 22; and Planche, Bull. de Pharm. vi. 351.
Given in full doses it appears more disposed to relax the bowels than the other simple bitters, and in susceptible individuals it is more to disorder the digestive process. In such cases both Lüseke and Sigel have seen it cause vomiting. Barbier says it quickens the bile. It is somewhat less bitter, and therefore, I presume, somewhat less powerful, than quassia.

By continued use the sweat and urine acquire a bitter taste; a sufficient proof that gentian, or its bitter principle, becomes absorbed. As some of the vegetable bitter tonics (for example, quassia and bumba) have been found to exert a specific influence over the cerebro-spinal system, and to yield preparations of a poisonous quality, they are naturally led to inquire whether any analogous facts have been observed with respect to gentian. The reply is in the affirmative. Magendie, indeed, discovered no poisonous operation in gentianin; he threw several grains of this principle into the veins of an animal, without any obvious effect, and swallowed two grains dissolved in alcohol, but only observed extreme bitterness, and a slight feeling of heat in the stomach. Moreover, Hartl inserted two grains of the extract of gentian into the inner side of the thigh of a rabbit, without ill effects resulting; the wound was slightly inflamed, though it soon healed. These facts prove that the bitter extractive of gentian possesses no narcotic properties. But if the narcotic principle of gentian be of a volatile nature, these experiments of Magendie and Hartl go for nothing, since, in the preparation of both the extract and gentianin, this principle would be dissipated by the heat employed. Now, Planche has shown, as I have already mentioned, at the distilled water of gentian causes violent nausea, and, within a few minutes, a kind of intoxication. Moreover, Buchner tells us, at some years ago a narcotic effect was produced in Prussia by the medicinal use of gentian root, although the presence of any foreign matter could not be detected. In the Philosophical Transactions for the year 1748, are mentioned some deleterious effects resulting from the use of gentian: but they were referred to a foreign root, said to have been intermixed with, and which greatly resembled, the true gentian root.

All these facts, then, support the opinion of Haller (quoted by Buchner), that gentian is not so innocuous as is generally supposed.

Uses.—Gentian is adapted to most of the cases requiring the use of the pure or simple bitters (p. 188). It agrees best with phlegmatic, torpid individuals, and is apt to disagree with irritable or susceptible persons. It is contra-indicated in febrile disorders and inflammatory conditions of the gastro-intestinal membrane. It is employed principally in the following cases:

1. In dyspepsia, and other gastric disorders, attended with debility.
or torpidity, and unaccompanied by any marks of inflammation or irritation, or great susceptibility, of the digestive organs. Sesquicarbonate of ammonia is a very valuable adjunct.

2. In intermittent diseases it may be used where cinchona is admissible; but it is much inferior to the last-mentioned substance. “Joined with galls or tormentil, in equal parts, and given in sufficient quantity, it has not failed,” says Dr. Cullen, “in any intermittent in which I have tried it.”

3. In many other diseases marked by weakness and debility, be unattended by fever or gastro-intestinal irritation, gentian is admissible and useful; as in some forms of gout, hysteria, uterine disorder &c. It is a constituent of the Duke of Portland’s powder for the gout (see p. 1199).

4. Against worms it has been used as if it possessed some specific influence.

5. In surgery it has been used for discutient fomentations, also, in the form of fine powder, as an application to issues, to promote the running, and as a tent, to enlarge and cleanse fistulous apertures.

Administration.—In the form of powder, the dose is from gr. to 5ss. But the infusion, tincture, or extract, are the usual forms of exhibition.

1. Infusum Gentianae Compositum, L. D. Infusum Gentianae, or Infusion of Gentian. — (Gentian root, sliced, 5ij. [3j. D.]; Orange Peel, dried, 5ij. [3j. D.]; Lemon Peel, fresh, 5iv. [5j. D.]; Boil [Distilled, L.] Water, 0j. [3xij. D.]. Macerate for an hour in a vessel lightly covered, and strain. The directions of the Edinburgh College are as follows:—Gentian, sliced, 8ss.; Bitter Orange Peel, dried and bruised, 3ij.; Coriander, bruised, 5j.; Proof Spirit, 6j. Cold Water, f3xvj. Pour the spirit upon the solids; in three hours add the water, and in twelve hours more strain through lines (calico).—The infusion of the London and Dublin Pharmacopoeias is very apt to spoil by keeping; but as it can always be speedily procured, this is not a circumstance of much importance. However, obviate it as much as possible, the Edinburgh College orders cold water to be used (by which less of the mucilaginous matter [pectin, &c.] is dissolved), and employs spirit to promote the solution of the bitter principle, while the quantity of gentian is much increased; so that, in fact, we have a weak tincture, rather than an infusion. Besides the objections which may arise out of these deviations, a very important one is the length of time required for the maceration. Infusions of gentian are stomachic and tonic. When prepared according to the London and Dublin Pharmacopoeias, the dose is f5j. to f3xj.; when according to that of the Edinburgh, f3ss. to f3j.

2. Mistura Gentianae Composita, L.; Compound Mixture of Gentian.—(Compound Infusion of Gentian, f3xij.; Compound Infusion of Senna, f3vj.; Compound Tincture of Cardamoms, f3ij. Mix.)—

2 Quinsey, Diapause.
Tonic and cathartic. Used in dyspepsia with constipation.—Dose, 3ij. to fij.


The relative proportions used by the Dublin College are the same as those of the London. The Edinburgh College employs of Gentian, sliced and bruised, 3iiss.; Dried Bitter Orange Peel, bruised, 3x.; Cinella, in moderately fine powder, 3vj.; Cochineal, bruised, 3ss.; and Proof Spirit, Oij. This tincture may be more conveniently prepared by percolation, as directed for the compound tincture of caromom, E.).—A grateful cordial tonic and stomachic. Employed as a adjunct to the infusion, effervescing draughts, bottle soda-water, &c.—Dose, f5ss. to f3ij.

4. Extractum Gentianae, L.E. D.; Extract of Gentian.—(Gentian, sliced, lb. ijss.; Boiling Distilled Water, Cong. ij. Macerate for 4 hours: then boil down to a gallon, and strain the liquor while hot; lastly, evaporate to a proper consistence, L. “Take of Gentian, by convenient quantity; bruise it to a moderately fine powder; mix thoroughly with half its weight of distilled water; in twelve hours put it into a proper percolator, and exhaust it by percolation with emperate distilled water; concentrate the liquid, filter before it becomes too thick, and evaporate in the water-bath to a due consistence,” E.)—Good gentian root yields, by the process of the London Pharmacopoeia, about half its weight of extract. Extract of Gentian is tonic. It is usually employed as a vehicle for the exhibition of the metallic substances (especially chalybeates) in the form of pill.—Dose, grs. x. to 3ss.

2. Agath'otes Chiray'ta, Don, E.—The Chiretta or Chiray'ta.

Gentiana Chirayita, Fleming.
Sex. Syp. Pentandra, Dignia.
(Herb and Root, E.)

History.—This plant seems to have been long in use among the natives of India. Professor Guibourt¹ thinks that it is the कालमुक of Dioscorides. Various circumstances, however, appear to me to be opposed to this opinion: one of the most conclusive is the absence of odour in the chirayta plant.¹ I have before stated (p. 3929) that Professor Royle refers the Calamus aromaticus of the

¹ Lib. i. cap. 17.
Greens to his *Andropogon Calamus aromaticus* (*A. nardoides*, neo ab Esenb.)

**Botany. Gen. Char.** — *Corolla* withering, rotate, in aestivation twisted to the right; with glandular hollows protected by a fringe scale upon the segments. *Anthers* not changing. *Stigma* sessile. *Capsule* conical, one-celled, with spongy placenta upon the summit. *Seeds* indefinite, minute (Lindley).


**Hab.** — Mountains of Nepal and the Morungs.

**Description.** — The plant is pulled up by the root, about the time that the flowers begin to decay and the capsules are well formed. The dried plant, with the root (*herba et radix chiretiæ sive chirayta*) is met with in the shops. The root is fibrous; the stem is round, smooth, not jointed, marked with the cicatrices of leaves, has a yellowish pith; the leaves are as above described. The whole plant without odour, but has an intensely bitter taste.

**Composition.** — The stems of this plant were analysed by MM. Lassaigne and Boissel, who obtained the following results: — *reca*, yellow bitter matter, brown colouring matter, *gum*, *malic acid* [wood fibre], *malate of potash*, *chloride of potassium*, *sulphate of potash*, *phosphate of lime*, *silica*, and traces of oxide of iron.

The bitter matter is the most important constituent. No vegetable alkali has been detected in it. The substance sold as *sulphate of chiraytiæ* is sulphate of quina.

**Physiological Effects.** — Chirayta is an intensely bitter substance, and produces the before (p. 188) described effects of the simple or pure bitters. In its operation, as well as by its botanical affinities, it is closely allied to gentian. It appears to possess rather a relaxing than a constipating effect.

**Uses.** — It has long been employed by the natives of India in the same case of cases in which gentian has been used in Europe. As a stomachic it is especially serviceable in the dyspepsia of gouty subjects. It strengthens the stomach, obviates flatulency, and diminishes the tendency to acidity. Combined with the seeds of *Guilandina Bonduc*, it is employed with success in intermittents.
COMMON CENTAURY.

Administration.—It may be given in powder, in the dose of 5 fluidrams; it may be employed in the form of infusion, tincture (prepared with clove, mace, and orange peel, like compound tincture of gentian), or extract.

Infusum Chiretta, E.; Infusion of Chiretta.—(Chiretta, 3 fluidrams; Aloes Water, 0.04 fluidrams. Infuse for two hours, and strain through linen calico).—The dose of this is 5 fluidrams to 3 fluidrams.


Gen. Syst. Pentandria, Monogynia.

(Centaurium, L.—The flowering heads, E.—Folli, D.)

History.—This plant was known to the ancients, and received one of its names (Chironia Centaurium) from Chiron the Centaur, who is said to have lived 1270 years before Christ. But the plant which Linnaeus says cured Chiron of a wound received by an arrow, which impaled his foot when examining the arms of Hercules, is supposed to be the Centaurea Centaurium.


Sp. Char.—Stem nearly simple. Panicle forked, corymbose. Leaves ovate-lanceolate. Calyx half the length of the tube; its segments united by a membrane (Smith).

Root small, tapering. Stem about a foot high, leafy. Radicles ovate-ovate; the rest acute, ovate, or elliptic-lanceolate; all three-bibed, bright green. Flowers nearly sessile. Bracts opposite, awl-shaped. Calyx slender. Tube of corolla pale-greenish; limb bright pink, expanded only in sunshine, closing as soon as gathered.


Description.—The herb or tops (herba seu summitates vel cacumina centaurii minoris) of the common or lesser centaury are without stour, but have a very bitter taste. They are collected when in flower.

Composition.—According to Moretti,* common centaury contains bitter extractive, free acid, mucous matter, extractive, salts [and woody fiber].

Bitter matter (Centauria).—The principal constituent of common centaury is the bitter extractive, called by Dulong d' Astafort* centauria. This, when combined with hydrochloric acid, is said to be an excellent febrifuge. Centaurin must not be confounded with centaurite, the bitter principle of Cnicus benedictus, L. Cand.
PHYSIOLOGICAL EFFECTS.—Similar to those of gentian (p. 127) and of other simple or pure bitters (see p. 188).

USES.—Common or lesser centaury is rarely used by medical practitioners; yet it might be employed as an indigenous substitute for gentian. Dose of the powder, 3j. to 5j. It may be also used to make an infusion.

4. MENYANTHE'S TRIFOLIATA, LINN., L. E. D.—COMMON BUR- 
BEAN; MARSH TREFOIL. 

Sex. Syst. Pentandria, Monogynia. 

(Menyanthes, L.—Leaves, E.—Folia, D.)

HISTORY.—Sprengel 7 considers this to be the plant referred to by Theophrastus under the name of μηνανθος.

BOTANY. Gen. Char.—Calyx five-parted. Corolla funnel-shaped, the limb spreading, five-lobed, equal, hairy on the inside. Stamens five. Style one; stigma capitate, two- to five-grooved. Capsule ovoidal; the parietes seminiferous (Bot. Gall.)

Sp. Char.—Leaves ternate. Disk of the corolla densely shaggy (Smith).

Rhizoma black, creeping, jointed. Leaves on long stalks, broad sheathing stipules at base: they are trifoliolate; leaflets oval, smooth. Scapes round, ascending, smooth. Bracts of Calyx obtuse. Corolla white or flesh-coloured, elegant. Ants yellow.

Hab.—Indigenous; watery meadows, ditches, &c.; frequently cultivated in ornamental aquaria, on account of the beauty of the flowers. Perennial. Flowers in June and July.

DESCRIPTION.—The whole herb (herba menyanthis seu trip 
floribus) is odourless, but has a very bitter taste. Its infusion strikes a green colour (tannate of iron) with the sesquichloride of iron. The leaves (folia menyanthis) are the parts usually employed.

COMPOSITION.—Menyanthes was analyzed by Tronmsdorff, and it was found that the fresh plant consists of 75 parts of moisture and 25 parts of solid matter, composed of bitter extractive, vegetable albumen, gum, resin (chlorophylle), peculiar matter precipitable by tannic acid, soluble in water and in weak spirit, brown gum, fuscum (indus menyanthinum, malic acid, and acetate of potash.

The bitter extractive is the active principle. Brandes states that he procured a white bitter powder from menyanthes; but B. Tronmsdorff reports Brandes's experiments, and procured only a yellowish-brown bitter extract.

PHYSIOLOGICAL EFFECTS.—Tonic and astringent. In large doses a cathartic, and sometimes emetic.

USES.—This plant is used by the brewers of some parts of Germany.

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7 Hist. Rei Herb. t. i. p. 82.
8 Hist. Plant. li. iv. cap. 11.
PERENNIAL WORM GRASS.

cularly Silesia and the adjacent provinces, as a substitute for
It is rarely employed in medicine, but is applicable for the
purposes as the other bitter tonics (see p. 188). It has been
med efficacious as an antiscorbutic.\(^1\)

MINISTRATION.—It may be given in powder, infusion, or extract.
The dose of the powder is from \(\frac{\text{f}j}{3} \text{ to } \text{g}j\); if given to the extent of
generally purges. The dose of the infusion (prepared with \(\text{f}j\).
\(\text{dried herb, and } \text{f}x\text{v}. \text{of boiling water} \) is \(\frac{\text{f}j}{3} \text{ to } \text{f}.\).
of the
extract, grs. \(\text{x} \) to grs. \(\text{xy} \).

OTHER MEDICINAL GENTIANACEÆ.

SÉRA W. AL'TERI, or the American Calumba, is a native of the southern and
portions of the United States, and is very abundant in Arkansas and
Ark. The root is officinal in the Pharmacopœia of the United States. As
ith in commerce, it is in transverse circular segments, about an inch in
, and an eighth of an inch, or more, in thickness. It contains no starch,
nee undergoes no change of colour when touched with iodine. Its in-
or decoction becomes blackish-green (tannate of iron) when treated with
ute of iron, and lets fall a precipitate (tannate of gelatine) on the addition
ution of isinglass. The effects, uses, and doses of Frasera are the same
of gentian. The fresh root is said to operate as an emetic and cathar-
Some years ago it was introduced into France, and sold for calumba;
at got the name of False Calumba. The chemical characters above given,
as the physical properties of the root, readily distinguish it\(^7\).

ORDER XLII.—SPIGELEIACEÆ, MARTIUS.—THE WORM-
GRASS TRIBE.

TIAL CHARACTER.—Calyx inferior, regular five-parted. Corolla regular,
five lobes, which have a valvate aestivation. Stamens five, inserted into
corolla, all in the same line; pollen three-corned, with globular angles.
ry superior, two-celled; style articulated with it, inserted; stigma simple.
ical, two-celled, two-valved, the valves turned inwards at the
in, and separated from the central placenta. Seeds several, small; testa
; embryo very minute, lying in a copious fleshy albumen, with the radi-
next the hilum.—Herbaceous plants, or under-shrubs. Leaves opposite,
, with stipules, or a tendency to produce them. Flowers arranged in
ided spikes. Pubescence simple or stellate (Lindley).

ITIES.—See Spigelia.

IGE'LLIA MARILANDICA, LINN. L. E. D.—CAROLINA PINK;
PERENNIAL WORMGRASS.

SEX. SYST. PENTANDRIA, MONOGENIA.
(Radix, L. D.—Root, E.)

HISTORICAL.—The anthelmintic virtues of this plant were first learned
by the Cherokee Indians, who became acquainted with them, ac-

\(^2\) Murray, App. Med. t. ii. p. 34.
\(^3\) United States Dispensatory.
acording to Dr. Garden, about 1723: they were made known to the profession about 1740.


**Sp. Char.** — *Stem* simple, herbaceous. *Leaves* opposite, sessile, acuminate.

*Root* perennial. *Stems* composed of numerous fibres, from a cylindrical rhizome. *Stems* several, erect, four-sided and grooved (from the decurrent leaves). *Leaves* decussate, ovate-lanceolate, entire, smooth, but somewhat slightly pubescent on the veins and margins. *Flowers* in simple one-sided spikes (or racemes) *Corolla* much longer than the *calyx*, of a rich carmine colour, narrowly paler at the base, and orange-yellow within. *Capsule* date, smooth. *Seeds* several in each cell.

**Hab.** — Southern States of North America; seldom found north of the Potomac.

**Collection.** — It is collected by the Creek and Cherokee Indians, who dispose of it to the white traders. By these it is packed in bales, or more commonly in large bales, weighing from three hundred to three hundred and fifty pounds. That contained in casks, or more commonly in large bales, weighing from three hundred to three hundred and fifty pounds. That contained in casks is of a greyish green colour, a faint odour and a bitter taste. The root (*radix spigelii*) consists of numerous, short, thick, brown fibres, issuing from a short, dark branch, dark brown fibres, issuing from a short, dark branch of a bright colour. Some parcels have recently brought from the shops, and have commanded a price above than double the price of the drug prepared in the usual way.

**Description.** — The dried plant (*herba spigelii*), as usually sold in the shops, is of a greyish green colour, a faint odour and a bitter taste. The root (*radix spigelii*) consists of numerous, short, thick, dark brown fibres, issuing from a short, dark branch of a bright colour.

**Composition.** — The herb and root have been analyzed by Wackenroder. Feneulle probably analyzed this plant under the name *Spigelia anthelmintica*.

**Wackenroder's Analyses.**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myrcin</td>
<td>0.01</td>
</tr>
<tr>
<td>Resin, with chlorophyllae</td>
<td>2.40</td>
</tr>
<tr>
<td>Peculiar resin</td>
<td>0.20</td>
</tr>
<tr>
<td>Peculiar tannin</td>
<td>17.20</td>
</tr>
<tr>
<td>Woody fibre</td>
<td>75.20</td>
</tr>
<tr>
<td>Malate of potash, and chloride of potas-</td>
<td>2.10</td>
</tr>
<tr>
<td>sium</td>
<td></td>
</tr>
<tr>
<td>Malate of lime</td>
<td>4.20</td>
</tr>
<tr>
<td>Herb of Spigelia</td>
<td>101.30</td>
</tr>
<tr>
<td>Fixed oil, with some fixed oil</td>
<td></td>
</tr>
<tr>
<td>Acid resin, with some fixed oil</td>
<td></td>
</tr>
<tr>
<td>Peculiar tannin</td>
<td></td>
</tr>
<tr>
<td>Bitter acid extractive</td>
<td></td>
</tr>
<tr>
<td>Woody fibre (which yields 18.74 of</td>
<td></td>
</tr>
<tr>
<td>Root of Spigelia</td>
<td></td>
</tr>
</tbody>
</table>

1. **Bitter extractive.** — Feneulle ascribes the activity of *Spigelia* to a bitter extractive, like that of the purgative Leguminose. Taken inter

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*Essays and Obs. Phys. and Lit.* vol. iii.

*United States' Dispensatory.*

*Greftin's Handb. d. Chem. ii.* 1298.

*Journ. de Pharm.* i. i. p. 927.
vertigo and a kind of intoxication. It is, I presume, identical with the acid extractive of Wackenroder.

Physiological Effects.—The physiological effects of this root have not been accurately determined; but the observations hitherto show them to be those of a local irritant (or acrid) and narcotic nature.

The ordinary dose (one or two drachms for adults) it has a very sensible effect on the system, though it may act efficaciously anthelmintic. In larger doses it appears to operate as an irritant to the gastro-intestinal canal, and gives rise to purging and sometimes to vomiting, though its effects in this way are very un

In poisonous doses it operates as a cerebro-spinant or nerviving rise to “vertigo, dimness of vision, dilated pupils, spasm of the facial muscles, and sometimes even to general convulsions. Spasmodic movements of the eyelids have been observed in the most common attendants of its narcotic action. The death of two children, who expired in convulsions, was attributed to Chambers to the influence of spigelia. The narcotic effects did to be less apt to occur when the medicine purges, and to be somewhat obviated by combining it with cathartics. The danger of its employment cannot be great, as it is in very general use in the United States, both in regular and domestic practice, and we hear at present of serious consequences. Its effects upon the stomach have been erroneously conjectured to depend on other roots mixed with the genuine spigelia.

Uses.—Employed only as an anthelmintic. Its vermifuge properties were first made known to the profession by Drs. Lining and Lin. Though scarcely used in this country, it stands at the head of anthelmintics in the United States of America.

Administration.—The dose of the powder, for a child of three or four years old, is from grs. x. to grs. xx.; for an adult, 5 j. to 5 j.; quantity is repeated, every morning and evening, for several days and then followed by a brisk cathartic. It is frequently combined with aloes.

Usus Spigelle. Ph. United States. Infusion of Pink-root. 6 lbs. root, 3 ss.; Boiling water, $3 x v j$. Macerate for two hours in a covered vessel, and strain).—The dose, for a child of two or three years old, is $3 ss$. to $3 j.$; for an adult, from $3 j$. to $3 v j$. repeated morning and evening. A quantity of senna, equal to that of the root, is usually added, to ensure a cathartic effect. The preparation is kept in the shops of the United States, and much used by physicians, under the name of worm tea, consists of

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1 United States' Dispensatory.
2 Essay and Obs. Pharm. and Lit. vol. i. p. 386.
3 Ibid. vol. ii. p. 145.
spigelia root, senna, manna, and savine, mixed together in various proportions to suit the views of different individuals.

**OTHER MEDICINAL SPIGELIACEAE.**

Spigelia anthelmintica is a native of South America and the West Indies. Its action is similar to that of the last-mentioned species. So notorious has it been regarded, that in France it is called Brinçillières, after a Marchioness de Brinçillières, a woman famous for poisoning in the reign of XIV., and who was executed on the 16th of July, 1676. Its anthelmintic properties were noticed in 1751 by Dr. Browne. This plant was analagously named Ricord Madianna. Dr. Brown says, it procures sleep almost as certain as opium.

**ORDER XLIII.—ASCLEPIADACEÆ, Lindley.—THE SWEET LOW-WORT TRIBE.**

Asclepiadaceæ, R. Brown.

The plants of this order are for the most part acrids. In large doses they are emetic and cathartic; in small doses, expectorant, diaphoretic, and anti-spasmodic. The roots are the parts usually employed in medicine.

Though none of the species are contained in the British pharmacopoeia, several have attracted the attention of practitioners in this country.

1. Calotropis gigantea, R. Brown (Asclepias gigantea, Linn.) has been introduced from India under the name of Mudar or Madar. It is said to contain a peculiar principle called mudarine, which coagulates by heat, and is again fluid on exposure to cold. The principal value of Madar is as an antispasmodic and sudorific. It has been employed in venereal diseases, chronic cutaneous affections, and various other maladies. Mr. Robinson found it decided in a case of elephantiasis, which Mr. Playfair calls jugularis leprosaria. The powder of the bark of the root is given in doses of from grains to drachms. Dr. Ainslie considers the dried milky juice more efficacious.

2. The root of Hemidesmus indicus, R. Brown, (Periploca indica, Asclepias pseudosaroca, Roxb.) is used in India under the name of country parilla. The attention of practitioners in this country was drawn to it by Ashburner in 1831; and again in 1833. It has been called Indian or sarsaparilla, annamari, or the root of Smilax aspera. How this last and erroneous appellation became applied to it I cannot tell; for I find from specimens of the root of Smilax aspera brought from the south of Europe, that no resemblance exists between the latter and the root of Hemidesmus indicus. The latter is brownish externally, and has a peculiar aromatic odour, and a feeble, bitter taste. It is long, tortuous, cylindrical, rough, furrowed longitudinally, and has a pith divided, by transverse fissures, into moniliform rings. The cortical layer has a corky consistence, and surrounds a ligneous medulliform. Mr. G.
l from it a volatile, crystallizable acid, (?) on which the taste, smell, and, 
its medicinal properties depend. From an erroneous notion of the 
root, he called the acid the *smilaseric acid*, but it may with 
more be termed *hemidesmic acid*. Hemidesmus indicus has been employed 
ap and efficacious substitute for sarsaparilla in cachectic diseases; but 
effects and uses require a more extended examination than has yet been 
to them. Dr. Ashburner says it increases the appetite, acts as a diuretic, 
roves the general health; "plumpness, clearness, and strength, succeed-
nication, muddiness, and debility." It has been used with benefit in 
diseases. In some cases it has appeared to succeed where the sarsapa-
failed; and vice versa it has frequently failed where sarsaparilla suc-
The Tamool doctors employ it in strangury and gravel. It may be 
tered in the form of infusion (prepared by steeping 31. of the root in Oj. 
g [or lime] water for twelve hours); a pint of which may be given in 
or hours, in doses of a wine-glassful. The decoction may be substituted 
for the infusion. Carbonate of soda is frequently added to it. The extract is 
able, as the heat used in preparing it must volatilize part at least of, the 
meat and soda, and part of the acid. A syrup has also been employed. The powder of the bark of 
used in India against the thrush.

leaves, flowers, and fruit of *Cynanchum Ar'gel* are employed by the 
as to adulterate the senna of that country. I believe all the *Alexandrian* 
ought to England contains some portion of these leaves. (For their cha-
ffects see the Order Leguminose.)

The substance called French or Montpellier Scammony (*scammonium* 
is made, in the southern part of France, with the expressed juice of 
monspeliacum, mixed with different resins and other purgative sub-
It occurs in semi-circular, blackish, hard, compact cakes, which fre-
have the smell of balsam of Peru. The juice of this plant has been 
by Marquart.

substance called Smyrna Scammony (*scammonium amyrnseum*) is said to 
seed from the *Secamone Alpini*, Römer and Schultes (*Periplóca Secamone* 
and Marquart has analyzed some substances bearing this name (see

**ORDER XLIV.**—APOCYNACEAE, Lindley.—THE NUX-

VOMICA TRIBE.

**Character.**—Calyx divided into five, persistent. Corolla monope-
hypogynous, regular, five-lobed, with contorted stivation, deciduous.
se five, arising from the corolla, with whose segments they are alternate. 
ents distinct. Anthers two-celled, opening lengthwise. Pollen granular, 
e, or three-lobed, immediately applied to the stigma. Ovaries two, or 
to two-celled, polysemous. Styles two or one. Stigma one. Fruit a 
capsule, or drupe or berry, double or single. Seeds with fleshy or car-
albumen; testa simple; embryo foliaceous; placenta inconspicuous; 
turned towards the hilum.—Trees or Shrubs, usually milky. Leaves 
ite, sometimes whorled, seldom scattered, quite entire, often having eil 
and upon the petioles, but with no stipules. Inflorescence tending to 
dose. (Lindley).

**Species.**—Extremely variable. An order which contains the Nux-vomica, 
Tieuté, the Woooray, and the Tanghin poisons, cannot but be regarded 
suspicion and dread. Yet it contains some harmless and edible species.

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* Pharm. Centr.-Blatt für 1857, S. 693.
* Ibid. für 1857, p. 596.
* See Ryrole's Illustrations, p. 272.
STRYCH'NOS NUX-VOM'ICA, Linn., L. E. D.—THE POISON-NUT.

Sex. Syt. Pentandra, Monogynia.
(Semina, L.—Seeds, E.)

History.—We became acquainted with Nux-vomica through Arabian authors. In the Latin translation of one of the works of Serapion* we find the word nux-vomica, but it appears to have been applied to some other substance (probably to St. Ignatius’s nut). Ar. "Eust nux," says he, "cujus color est inter glaucescentem et albam, major avellana parum et sunt in ea nodi." To which he after adds, "movet vomitum;" from which I presume the name of the vomiting nut, was originally derived. Mesue also mentions nux-vomica. Avicenna† says, nux-methel "est similis nuci vomicae," and it is probable that the nux-melch of Serapion is the substance we denominate nux-vomica.

Botany. Gen. Char.—Calyx four- to five-parted. Corolla tubular with a spreading four- to five-cleft limb, and a valvate actinostylous. Stamens four to five, inserted into the throat of the corolla, which is either naked or bearded. Ovary two-celled, with indefinite style attached to a central placenta; style one; stigma capitate. Fruit corticate, one-celled, many-seeded, or by abortion one-seeded, niddulant, discoidal. Albumen large, cartilaginous, almost divided into two plates. Embryo with leafy cotyledons (Lindley).

Fig. 256.

Strychnos Nux-vomica.

Sp. Char.—Leaves opposite, three- to five-nerved, oval, lucid. Berries many-seeded (Roxburgh).

Middling-sized tree. Trunk short, crooked, pretty thick; the branches irregular, often crooked, pretty thick; the wood white, hard, and bitter. Leaves opposite, oval, shining, entire, three- to five-nerved. Corymbbs small, terminal, five-branched. Corolla funnel-shaped, white. Stamens five, inserted over the divisions of the corolla. Ovarium two-celled. Style the length of the corolla. Stigma capitate. Berry round, smooth, size of a pretty large apple, covered with a smooth, somewhat hard, shell, of a rich orange-red color when ripe, filled with a white, soft, gelatinous pulp, which is greatly eaten by many sorts of birds. Seeds several, immersed in the pulp of the berry, and attached to a central placenta.

Hab.—Coromandel, and other parts of India; Ceylon.

Description.—a. Of the Seeds.—The seeds (nuces vomicae) of this tree are round, peltate, scarcely an inch in diameter, nearly the shape of a drupe, very slightly convex on one side, and concave on the other, and surrounded by a filiform annular stria. From their fancied resemblance to the
delicate structure of the human head and limbs, they are called by the doctors of

† Lib. 2°, tract. 2°, cap. 963.
to grey eyes, as well as from their being poisonous to crows, Germans term them Krähenaugen, or crows' eyes. In the central surface of the seed is the orbicular hilum or umbilicus.

![Fig. 257. Nux-vomica.](image1)

![Fig. 258. Sections of Nux-vomica.](image2)

e seeds have two coats; the outer one, or testa, is simple, and gives origin to short silky hairs, of an ash-grey, or yellow, colour, and which are directed from the centre towards the circumference: within this is the inner coat, or endopleura, which is simple, and very thin, and envelopes the nucleus of the seed.

This nucleus is composed of two parts—namely, albumen and embryo. The albumen is bipartite, cartilaginous, or horny; of a dirty-white colour, of an intensely bitter taste, and, has, in its interior, a cavity (loculamentum verum). Unlike that of most seeds, the albumen of nux-vomica is of a poisonous nature. The embryo, which is milk-white, is seated in the circumference of the seed, its locality being frequently indicated by a point somewhat more projecting than the surrounding parts. It consists of two large cordiform, acuminated, triple-very thin cotyledons, a distinct cauliculus, and a centripetal (i.e. a radicle directed towards the centre of the fruit).

The Bark.—The bark of the Strychnos nux-vomica (nux bark; cortex strychnos nucis vomicae; cortex angusture seu false; cortex pseudo-angusture seu virosae) occurs in flat pieces (angustura falsa convoluta seu plana), or in arched backwards, having the twisted appearance of dried

It is more compact and heavy than real angustura. The epidermis varies in its qualities; sometimes it contains a dark fungoid, or spongy rust-coloured layer (hence the angustura ferruginea), which is only the altered epidermis; at other times it is not thick, not fungous, but covered with numerous prominences, formerly supposed to be some species of lichen, but now known to be only an epidermoid alteration, a
kind of leprous exuberance, the more advanced stage of which constitutes the rust-coloured layer already mentioned. The powder is intensely bitter, and of a yellowish-white colour.

Nux-vomica bark was formerly confounded with angustura or cusparia bark, hence its name of false angustura bark. The history of the mistake is as follows:—In 1804, Dr. Rambach, a physician at Hamburg, observed that some specimens of angustura bark, said to be from the East Indies, acted as a powerful poison; and as repeated cases of poisoning occurred with the same substance, an order was issued, forbidding the use of angustura bark. On the 15th of October, 1815, the Commission of Health of the Grand Duchy of Baden ordered all the angustura bark in the possession of the apothecaries to be seized, and placed under a seal; the physicians at the same time receiving an intimation that they were not, in future, to prescribe this bark. Similar ordinances were issued in Austria, Bavaria, and Wurttemberg.

The origin of the bark is said, by Batka, to be as follows:—A quantity of it was imported from the East into England, and not being saleable, was sent to Holland; and as no better means of getting rid of it offered, it was mixed with, and sold as, genuine angustura or cusparia bark. Great obscurity long existed as to the tree which yielded it. At first it was attributed to the Brucea ferruginea or antidysenterica, a native of Abyssinia, belonging to the family Xanthoxylaceae; but in 1831, Geiger had occasion to examine the bark of the B. ferruginea, and found that it had no resemblance to false angustura. Now, the compositional and effects of this bark rendered it, in the highest degree, probable, that it was the product of some tree of the family Apocynaceae, most probably of the genus Strychnos; Batka said of the S. nux-vomica, or some kindred species; an opinion which was confirmed by my examination of the specimens of the nux-vomica plant in Dr. Wallich's collection, in the possession of the Linnean Society. In 1837, Dr. O'Shaughnessy established the identity of false angustura bark and the bark of the nux-vomica tree. Since then I have examined about 1 cwt. of the latter bark brought to this country, and find it to be identical with false angustura bark contained in my museum, and which I had purchased in Peru several years before.

Commerce.—In 1838 there were imported 1017 lbs. of nux-vomica; in 1839 only 478 lbs.; in 1840, 550 lbs. The duty is 2s. 6d. per lb.

Composition.—The seeds of Strychnos Nux-vomica have been analyzed by Rese, Desportes, Braconnot, Chevreul, and Pelletier and Caventou. The most important of these analyses is that made by the last-mentioned chemists; who also examined the bark of Strychnos Nux-vomica, under the name of false angustura. The leprous coating of this bark they afterwards submitted to a separate examination, under the idea of its being a lichen.
NUX-VOMICA.

Pelletier and Cavallon’s Analyses of the Strychnos Nux-vomica.

1. Of the Seeds.
strychnine, or igsuric acid.
strychia in combination with strychnine.
voca (a small quantity).
cremate oil.
crude colouring matter.
res.
seeds (a little).
crushed.

diffuse lime and chloride of potassium in the ashes.

Nux-vomica seeds.

1. STRYCHNIA. (See p. 1307.)

22. BRUCIA. Brucia; Vonniea, Guib., discovered in 1819, by Pelletier and
vien, exists in the bark and seeds of nux-vomica, and in St. Ignatius’s
san; in the two latter substances it is associated with strychnia, and is in com-
bination with igsuric acid; while in the bark of nux-vomica it is combined
with gallic acid. Brucia in the anhydrous form, as obtained by fusing it, has a
slaty appearance; but when combined with water, it is capable of crystallizing,
as form of the crystals being oblique four-sided prisms; or sometimes the crys-
tals have a pearly laminated appearance, something like boracic acid. Its taste
very bitter, though less so than that of strychnia. It is soluble in 850 parts
of cold, or 500 parts of boiling water; but the presence of colouring matter, of
which it is difficult to deprive it, promotes its solubility. It is very soluble in
alcohol, but is insoluble in ether and the fixed oils, and is very slightly, soluble
in the volatile oils. Nitric acid assumes a fine red colour when added to
brucia: deoxidizing agents, as sulphured hydrogen and sulphurous acid, deco-
ourize this solution. Iodic and chloric acids produce the same phenomena as
acrid acid. Chlorine communicates a red colour to brucia.

The following is the composition of brucia:

<table>
<thead>
<tr>
<th>Atoms</th>
<th>Eq. Wt.</th>
<th>Per. cent.</th>
<th>Regnauld</th>
<th>Liebig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon</td>
<td>48</td>
<td>288</td>
<td>70.75</td>
<td>70.80</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>27</td>
<td>179</td>
<td>46.63</td>
<td>66.67</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>2</td>
<td>46</td>
<td>6.88</td>
<td>7.65</td>
</tr>
<tr>
<td>Oxygen</td>
<td>58</td>
<td>152</td>
<td>15.72</td>
<td>19.06</td>
</tr>
<tr>
<td>Brucia</td>
<td>1</td>
<td>407</td>
<td>99.99</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Regnauld states, that 100 parts of crystallized brucia lose, by heat, 18.41 per
cent. of water. Hence 1 atom of brucia, according to the above formula, com-
prises with 10 atoms of water to form crystallized brucia.

More recently Regnauld* has given the following formula for anhydrous
brucia: C₁₄H₂₆N₂O₈.

According to Dr. Fuss*, brucia is not a peculiar alkaloid, but a compound of
strychnia and resin (yellow colouring matter). He has proved this both analyti-
cally and synthetically. The property of brucia to become reddened by nitric
acid and by chlorine, he ascribes to the resin present. Prof. Erdmann, who
examined the products of Fuss’s experiments, has confirmed his statements.

The salts of brucia are readily formed by saturating dilute acids with brucia.
They possess the following properties:—For the most part they are soluble and
crystallizable, and have a bitter taste. They are decomposed by potash, soda,
caustic, the alkaline earths, morphia, and strychnia, which precipitate the
resin. They produce precipitates (fumate of brucia) on the addition of tannic
acid. Both nitric acid and chlorine colour them as it does free brucia.

* Pelletier, Journ. de Pharm. xxiv. p. 150.
* Hütte, für 1839, p. 67; Ann. de Pharm. xxix. p. 58.
* Berlinisches Jahrbuch für die Pharmacie, Bd. xiii. S. 497. 1840.
The effects of brucia on man and animals appear to be precisely like those of strychnia, though larger doses are required to produce them. Mace considers it to possess only one-twelfth the activity of strychnia; while A. T. Thomson regards it as having one-sixth the power of impure strychnia, and one fourth that of pure strychnia. Dose, half a grain, which is to be gradually increased to five grains. It may be given in the same way as strychnia.

3.strychnic or Igsacric Acid.—Exists in the seeds of nux-vomica, Ignatius's bean, and snake wood. Dr. A. T. Thomson* thinks that igsacric strychnia exists in Arumca montana. Igsacric acid is a crystallizable, and in acid, rough taste. It is soluble in water and alcohol. The salts of iron, cury, and of silver in solution, are unaffected by it; but those of copper are reddened green, and after some time a light green precipitate is deposited.

4. Yellow Colouring Matter.—Found in the seeds and bark of nux-vomica, in St. Ignatius's bean, and the Upas Tienté. Also in Strychnos pseudo-Casela d'Anta, and Pereira Bark (see p. 1312). It is soluble in water and alcohol, and is reddened by nitric acid [and by chlorine].

5. Reddish Yellow Colouring Matter.—Resides in the rust-coloured emoid alteration of nux-vomica bark. Also in Strychnos pseudo-quina (see p. 1312). It is insoluble in cold water and in ether, but dissolves with facility in alcohol. Nitric acid renders it deep green by combining with it.

6. Other Constituents.—The water mentioned in the above analysis is probably derived from the hairs with which the seeds are invested; it enables the seeds to resist moisture. Resin is probably a constituent of the seeds; for in treating nux-vomica is rendered milky by water. An odorous, non-acid, innoxious liquid is obtained by submitting nux-vomica and water to distillation. Manganese copper in the ashes of nux-vomica; but I have several times repeated this experiment without recognizing this metal.

Chemical Characteristics. 1. Of the Seeds. — Powdered nux-vomica has a yellow grey colour, a bitter taste, and a peculiar analoguous to that of liquorice. Thrown on burning coals it inflames when the temperature is very high; but when lower, it decomposes; evolves a thick white smoke of a peculiar odour, and leaves a cinnamonic residuum. Concentrated sulphuric acid blackens it. Molar acid communicates to it a deep orange-yellow colour. If the powdered nux-vomica be digested with boiling water acidulated with sulphuric acid, the filtered liquor is turbid and slightly yellow. Nitric acid, after a few minutes, reddens it; ammonia makes it brown, and precipitates blackish flocks. If the sulphatic solution be digested with powdered marble (to saturate the excess of acid), then evaporated to dryness, and the residue treated with boiling alcohol, we obtain a reddish solution of sulphates of strychnia and brucia, with colorless matter. This has a bitter taste, is reddened by nitric acid, prodigious convulsions when given to birds or other small animals, and forms flocculent coloured precipitate on the addition of ammonia. Sometimes crystals are deposited from the alcoholic liquor, on standing two or three days.

Ammoniacal-sulphate of copper added to the infusion of nux-vomica produces an emerald-green colour, and gradually greenish-white precipitate (igsacrate of copper). Ammoniacal-phosphate of strychnia remains in solution. Sesquichloride of iron.

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* Lancet, Sept. 16, 1837.
produces an emerald colour, which disappears on the addition of hydrochloric acid: this coloration does not depend, according to Pelleger and Caventon, on the saccharic acid; nor can it depend on tannic acid, for gelatin gives no indication of this substance: if the decoction be boiled with animal charcoal, it loses the power of becoming green on the addition of a ferruginous salt. Nitric acid communicates an orange-red colour to the decoction, owing to its action on the bruica and yellow colouring matter. A solution of iodine communicates yellowish-brown tint to the decoction; but after a few minutes the colour disappears (owing, perhaps, to the formation of the hydriotes of strychnia and bruica), and the iodine is no longer detectable or starch, without the addition of nitric acid or chlorine. Tannic acid, or infusion of nutgalls, produces in the decoction a copious precipitate (tannates of strychnia, bruica, and some other vegetable matter). Alcohol also causes a precipitate (gum). Acetate and diazide of lead cause abundant precipitates composed of gummate and tartrate of lead, with colouring and fatty matter.

2. Of the Bark.—An infusion of this bark reddens litmus, in consequence of the excess of acid present. Strong nitric acid added to this solution produces a red colour; and by dropping the acid on the outer surface of the bark, a blood-red spot is produced: in both cases the effect arises from the action of the acid on the bruica and yellow colouring matter. If nitric acid be applied to the external surface of the bark, it produces a deep green colour, in consequence of the action of the acid on the yellow colouring matter (see Strychnos pseudopomaria, p. 1312). Infusion of galls added to the infusion of this bark occasions a white precipitate (tannate of bruica). Sulphate of iron colours the infusion green, from its action on the yellow colouring matter. (For other characteristics see Angostura Bark.)

Physiological Effects. 1. Of the Bark. a. On Animals generally.—The experiments of Pfaff, the Vienna faculty, Emmert, Leyer, Orfila, Magendie, and Jäger⁷, have shewn that it is a powerful poison to dogs, rabbits, wolves, and other animals. Thus eight, twelve, or eighteen grains of it, kill dogs, the symptoms being precisely the same as those of nux-vomica already detailed. Emmert (quoted by Christison) inferred, from experiments made on animals, that this bark acts on the spine directly, and not on that organ through the medium of the brain.

b. On Man it also acts as a powerful poison. Emmert⁸ mentions a boy who had taken by mistake the decoction of this bark died forthwith. His intellectual powers were unaffected; he entreated his physician not to touch him, as violent convulsions were immediately brought on; he was powerfully sweated, but did not vomit. Marcet was nearly poisoned by swallowing through mistake three quarters of a liqueur-glassful of a strong vinous infusion⁹.

Of the Seeds. a. On Vegetables.—Marcet⁹ states, that a quarter

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⁹ Journ. de Pharm. t. ii. p. 507.
of an hour after immersing the root of an haricot plant (Phaseolus vulgaris) in a solution of five grains of the extract of nux-vomica in an ounce of water, the petals became curved downwards, and in twelve hours the plant died. Fifteen grains of the same extract were inserted in the stem of a lilac tree, on July the 5th, and the wound closed. In thirteen days the neighbouring leaves began to wither.

β. On Animals generally.—Nux-vomica appears to be poisonous, to a greater or less degree, to all classes of animals. On the vertebrates its effects are very uniform, though larger quantities are required to kill herbivorous than carnivorous animals. Thus a few grains will kill a dog, but some ounces are required to destroy a horse. It occasions in all, tetanic convulsions, increased sensibility to external impressions, asphyxia, and death.

γ. On Man.—Three degrees of the operation of nux-vomica on man may be admitted.

αα. First degree: tonic and diuretic effects.—In very small and repeated doses, nux-vomica usually promotes the appetite, assists in digestive processes, increases the secretion of urine, and renders the excretion of this fluid more frequent. In some cases it acts slightly on the bowels, and occasionally produces a sudorific effect. The pulse is usually unaffected. In somewhat larger doses, the stomach not unfrequently becomes disordered, and the appetite impaired.

ββ. Second degree; rigidity and convulsive contraction of the muscles.—In larger doses, the effects of nux-vomica manifest themselves by a disordered state of the muscular system. A feeling of weight and weakness in the limbs, and increased sensibility to external impressions (of light, sound, touch, and variations of temperature), with depression of spirits and anxiety, are usually the precursory symptoms. The limbs tremble, and a slight rigidity or stiffness is experienced when an attempt is made to put the muscles into action. The patient experiences a difficulty in keeping the erect posture, and in walking, frequently staggers. If, when this effect is beginning to be observed, he be tapped suddenly on the ham while standing, a slight convulsive paroxysm is frequently brought on, so that he will have some difficulty to prevent himself from falling. I have often in this way been able to recognize the effect of nux-vomica on the muscular system, before the patient had experienced any particular symptoms.

If the use of the medicine be still persevered in, these effects increase in intensity, and the voluntary muscles are thrown into a convulsed state by very slight causes. Thus, when the patient inspires more deeply than usual, or attempts to walk, or even to turn in bed, a convulsive paroxysm is brought on. The sudden contact of external bodies also acts like an electric shock on him. The further employment of nux-vomica increases the severity of the symptoms, the paroxysms now occur without the agency of any evident excite cause, and affect him even when lying perfectly quiet and still in bed.

1 O'tilla, Toxicol. Gén.
muscular fibres of the pharynx, larynx, oesophagus, and bladder, or become affected, and Trousseau and Pidoux say those of the penis likewise influenced, and the nocturnal and diurnal erections are inconvenient even in those who, for some time before, had a somewhat of their virility. I am acquainted with two cases of paralysis, in which the use of nux-vomica caused almost constant diurnal erection. Females also, say Trousseau and Pidoux, exhibit more energetic venereal desires; and "we have," they add, received confidential information on this point, which cannot be doubted."

The pulse does not appear to be uniformly affected; for the most part it is slightly increased in frequency between the convulsive attacks, but Trousseau says he has found it calm even when the dose of the medicine was sufficient to cause general muscular rigidity. As to the production of the affection of the muscles, various unhelpful sensations are oftentimes experienced in the skin, which teeth have compared to the creeping of insects (formication), or to the passage of an electric shock; and occasionally an eruption makes appearance.

It is remarkable that in paralysis the effects of nux-vomica are twice observed in the paralysed parts. Magendie states he has observed sweating confined to the paralysed parts. "I have," says this physiologist, "the affected side covered with an anxious eruption, while the opposite side was free from it. One side the tongue is sometimes sensible of a very bitter taste, which is perceptible to the other side."

**Third degree: tetanus, asphyxia, and death.**—To illustrate this sad and most violent degree of operation I think I cannot do better to relate a case of poisoning by nux-vomica reported by Mr. Her.

A young woman swallowed between three and four drachms of this substance powder, and in half an hour was seen by Mr. Ollier. She was sitting by the window, quite collected and tranquil; her pulse about 80, and regular. He left her about ten minutes to procure an emetic, and on his return found that she had thrown herself back in her chair, and that her legs were extended, and considerably separated. She was perfectly sensible, and without pain, but seemed in pain, held on to her husband's coat, and entreated him not to leave her. A separation had broken out on her skin, her pulse had become faint, and much smaller, and she called frequently for drink. She then had a slight and transient convulsion. Recovering from it, she was in great trepidation, kept fast hold of her husband, and refused to let him go, even for the alleged purpose of getting her drink. In a few minutes after, she had another, and a more violent attack, or shortly afterwards, a third: the duration of these was from a minute and a half to two minutes. In them she retained her grasp; her whole body was tightened and stiffened, the legs pushed out and forced apart. I could not say Mr. Ollier perceive either pulse or respiration; the face and hands were cold, the muscles of the former, especially of the lips, violently agitated, and she emitted a moaning, chattering noise. She was not unlike one in an

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"Traité de Théran, t. i. p. 515.
epileptic fit, but did not struggle, though, as she was forced out, it was difficult to keep her from falling on the floor.

In the short interval of these attacks she was quite sensible; was tormented with incessant thirst; perspired; had a very quick and faint pulse; complained of being sick, and made many attempts to vomit. (I should state she swallowed some ipecacuanha powder to evacuate the poison.) She continued to refuse to let her husband move, and to the question whether she was in pain replied, "No—no—no!"

A fourth and most vehement attack soon followed, in which the whole body was extended to the utmost, and she was rigidly stiff from head to foot, insomuch that, with all the force of the surgeon, he could not bend her thighs on the pelvis to replace her in her seat. From this she never recovered; she fell into a fit of asphyxia, and never breathed again. She now relaxed her grasp; her colourless hands dropped upon her knees; her face, too, was livid; the lips contracted; the lips wide apart, shewing the whole of the closed teeth, and salivary foam issued plentifully from the corners of her mouth. The expression of the whole countenance was at this time very frightful. On removal of the body, it was discovered that the urine had been discharged. She died in an hour after taking the poison. Five hours afterwards, she was still as stiff and as a statue; if you lifted one of her hands, the whole body moved with it, but the face had become pale in comparison, and its expression more placid.

Post-mortem Appearances.—In the case just related the body was observed to be rigid after death, but in the lower animals the reverse is generally noticed. As in other cases where death takes place from obstructed respiration, venous congestion is observed. Occasionally there is redness or inflammation of the alimentary canal, and now and then softening of the brain or spinal cord.

Modus Operandi.—There are several points connected with this modus operandi of nux-vomica which require investigation:

1st. Is this seed a local irritant?—In medicinal doses it does not usually disorder the stomach, nor is it invariably irritant in its operation, even when swallowed as a poison. In some instances, however, the pain and heat in the stomach, the burning in the gullet, the nausea and vomiting, are evidences of its local action; and in several cases, marks of inflammation have been observed in the stomach on examination of the body after death. Strychnia also acts as a local irritant.

2nd. On what part of the body does nux-vomica exercise a specific effect?—The symptoms clearly indicate the nervous system to be specifically affected; and as the voluntary muscles are supplied with nervous influence from the cerebro-spinal portion of the nervous system, it is presumed that it is on this portion that nux-vomica exerts its principal or sole influence. Physiologists, however, have endeavoured to ascertain what part of the cerebro-spinal system was principally affected. Now the tetanic symptoms, and the absence of narcotism, have led to the conclusion that the spinal cord was the seat of the disease—a conclusion supported by the fact, that the division of this cord, nay, even complete decollation, will not prevent the poisonous effects of nux-vomica; whereas the destruction of the cord by the introduction of a piece of whalebone into the spinal canal, causes the immediate cessation of the convulsions; and if only a part of the cord be destroyed, the convulsions cease in that part of the body only which is supplied with nerves from the portion of
dulla destroyed. These facts, then, originally observed by Gendrie, and which I have myself verified, lead to the conclusion, that the abnormal influence, whatever it may be, which causes the convulsions to take place, is not derived from the contents of the nux, but from the medulla spinalis itself. Moreover, as the cervical nerves seem principally affected, it has been presumed, that the disorder is seated in the anterior columns of the cord; but the white fibres of the nervous system are merely the conductors of nervous powers, the gray matter being apparently the source of it. Once, then, the seat of operation of nux-vomica is the seat of the ex functions. The increased susceptibility to external impressions produced by strychnia also depends, according to Dr. Stannius, the primary action of this substance on the spinal marrow. The physiologist concludes from his experiments on frogs, that the thripetal nerves receive, from the spinal cord, an increase of their stability; and that, thus charged, they react upon the medulla, occasion the peculiar convulsions.

F. Flourens asserted, that the part of the nervous system on which nux-vomica more particularly acted was the medulla oblongata. But MM. Orfila, Ollivier, and Drogartz, in their report a case of poisoning by this substance, particularly mention that they observed no traces of alteration in the condition of the medulla oblongata, the tuber annulare, or the crura cerebri; which is in opposition to Flourens' opinion; for he asserted, that the specific or excitatory action of each substance on each organ, always left, after the traces of its action sufficient to distinguish the affected from other organs.

But it may be asked, is the cerebrum unaffected by nux-vomica? Indeed, true that the intellectual functions are not usually much affected by this drug, but the mental anxiety commonly experienced by persons under its use, the occasional appearance of stupor, and the observations of Andral and Lallemand on the injurious effects it in some apoplexies, leave no doubt that, occasionally at least, the cerebrum is affected. Bally has observed an appearance of opisthotonos, vertigo, tinnitus aurium, sleeplessness, and turgescence of the eyelids of the face, result from the use of strychnia.

The cerebellum is said, by some, to be acted on by nux-vomica, at least for the most part on hypothetical grounds, though it must be mentioned that MM. Orfila, Ollivier, and Drogartz, observed the cerebellum presented more evidences of lesions than the other parts of the nervous system. Another argument, which probably would be advanced by phrenologists in favour of the affection of the cere-

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2 Dr. M. Hall, "Lectures on the Nerve System.
5 Arch. Gen. de Méd. viii. 29.
bellum by this drug, is the observation of Trousseau, that the sexual
feelings are usually excited by it.

Ségalas found, in his experiments on animals, that in some cases
life could not be prolonged by artificial respiration, and that after
the heart could not be stimulated to contract. These and other
reasons seem to show, that nux-vomica exhausts the irritability of
the heart. But in all probability this is affected only secondarily
the essential and primary action being on the nervous system.

3rd. What kind of action does nux-vomica set up in those parts
of the nervous system on which it acts?—As the muscles receive from
nervous system a preternatural stimulus to action, it is presumed
this system (or at least certain parts of it) is in a state of excitement
or irritation. In one case mentioned by Mr. Watt, there was
observed softening of the lumbar portion of the spinal cord; and in
other cases reported by MM. Orfila, Ollivier, and Drogratz, the whole
substance of the brain, especially of the cerebellum, was softer.
Andral and Lallemant have both observed that this remedy, in its
forms of apoplexy, produced symptoms indicating ramollissement.

4th. What is the reason that strychnia first displays its remark-
able influence on paralytic limbs?—Ségalas has offered the following
explanation of this well-known fact: the muscles of the unaffec-
ted limbs being simultaneously subject to the government of the
spinal cord and the action of the poison, are better enabled to resist the
influence of the poison, which, not being under cerebral influence,
are more affected by the poison. To this hypothesis, however, it
is clear that objections present themselves. Under the influence
of strychnia paralysed parts sometimes suffer violent pain, while
healthy parts are free from it. How, asks Ollivier, is this spec-
ial influence on paralysed parts only to be explained? Does it not
moreover, that these parts are not so entirely isolated from the
influence of the nervous centres as the hypothesis of Ségalas would
us to infer?

Dr. Marshall Hall has advanced a most ingenious explanation
of the above-mentioned fact. Strychnia, he asserts, does not, in the
case of paralysis, first display its influence on the paralytic limb.
When the paralysis is cerebral, the irritability of the muscular fibres
becomes augmented, from want of the application of the stimulus of
volition; and in such cases, therefore, strychnia first affects the
paralysed muscles, because these are more irritable than the sound
ones. But in spinal paralysis, the irritability is diminished, and in
such strychnia does not firstly and mostly affect the paralysed limb.
The augmented irritability of the muscles in cerebral paralysis, and
the diminished irritability in spinal paralysis, he ascertained by the
electricity.

This explanation appeared to me so plausible and satisfactory that
the first edition of this work (pp. 911-12) I adopted it, believing it
gent a clear and physiological elucidation of the facts before
ed. But in the summer of 1841 I made a number of observa-
s on paralytic patients in the London Hospital, which convinced
that it does not correctly interpret the phenomena in question.
following is a brief abstract of one case, out of many similar
s:—

A middle-aged man was admitted into the hospital suffering with hemiplegia
years' standing, and the consequence of apoplexy. He was put under the
ence of the alcoholic extract of nux-vomica. In a few days the muscles of
paralysed limbs were powerfully affected by the remedy, but those of the
side were unaffected by it. I then resolved to try the effects of voltaic
icity on the paralysed and healthy muscles. For this purpose I directed
hand to be placed in a separate basin containing a solution of salt. The
basins were then respectively connected with the electrodes of a magneto-
machine, and a current of electricity thus simultaneously traversed the
dyed and healthy arms. To my great surprise the muscles of the
dyed arm were comparatively but slightly affected, while those of the sound
were most powerfully convulsed. This experiment was tried repeatedly,
variably with the same result.

In this case the paralysis was undoubtedly, I think, cerebral. On
Hall's hypothesis the effects of strychnia on the paralysed limbs
ed it to be so. Yet the paralysed muscles were less irritable
the sound ones, as manifested by voltaic electricity. I have ob-
the same effects in many other cases. Furthermore I may
that in every case of paralysis, whether cerebral or spinal,
are found the muscles of the paralysed parts to be less irritable
oltaic electricity than those of the sound part. Nor have I met
a single exception to the statement that strychnia first displays
effects on the paralysed parts; a fact of which I cannot at pre-
ter a satisfactory explanation.

II. Does nux-vomica or its active principles become absorbed?—
oral reasons, some of which have been before alluded to (see
10 and 113), may be adduced in favour of the affirmative of
question. Thus the blood of animals under the influence of
poison has been found to be poisonous (though Messrs. Morgan
Addison deny that this was the case in their before-mentioned
ment, p. 116). Moreover, the activity of this drug seems to be in
ratio of the absorbing power of the part.

II. Is any change produced in the blood-discs by strychnia?—
er, strychnia produces no change in them; and Dr.
inius was unable to detect, by means of the microscope, any
ation in the appearance of the blood of frogs poisoned by
chnia.

II. In what manner is death produced by nux-vomica?—Frequently
stoppage of respiration, in consequence of the spasmodic con-
of the respiratory muscles (see p. 178). In other cases, death

1 * Physiol. by Baly, vol. i. p. 107.
seems to arise from excessive exhaustion of the nervous power. (Cloquet’s case, quoted by Christison, p. 801).

Uses. — The obvious indications for the use of nux-vomica, or brucia, are torpid or paralytic conditions of the nervous fibre; while these agents are contra-indicated in spasmodic or convulsive diseases. Experience, however, has fully proved that the use of these agents prove injurious, and accelerate organic changes.

1. In paralysis.—Of all the diseases for which nux-vomica has been employed, in none has it been so successful as in paralysis. It is deserving of notice, that this is one of the few remedies whose discovery is not the effect of mere chance, since Fouquier had observed its use by legitimate induction from observation of its physical effects. That a remedy which stimulates so remarkably the nervous system to action should be serviceable when that system no longer receives its accustomed natural stimulus is, à priori, not astonishing. Paralysis, however, is the common effect of various lesions of nervous centres, in some of which nux-vomica may be injurious, in others useless, and in some beneficial. It is, therefore, necessary to point out under what circumstances this remedy is likely to be advantageous or hurtful.

A very frequent, and, indeed, the most common cause of paralysis is hemorrhage of the nervous centres. Blood may be effused upon the external surface of these centres, into their cavities, or in the interstices, the latter being by far the most common case—in the suprarenal portion, according to Andral, of 386 out of 392 instances of hemorrhage. It is almost superfluous to add that the radical treatment of these cases can be effected only by the removal (that is, aspiration) of the effused blood. Now the process by which this is effected is almost entirely a natural one: art can offer no assistance of a like kind, though by the removal of impeding causes she may be rendered negatively useful. Nux-vomica can, in such cases, be of no use at all; on the contrary, it may be injurious.

The part immediately surrounding the sanguineous clot is much softened, a condition formerly regarded as the effect of tension. But Lallemand has satisfactorily shown that it often, not invariably, precedes the hemorrhage. This softening, or lissémentation, is, according to the same authority, a constant and necessary result of an acute or chronic irritation. But the facts at hand do not warrant this generalization, since cases occur apparently are unconnected with irritation. For this softening can do but little; we have, in fact, no particular or uniform treatment. If we can connect with it any increased vascular action, of blood-letting and the other antiphlogistic means are to be resorted to, whereas, if the reverse condition of system exist, marked by languor and debility, tonics and stimulants may be admin
omica in these cases offers no probability of benefit; on the contrary, we might suspect that, as it irritates the spinal cord, it probably has the same effect on the brain, and hastens the action of softening. Now experience seems to confirm our theoretical anticipations. Andral relates the case of a man who was in a state of ague, in consequence of an old apoplectic attack. A pill of one-twelfth of a grain of strychnia (the active principle of nux-vomica), was given him, and it produced a strong stiffness of the paralysed members. The following day he ached in the head, on the side opposite to that paralysed; intellectual functions were weaker, and his hemiplegia was intensified; in fact, he had all the symptoms characterising softening of the brain. It is, therefore, probable that the strychnia set up an inflammatory condition of the nervous substance around the apoplectic tract, and that this condition was the precursor of ramollissement. Therefore, nux-vomica is employed in those cases of paralysis where inflammation of the brain or spinal marrow, or both, are likely to increase the evils it is intended to mitigate. Andral reports two cases in which this drug, administered in cerebral maladies, occasioned convulsive movements, which continued until death. On opening the bodies, the cerebral substance was found disorganized and softened. These facts suggest some useful reflections as to the use of this powerful drug in paralysis, and prevent its indiscriminate use in all cases of this disease.

There are cases in which paralysis, arising from cerebral haemorrhage, may be advantageously treated by nux-vomica. The sanguineous clot is poured out in the apoplectic cell has at first a gelatinous consistence, some of it still remaining fluid. "Somewhat later," Andral says, "twelve or fifteen days after the attack, for instance, the sanguineous clot is found to be firmer and more circumscribed; later it becomes white or yellow, and is surrounded by a brownish fluid. The walls of the containing cavity are smooth, and lined with a delicate membrane. The surrounding cerebral substance in cases retains its natural appearance, and in others is altered in colour and consistence. As the interval between the effusion and the examination increases, the coagula gradually disappear."

"The cyst is now found to contain a serous fluid, occasionally having cellular bridges running from one side to the other; and nature attempts to get rid of the cyst by producing adhesion of the membranes, leaving only a linear cicatrix. Now it is well known, that in disease of some of the voluntary muscles, the power over them becomes gradually diminished; and it appears that occasionally cerebral hemorrhage, after the absorption of the effused blood, the system remains, as it were by habit. In these cases the cautious employment of nux-vomica, or of its active principle, may be attended with beneficial results, by favouring the return both of motion and sensation.

* Bayle, Bibl. Therap. i. ii. p. 297.
But paralysis, like some other diseases of the nervous system, exist without our being able to discover after death any lesion in nervous centres; and it is then denominated a functional disease if there were actually no organic lesion. To me, however, the fact of the lesion of action is a strong ground for suspecting that there must have been an organic lesion of some kind, though it may be apparently nothing. "It is highly probable," says Andral, "that some lesions do exist in such cases, though they escape our notice." Experience has fully established the fact, that nux-vomica is more beneficial in those forms of paralysis usually accompanied by visible lesions of structure; such, for example, as paralysis resulting from exposure to the influence of lead and its compounds. Thus, of ten cases of saturnine hemiplegia, treated with nux-vomica or its active principles, and which are mentioned by Bayle, three were cured, and three ameliorated.

As hemiplegia more frequently depends on cerebral hemispheres than some other forms of paralysis, so it is, for the most part, amenable to remedial means. Thus, while out of twenty-six cases of paraplegia, nineteen were cured by nux-vomica or its constituents, yet in thirty instances of hemiplegia, only thirteen were cured. In six cases of general paralysis (that is, paralysis of both sides at once), four were cured by this remedy.

Paralysis which sometimes affects the muscles of certain organs, such as the eye-lid, has been employed with advantage. In the case of amaurosis, accompanied with paralysis of the eye-lid, nux-vomica has been found to have been cured by it; and several cases of incontinence of urine, depending on paralysis, or diminished power of the muscles of the bladder, have also been benefited by the same means. In some cases of local paralysis strychnia has been employed with benefit.

2. Paralysis of the Sentient Nerves.—The good effects produced from the use of nux-vomica in paralysis of the motor nerves, has led to its employment in functional lesions of sentient nerves, characterized by torpor, inactivity, and paralysis. That benefit has been obtained in these cases is physiologically probable, from the instance that one of the effects of this agent is an exaltation of the sensibility to external impressions, as I have before mentioned. Hitherto, however, the trials have not been numerous, nor remarkably successful. In amaurosis benefit has been obtained in some instances; and where no organic lesion is appreciable, this agent deserves a trial. The endermic method of using it has been preferred. Small blisters, covered with powdered strychnia, have been applied to the temples and eyebrows. The remedy causes sparks to be perceived in both eyes, especially the affected one; and it is the more of these, the better should be the prognosis: moreover, red-coloured sparks are thought more favourable than sparks of other colours. When the malady is complicated with disease of the heart, the remedy must be employed with extreme caution.

3. Other Affections of the Nervous System.—I have seen...
ca very serviceable in shaking or tremor of the muscles produced habitual intoxication. A gentleman thus affected, who had for al weeks lost the power of writing, reacquired it under the use of the medicine. Chorea has been benefited by it. In tetanus it has tried at the London Hospital without any augmentation of convulsions. Several cases of epilepsy are said to have been cured by it: but, judging from its physiological effects, it would not be calculated to act injuriously, rather than beneficially, in disease; and in one case the use of strychnia apparently produced paralysis and death. It has also been employed in hypochondriasis and hysteria. It has also been used in neuralgia with good 1.

Affectations of the Alimentary Canal.—On account of its intense action, nux-vomica has been resorted to as a tonic and stomachic dyspepsia, especially when this affection depends on, or is caused with, an atomic condition of the muscular coat of the stomach. pyrosis, resulting from simple functional disorders of the stomach, Mr. Mellor considers it to be almost a specific. Even when it is symptomatic of organic disease of the stomach, he says it is essential service. In febrile states of the system, its use is re-iterated. Dr. Belcombe has confirmed these statements, also speaks of its good effects in gastroduinia. In dysentery, regularly when of an epidemic nature, nux-vomica has gained a reputation. Hagstrom says, he has proved its value in some forms of cases; and his report has been confirmed by Hufeland, and others. In colica pictonum, a combination of strychnia and hydrochlorate of morphia has been found, by Bally, highly successful. In prolapsus of the rectum, Dr. Schwartz has recom mended the use of this remedy, which he has employed for ten years, in adults and children, with great benefit. One or two grains of the alcoholic extract are to be dissolved in two drachms of water; of this solution he gives to sucking infants two or three drops; older children from six to ten or fifteen drops, according to their

In impotence.—The excitement of the sexual feelings, which have been produced by nux-vomica, led him to employ this remedy against impotence, and he has found it successful both in men and females. In some cases, however, its good effects were observed only while the patients were taking the medicine. A young woman, twenty-five years of age, of an athletic constitution, who had been married for eighteen months without having any other than occasional relations, was accused by Dr. Belcombe of the use of nux-vomica, though he again lost it soon after leaving this employment.

Proceeding are the diseases in which nux-vomica has proved

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1 See, Formula.
2 Ibid. Therap. t. ii. p. 135 and 230.
3 Ibid. p. 134.
5 Ibid. p. 136.
6 Ibid. p. 964.
7 Bayle, op. cit. p. 135.
8 Ibid. 136.
9 Ibid. vol. vi. p. 255.
10 Ibid. vol. xvi. p. 758.
most successful. It has, however, been used in several other intermittent fevers, intestinal worms, &c.) with occasional benefit.

**Administration.**—Nux-vomica is used in the form of powder, tincture, or extract. Strychnia and brucia may be regarded as preparations of it. The powder of nux-vomica is administered doses of two or three grains gradually increased. Fouquier sometimes increased the quantity to fifty grains.

**Antidote.**—Evacuate the contents of the stomach as speedily as possible. No chemical antidotes are known. Probably astrin (as infusion of galls, green tea, &c.) would be serviceable. Do regards chlorine, iodine, and bromine, as antidotes for strychnia brucia; but further evidence is required to establish the correctness of his inferences. Emmert* says that vinegar and coffee increase the poisonous effects of nux-vomica (false angustura) bark. To the spasms, narcotics may be employed. Sachs and others have recommended opium. As conia is the counterpart of strychnia, it deserves a trial. I applied it to a wound in a rabbit affected with tetanus from the use of strychnia: the convulsions ceased, but the animal died. In the absence of conia, the extract of hemlock should be employed. Ether and oil of turpentine have been recommended. To relieve the excessive endermic operation of strychnia, aceto morphia applied to the same spot has given relief.

1. **Tinctura Nucis-Vomicae, D.** Tincture of Nux-vomica.—Take the nux-vomica, scraped, añij.; Rectified Spirit, 5viij. Macerate for seven days, and filter.—Dose, ³iv. to ³lx. It is sometimes used as a brocation to paralysed parts, and its good effects in this way should be increased by combining it with ammonia.

2. **Extractum Nucis-Vomicae, E. D.** Extract of Nux-vomica.—Take of nux-vomica any convenient quantity; expose it in a vessel to steam till it is properly softened; slice it, dry it thorouy, and immediately grind it in a coffee-mill; exhaust the powder by percolating it with rectified spirit, or by boiling it with the spirits of rectified spirit until the spirit comes off free of bitter Distil off the greater part of the spirit; and evaporate what remains in the vapour-bath to a proper consistence;” E.—The Dublin Gazet Order of Nux-vomica, scraped, 5viij.; Proof Spirit, Oij. [wine-meas.]

Digest in a close vessel for three days, and express the residue consume the mixed liquors by distillation, to a fourth part, and reduce to a proper consistence. By the Dublin process the pure extract is about 9 per cent. 9)—Dose, gr. ss., gradually increase to two or three grains. The extract is given in the form of pill.

3. **Strychnia, L. E.; Strychnine; Strychnina; Vanquished Tetanise.** This alkaloid was discovered in 1818 by Pelletier and Caventou. It has been found in Strychnos Nux-vomica, S. Ind.

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* Journ. de Pharm. L. xvi. p. 577.
* Bucler, Trefikal. S. 236.d.
* Barker and Montgomery, Observ. on the Dull. Pharm.
Colubrina, and St>Tienté In these plants it is frequently asso-
ciately with brucia, and is always combined with an acid.
The directions of the London College for preparing this alkali are
follows:—

Take of Nux-vomica, bruised, lb. iij.; Rectified Spirit. Cong. iij.; Diluted
sulphuric Acid; Magnesia; Solution of Ammonia, each as much as may be
scent. Boil the bruised nux-vomica with a gallon of the spirit for an hour in
sort, to which a receiver is fitted. Pour off this liquor, and again a third
to boil what remains with another gallon of spirit and the spirit recently dis-
and pour off the liquor. Press the nux-vomica, and let the spirit distil
the mixed and strained liquors. Evaporate what remains to the proper
distillation of an extract. Dissolve this in cold water, and strain. Evaporate
liquor with a gentle heat, until it has the consistence of syrup. To this,
if yet warm, gradually add the magnesia to saturation, shaking them together.
It aside for two days, then pour off the supernatant liquor. Press what re-
ins wrapped in cloth. Boil it in spirit, then strain, and let the spirit distil
into the residue a very little diluted sulphuric acid mixed with water, and
prepare a gentle heat. Set it aside for twenty-four hours, that crystals
form. Press and dissolve them. Afterwards to these, dissolved in water, to
ammonia, frequently shaking them, that the strychnia may be thrown down.
y, dissolve this in boiling spirit, and set it aside that pure crystals may be
faced:—

The directions of the Edinburgh College are as follows:—

Take of Nux-vomica, lb. j.; Quicklime, tiss.; Rectified Spirit, a sufficiency.
Get the nux-vomica for two hours to the vapour of steam, chop or slice it,
it thoroughly in the vapour-bath or hot air-press, and immediately grind it in
flax-mill. Macerate for twelve hours in two pints of water, and boil it;
through linen or calico, and squeeze the residuum; repeat the maceration
decoction twice with a pint and a half of water. Concentrate the decoctions
be consistence of thin syrup; add the lime in the form of milk of lime; dry
precipitate in the vapour-bath; pulverize it, and boil it with successive
ons of rectified spirit till the spirit cease to acquire a bitter taste. Distil off
spirit till the residuum be sufficiently concentrated to crystallize on cooling.
ly the crystals by repeated crystallization:—

The following is the rationale of the process of the London Phar-
aetic: the watery solution of the alcoholic extract contains the
ydrate of strychnia; the magnesia decomposes this, and by ab-
the strychnic acid sets free the strychnia.

MATERIALS.
Magnesia
Strychnate of Strychnia
Strychnia

PRODUCTS.
Strychnate of Magnesia.
Strychnine.
Strychnine.
Strychnia.

The strychnia is dissolved by the alcohol, and is left after distilla-
ation. Dilute sulphuric acid dissolves it, forming a sulphate, and from
sulphatic solution ammonia throws it down.

MATERIALS.
Ammonia
Sulphate of Strychnia
Strychnia

PRODUCTS.
Sulphate of Ammonia.
Strychnine.
Strychnia.

The strychnia is then dissolved in boiling spirit; and from the so-
then crystals are obtained, by cooling and evaporation.

The process of the Edinburgh Pharmacopia, a decoction of nux-
vomica is prepared; this contains the strychnate of strychnia with gum. This salt is decomposed by the lime, and the strychnia abstracted by rectified spirit.

In the preceding account I have omitted, for the sake of perspicuity, all notice of the brucia which is associated with the strychnia.

Pure strychnia is a white, odourless, intensely bitter, crystalline substance, the form of the crystals being the octahedron or four-side prism. When rapidly crystallized, it assumes the granular form. It is fusible, but not volatile; decomposing at a lower temperature than most vegetable bodies. Though so intensely bitter, it is also insoluble in water, one part of strychnia requiring 6667 parts of water, at 50°, to dissolve it: that is, one grain needs nearly fourteen ounces of water to hold it in solution. It requires 2500 parts of boiling water to dissolve it. It is slightly soluble in boiling rectified spirit, but scarcely so in cold water. It acts on vegetable colours, an alkali, saturates acids forming salts, and separates most of the metallic oxides (the alkaline substances excepted) from their combinations with acids. In some cases, part only of the metallic oxide is precipitated, a double salt being formed in solution. Thus, when strychnia is boiled with a solution of sulphate of copper, a green solution of cupreous sulphate of strychnia is obtained, while a portion only of the oxide of copper is precipitated.

Commercial strychnia usually forms, with strong nitric acid, a coloured liquid, which afterwards becomes yellow. This change does not occur with pure strychnia, but depends on the presence of one or both of the two substances—viz. brucia and yellow colombrane. As the red colour is destroyed by decolourizing agents (sulphurous acid and sulphuretted hydrogen), it appears to depend on the oxidizement of the substance referred to. If potash be added to a very concentrated solution of a strychnian salt which has been rendered by nitric acid, an orange precipitate is formed; an excess of water dissolves this precipitate. With strychnia chlorine forms a white precipitate.

A solution of bichloride of mercury, added to a solution of strychnia in hydrochloric acid, causes a white clotty precipitate (composed of bichloride of mercury and hydrochlorate of strychnia).

According to the Edinburgh College, strychnia for medicinal use which is declared to be "always more or less impure," possesses the following properties:

Intensely bitter: nitric acid strongly reddens it; a solution of 10 grains of 4 fluiddrachms of water by means of a fluiddrachm of pyroligneous acid, when decomposed by one fluidounce of concentrated solution of carbonate of soda, yields on brisk agitation a coherent mass, weighing when dry 10 grains, and entirely soluble in solution of oxalic acid.

The London College gives the following characters for crystal strychnia:

readily dissolves in boiling alcohol, but not so in water. It melts by heat and if it be more strongly urged, it is totally dissipated. This being endowed with violent powers, it is to be cautiously administered.
The following is the composition of strychnia:

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<td>Carbon</td>
<td>44</td>
<td>264</td>
<td>75.08</td>
<td>75.73</td>
<td>76.721</td>
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<tr>
<td>Hydrogen</td>
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<td>23</td>
<td>6.63</td>
<td>6.63</td>
<td>6.70</td>
<td>6.70</td>
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<tr>
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<td>2</td>
<td>26</td>
<td>8.07</td>
<td>8.43</td>
<td>8.186</td>
<td>5.81</td>
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<tr>
<td>Oxygen</td>
<td>4</td>
<td>32</td>
<td>9.22</td>
<td>9.28</td>
<td>10.304</td>
<td>11.05</td>
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Strychnia: 1 347. 100.00 100.00 100.00 100.00

More recently Regnault has given the following as the formula for the composition of strychnia: C_{42}H_{23}N_{3}O_{4}. Crystallized strychnia anhydrous.

The salts of strychnia, when pure, are for the most part crystalline, bite, and very bitter. They possess the following chemical characteristics:—1st. They are precipitated by the alkalies and their carbonates. 2dly. As usually met with in the shops, they are reddened by nitric acid. 3dly. they are precipitated by tannic, but not gallic acid. 4thly. They are unchanged by the action of the salts of iron.

a. Sulphates.—The neutral sulphate exists in the form of small, soluble in ten parts of water at 50° F., and in a less quantity boiling water. When heated, it fuses and loses three per cent. of weight, probably water of crystallization. But Liebig detected water in sulphate dried at 212° F. The bisulphate has an acid, bitter taste, and crystallizes in slender needles.

b. Nitrates.—The neutral nitrate crystallizes in pearly needles, erupt in stars. It is much more soluble in hot than cold water; slightly soluble in alcohol, but does not dissolve in ether. When heated to a little above 212°, it decomposes and becomes yellow, boils up, detonates slightly (but without the disengagement of light), leaves a carbonaceous mass behind. If the strychnia contains strychnic, the nitrate has a reddish tint. The binurate crystallizes in fine needles. When heated, it decomposes, becomes red, and detonates with the disengagement of light.

c. Hydrochlorate or Muricate.—This salt crystallizes in four-sided prisms, which lose their transparency in the air. It is much more soluble in water than the sulphate. When heated, it is decomposed with the evolution of hydrochloric acid.

The effects of strychnia are of the same kind as those of nux-vomica, but more violent in degree. As ordinarily met with in the shops, it may be regarded as about six times as active as the alcoholic extract of nux-vomica. The following are a few examples of poisonous operation:

Dr. Christison says, “I have killed a dog, in two minutes, with a sixth part of a grain, injected, in the form of alcoholic solution, the chest: I have seen a wild boar killed, in the same manner, with the third of a grain, in ten minutes.” Pelletier says, “half a
grain, blown into the mouth of a dog, produced death in five minutes. A half a grain, applied to a wound in the back of a dog, caused death in three minutes and a half. In all these and other instances death was preceded and accompanied by tetanus. The salts of strychnia act in the same manner.

Some individuals are more susceptible of the action of strychnia than others. Andrati has seen a single pill, containing one-twelfth of a grain, cause slight trismus, and the commencement of tetanus; stiffness of the muscles; while in other cases the dose may gradually increased beyond a grain, with comparative little effect. The largest dose I have given is a grain and a half, and this was repeated several times before the usual symptoms, indicative of the affection of the system, came on.

The following case occurred on board the Dreadnought Hospital, and was communicated to me by Mr. Cooper, Surgeon, Greenwich:

A Swede, aged 50–60, was admitted about the year 1833 with general palsy, one side being more affected than the other; he was also in some degree idiotic. Strychnia was given, at first in the dose of one-eighth of a grain in times a day, which was continued for several weeks, without apparent effect. The dose was then increased to one-quarter of a grain three times a day, which was also continued for some time, and not producing any perceptible effect, quantity was increased to half a grain twice or three times a day, and this was taken for many days before any influence of strychnia was manifested. One morning, about 9 A.M., the apothecary was suddenly summoned by a message that the man was in a fit. When seen he was insensible; face and chest a deep purple colour; respiration had ceased, and the pulsation of the heart nearly so. The whole body (trunk and limbs) was in a state of tetanic spasm; Trunk extended, and shoulders thrown back; muscles of chest and abdomen hard and rigid. In a short time the rigidity became less; the ribs could be compressed; and artificial respiration was kept up imperfectly by compress of the thorax. Circulation was restored in some degree, and the deep purple colour of the surface went off. Spontaneous respiration returned. The man sighed, and became apparently sensible; all spasm had ceased, for a minute or two; but as soon as circulation and consciousness were in some degree restored, the spasm recurred with extreme violence, again locking up the respiratory muscles. Respiration ceased; the surface again became purple; circulation went on, however, some time after respiration had ceased. Artificial respiration was kept up when the relaxation of the muscles would allow of it, but was this time ineffectual. The heart soon ceased to beat; the deep purple colour was instantly replaced by the pallor of death; and life was extinct.

The quick passing off of the purple colour of the surface was very remarkable; the change appeared to commence in the face, and passed downwards like the passing of the shadow of a cloud.

This case gives some colour to the idea that strychnia, like digitale and some other potent remedies, accumulates in the system.

The local action of strychnia is that of an irritant. Applied to the naked dermis, it causes burning and pungent pain, lasting from an hour to an hour; and where blisters have been applied, the surface inflames under the use of the remedy, and affords a copious suppuration.

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The uses of strychnia are similar to those of nux-vomica above
referred.

The dose of strychnia or its salts (acetate, sulphate, nitrate,
hydrochlorate) is, at the commencement, one-sixteenth or one-
teenth of a grain, which is to be gradually increased until its
effects on the muscular system are observed. The largest dose I
have ever seen attained is one grain and a half. Two scruples, taken
as a cause self-destruction, produced death in an hour and a half.
Strychnia is usually given in the form of pill (made with common
scouring of roses) or it may be dissolved in alcohol or acetic acid.

The endermic dose of strychnia should not, at the commencement,
ceed half a grain, and of its salts one-fourth of a grain.

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OTHER MEDICINAL OR POISONOUS APOCYNACÉE.

1. The seeds of Strychn'nos Ignavía, or St. Ignatius's beans, came into the
English shops, according to Alston, about the latter end of the seventeenth
century. But there is some reason to suspect that they were known long before this,
and are probably the substances which, in the Latin translation of Scarpion, are
denominated nuxes vomicae. Dale's gives, as one of their synonyms, "Igisur, 
Nux vomica legitima Serapionis." They are obtained from the Strychnos
gratia (called by some Ignatia amara), a tree indigenous to the Philippine
Islands, whose fruit is smooth and pyriform, and contains about twenty seeds.
These seeds, the St. Ignatius's beans of the shops, are about the size of olives,
seeded and convex on one side, and somewhat angular on the other. Exteriorly
they are brownish, with a blueish gray tint. Within the envelopes of the
seed is a very hard, horned, or cartilaginous albumen, in whose cavity is contained
the embryo. These seeds have been analyzed by MM. Pelletier and Caventon,
who found their constituents to be the same as those of nux-vomica, though in
somewhat different proportions. Their effects, therefore, are similar.

2. Strychn'nos Tset'te, the Tsettek or Tjettek, is a large climbing shrub,
growing in Java. The aqueous extract of the bark of this tree is the poison
called Upas tsete Tjettek, or Upas Radja, and which must not be confused
with the poison of the Antiaris toxicaria, before described (see p. 1094). The Upas
tsete was analyzed by Pelletier and Caventon, who found it to consist of
toxine combined with an acid (igsuric?), a reddish brown colouring matter,
which becomes green when mixed with nitric acid, and a soluble yellow colouring
matter, which is reddened by nitric acid. They could detect no brucin. The
result of this poison are precisely similar to those of nux-vomica and strychnia.

3. Ligna Colebrina, or Snake-woods.—In countries infested with poisonous
serpents, the natives have usually some substance which is fancied to possess the
power of preserving them from the bites of these poisonous animals; and thus
we have various articles, seeds, roots, and wood, which have the word snake
ixed to them.

In Asia there are several kinds of lignum colubrinum, or snake-wood, supposed
to be possessed of the above-mentioned property. The specimens, both in commerce, show that there are various substances to which applied; some being the wood of a stem, others of a root. The most of the wood of the *Strychnos Calabria*. The *S. ligniartina* yields to *Strychnos Colubrium* of Timor. Pelletier and Caventou analyzed on woods, and found that it had the same constituents as the bean of *Strychnos*, though in different proportions. Thus it contained more fatty and matter, less strychnia, and, in the place of bassorine and starch, a large of woody fibre. Its action, therefore, is precisely similar to the before poisons.

4. *Strychnos toxiferacea*, Schomb. yields the basis of the celebrate *Woorari, Ouari*, or *Ura* poison of Guayana, which produces paralytic convulsive movements, death from, apparently, suspended respiration: chief respiration is a most important means of relief. Dr. Hance found a bark of this plant as an application to foul ulcers.

5. The seeds of *Strychnos Potatoe*, or *clearing nuts*, are used clear muddy water.

6. The bark of the *Strychnos Pseudoquinsa*, called *Quina do Cafe* employed in the Brazil as a substitute for cinchona bark. It does poisonous properties. It was analyzed by Vanquelin, who discove strychnia nor brucia in it. Merendie also analyzed it, under the name of *copalchi* (see p. 1133), and could not discover any vegetable. The internal surface of the bark (liber), touched by nitric acid, becomes blackish green. In these character it agrees with *nux-vomica* bark.

b. The barks (also belonging to *Apocynaceae*) Pereira Bark (obtained from a species of *Cevine* and the *Cevina d'Anta* (procu *Rauwolfia*)—likewise become red with nitric acid. Pafford had discovered a*alkali* (called *Pereira*) in the pereira.

7. *Cerbera Tanghin*, or *Tang nephron*, is a native of Madagascar. it is a most deadly poison. Though, than an almond [with the shell], it is capable of destroying twenty people. It is analyzed by O. Henry and Ollivier, principle is a neutral crystalline principle of *Tanghin* (tangin-camphor, Gmelin), tractive (tanginina: tangnine, Gmelin) to possess narcotic properties. The seed causes convulsions and violent vomit. It is (or was) used, in Madagascar, the guilt of suspected persons who are able to withstand the ordeal are considered innocent; and, those who die are said to be guilty.

**Order XLV.—Oleaceae, Lindley.—The Olive Tree.**

**Oleander, R. Brown.**

**Essential Character.—Flowers hermaphroditic, sometimes dioecious monophyllous, divided, persistent, inferior. Corolla hypogynous, mono-**

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9 *Roxburgh, Fl. Ind.* vol. i. p. 575.
10 *Mem. du Museum* 1823, p. 422.
12 *Guibourt, Journ. de Pharm.* t. xxv. p. 709.
14 *Journ. de Pharm.* t. x. p. 49.
15 *Hooker, Bot. Mag.* t. 2968.
occasionally of four petals connected in pairs by the intervention of 
nectaries, sometimes without petals; extantum somewhat valvate.
aria generally apetalous]. Stamens two, alternate with the segments 
lemma, without any hypogynous disk, two-celled; the cells two-seeded; 
pendulous and collateral; style 1 or 0; stigma bifid or undivided.
aceous, berried, or capsular, often by abortion one-seeded. Seeds 
fleshy, abundant albumen; embryo about half its length, straight;
oliaceous, partly asunder; radicle superior; plumule inconspicuous.

A EUROPEÃ, Linn. L. E. D.—THE EUROPEAN OLIVE.

Sex: Syst. Dianthus, Monogynia.

rupis expressum, L.—Expressed oil of the pericarp, E.—Oleum ex fructu, D.)

—Few vegetables have been so repeatedly noticed and 
generally described by the ancient writers as the olive-tree. 
its fame seems to have been adopted as the emblem of benignity.

It is frequently mentioned in the Bible; the ancient 
were well acquainted with it; and several products of it 
referred to in medicine by Hippocrates. Pliny is most diffuse 
about it.

Gen. Char. — Calyx small, four-toothed. Tube of the 
fruit; limb four-cleft. Stamens two. Segments of the 
pericarp. Drupe, with a two-celled, two-seeded—by abortion, 
one-seeded—not (Bot. Gall.)

—Leaves lanceolate, quite entire; their surfaces differently 
coloured. Racemes panicled.

251. A long-lived tree of slow growth. Wood 
hard; used for cabinet-work. Leaves in pairs, 
shortly petioled, lanceolate, acute, green above, 
hoary beneath. Flowers small and white. 
Drupe elliptical, dark bluish green; kernel 
(pyrenae) hard, with usually only one ovule. 
The whitish character of the foliage gives a 
dull and monotonous appearance to countries 
where the olive is extensively cultivated, as 
Provence and Languedoc.

ORNUS EUROPEA, var. longifolia, is the variety 
chiefly cultivated in the south of France and Italy. 
O. europaea, var. latifolia, is chiefly cultivated in Spain; 
its fruit is nearly twice the size of the common olive 
of Provence or Italy, but the oil is too rank for most 
English palates.
Hab.—Levant, Barbary, South of Europe. Notwithstanding the olive is now so common in the southern parts of Europe, it is supposed by many to have been derived from Asia. Pliny tells on the authority of Fenestella, that there were no olive-trees in Spain, and Africa, in the reign of Tarquinius Priscus, in the 17th year from the foundation of the city of Rome. The Phoenicians are said to have introduced the olive-tree into France 680 years before Christ. Near Terni, in the vale of the cascade of Marmora, plantation of very old trees, and supposed to be the same place mentioned by Pliny, as growing there in the first century.

Description.—The products of the olive-tree deserving of mention are the resiniform exudation, the leaves, and the fruit.

1. Resiniform exudation of the olive-tree (Lecca gum).—The writers speak of exudation from olive-trees, and which Dioscorides describes as the tears of the Æthiopic olive. In modern times it has been improperly termed olive gum. Pelletier has analyzed it and found that it consists of a peculiar matter (olivite), brown resins dissolveable in ether, and benzoic acid. Olivite consists of C₆H₄O₃.

It was formerly employed in medicine.

2. Olive leaves (folia olive).—The leaves of the olive-tree have been analyzed by Pallas and other products, found to be acetic and gallic acids. They have been employed externally as astringents and antiseptics; internally, as tonics in intermittent fevers.

3. Fruit of the Olive-trees; Olives (Olive).—The preserved or pickled olives (Olive condite), so admired as a dessert, are the green unripe fruit deprived of part of their bitterness by soaking them in water and then preserved in an aromatic solution of salt. Several varieties are met with in commerce, but the most common is the small French (O. europaea, var. longifolia) and the large Spanish olive (O. europea, var. latifolia). Olives à la picholine have been soaked in a solution of lime or alkali. Ripe olives are remarkable for the circumstance of their sarcocarp abounding in a bland, fixed oil.

Expression of Olive Oil.—The process of procuring olive oil is somewhat modified in different countries, though the principles are the same in all.

In Spain, the olives are pressed by conical iron rollers, elevated above the stage or floor, round which they move on two little wheels, the margins to prevent the kernels being injured, the oil from which is said to have an unpleasant flavour. Spanish olive oil, however, is inferior to other kinds from the circumstance of the time which elapses between the gathering and the grinding of the olives.

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* Journ. de Pharm. xii. 784.
some from the number of mills not being in proportion to the
to bear their turn, and, in consequence often undergo decom-
house, the finest oil is procured by bruising the fruit in the
mediately they are gathered, and then submitting the paste
ure. The first product has a greenish tint, and is termed
(oileum olivarum virgineum; huile vierge). The cake or
removed from the press, broken up with the hand, moistened
ing water, and repressed. The products are water, and oil
and quality: these separate by standing. The cake, which
istermed grignon, and is employed by some as fuel; others,
ferment it, and, by the aid of boiling water, obtain a very
oil, called gorgon, which is employed either for soap-making
ng in lamps.

the view of increasing the quantity of oil, some persons
the olives to undergo incipient fermentation, which breaks down
enchyma of the fruit before they are pressed; but the quality
oil is thereby injured. Guibourt tells us that it is a yellow,
ild and agreeable oil, and is much used for the table.
machinery employed by the Neapolitan peasants in the pre-
the Gallipoli oil is of the rudest kind. The olives are
to drop in their maturity from the tree on the ground, where
picked up chiefly by women and children, and carried to
. The oil when expressed is sent, in sheep or goat skins car-
mules, to Gallipoli, where it is allowed to clarify in cisterns
be rock on which the town is built. From these it is conveyed
or skins to basins near the sea-shore, and from these basins
asks are filled.

garding to Sirene, 100 lbs. of olives yield about 32 lbs. of oil;
which come from the pericarp, 4 from the seed, and 7 from the
matter of the nut (pyrenae). That obtained from the pericarp
fines quality.
ently-drawn olive oil deposits, by standing, a white fibrous
which the ancients employed in medicine, under the name of

Perties of Olive Oil.—Olive oil (oleum olivae seu olivarum;
ol) is an unctuous fluid, of a pale yellow or greenish-yellow
When of good quality, it has scarcely any smell. Its taste
and mild. Its sp. gr. at 77° F. is 0.9109, according to
When exposed to a temperature of 32° F. it deposits
bles (margarine, Lecanu; stearine, Chevreul). It is soluble
about 1½ times its weight of ether; but it is very slightly solu-
ly in alcohol. By exposure to the air it readily becomes

Bollan, Travels through Spain, p. 343, 1762; Jacob, Travels in Spain, p. 149, 1811.
Rioux, t. i. p. 339.
McCulloch, Dict. Commerce.
De Candolle, Phys. Veg. p. 299.
rancid; thin layers of it become thick, but do not dry. Hyponitrous acid converts it into elaidine (see p. 769), which, by saponification, yields elaidic acid. When mixed with sulphuric acid, and kept cool, it yields sulpho-margaric, sulpho-glyceric, and sulpho-oleic acid. With the basic metallic oxides it forms glycerine and soaps (see margarates): Spanish or Castile soap (see p. 566) is made with salda; lead soap, or emplastrum plumbi (see p. 813) with oxide of lead.

Varieties.—Provence oil (oleum provinciale), the produce of Aix, is the most esteemed. Florence oil is a very fine kind of olive oil, imported from Leghorn, in flasks surrounded by a kind of net-work, formed by the leaves of a monocotyledonous plant, and packed in half chests; it is used at the table, under the name of salald oil. Lucca oil is imported in jars holding nineteen gallons each. Genoa oil is another fine kind. Gallipoli oil forms the largest portion of the olive oil brought to England; it is imported in casks. Apulia and Calabria are the provinces of Naples most celebrated for its production; the Apulian is the best. Sicily oil is of inferior quality; it is principally produced at Milazzo. Spanish oil is the worst. The foot deposited by olive oil is used for oiling machinery, under the name of droppings of sweet oil.

Adulteration of olive oil.—Olive oil is said to be occasionally mixed with other vegetable oils (as poppy oil). Four methods have been proposed to detect the fraud:—

1. Beading.—If we shake pure olive oil in a phial half filled with it, the surface of the oil soon becomes smooth by repose; whereas when poppy oil is present, a number of air-bubbles (or beads as they are termed) remain.

2. Freezing.—Olive oil is completely solidified when cooled by ice; poppy oil, however, remains in part liquid. Even two parts of olive oil to one of poppy oil will not completely congeal.

3. Electrical diaphragm.——Olive oil, according to Rousseau, conducts electricity 675 times worse than other vegetable oils. The addition of two drops of poppy or beech-nut oil to 154½ grains of olive oil is sufficient to quadruple the conducting power of the latter. To ascertain the conducting power of oil, Rousseau used the electrical diaphragm (from diaphragm, to conduct; and meterv, to measure). It consists of one of Zamboni’s dry piles and a feebly-magnetized needle moving freely on a pivot. The electricity developed by the pile produces a deviation in the direction of the needle; but when any substance is interposed between the needle and the pile, the deviation is less in proportion to the bad conducting power of the interposed substance.

4. Formation of elaidine.—If recently-made nitrate of mercury (prepared by dissolving 6 parts of mercury in 7.5 parts of nitric acid, sp. gr. 1.36) be mixed with twelve times its weight of pure olive oil, and the mixture strongly agitated, the whole mass becomes solid.
of a few hours; this, however, does not occur with adult oil. We judge of the presence and quantity of foreign oils by the peculiar and quickness of solidification of the suspected olive oil.

In carefully mixed with a twelfth of its volume of solution of nitrate of prepared as for the Unguentum Citrinum (see p. 708), it becomes in four hours like a firm fat, without any separation of liquid oil."

POSITION.—In 1808, Gay-Lussac and Thénard examined the composition of this oil. In 1815, Braconnier ascertained the proximate constituents of it; and subsequently Saussure and the ultimate composition of these constituents.

<table>
<thead>
<tr>
<th>Proximate Analysis</th>
<th>Gay-Lussac and Thénard's</th>
<th>Saussure's</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Carbon 72%</td>
<td>75%</td>
</tr>
<tr>
<td></td>
<td>Hydrogen 13%</td>
<td>12%</td>
</tr>
<tr>
<td></td>
<td>Oxygen 7%</td>
<td>8%</td>
</tr>
<tr>
<td></td>
<td>Nitrogen 2%</td>
<td>3%</td>
</tr>
<tr>
<td></td>
<td>Olive Oil 100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

OLIVE OIL.—Braconnier obtained it by exposing olive oil to a temperature of about 21° F. in order to cause the coagulation of the margarine. This is a greenish yellow liquid; at 14° F. it deposited a little margarine.

Margarine.—The solid matter of olive and other vegetable oils, obtained is usually denominated stearine, but Le can has pointed out several by which it is distinguished from that principle; thus, it is more and is much more soluble in cold ether. In most other respects it agrees stearine.

The duty on olive oil is £4 4s. per ton, except on that from Sicily, which is £8 8s. In 1839, duty was paid 74 tons.

PHYSIOLOGICAL EFFECTS. a. On Vegetables.—Olive oil, as well as fixed oils, acts injuriously on the roots of plants, by obstructing enzymes and meatus, and preventing the passage of water.

b. Animals.—Injected into the veins, the fixed oils prove injurious to their mechanical operation. They obstruct the circulation of the capillary vessels, and in this way cause death. Both Courten and others have destroyed dogs by injecting half an ounce of the veins.

c. Man.—The fixed oils are extremely nutritious, but they are of digestion, and hence are apt to disagree with dyspeptics.

Some writers (as Dr. Dunglison) are of opinion that, as a condiment, with salad, oil promotes the digestibility of the Swallowed in large doses, olive oil acts as a laxative, in without occasioning pain.

* Roth, Phys. Chim. ii. 320.
* Ibid. iv. 204.
* De Candolle, Phys. Veg. p. 1347.
* Ecceus. of Hygiene, p. 389.
Uses.—In England, the dietetical uses of olive oil are very limited, being principally confined to its mixture with salads. In Spain and some other countries it is frequently employed as a substitute for butter. Dyspeptics should carefully avoid its use.

Medicinally it is not often administered by the mouth. As a laxative it may be used in irritation, inflammation, or spasm of the alimentary canal, or of the urino-genital organs. In irritant poisoning it is exhibited as an emollient and demulcent, to involve acids and corrosive substances, and sheath the stomach from their action. At one time it was supposed to possess antidotal properties for arsenical poisons; and Dr. Paris tells us, that the antidote on which the men employed in the copper-smelting works and tin burning-houses of Cornwall, rely with confidence, "whenever they are infested with more than an ordinary portion of arsenical vapour, is sweet oil; as an annual sum is allowed by the proprietors, in order that it may be constantly supplied." There is, however, no reason to believe that its agency is more than mechanical, as already mentioned (see p. 610).

Oil was formerly recommended as an antidote for cantharides, but the discovery of the solubility of cantharidin in oil has led to the suspicion, that, instead of alleviating, it might increase the patient's danger. There is no just ground for supposing that oil, applied externally, or taken internally, has any particular influence in counteracting the operation or relieving the effects of the poison of venomous serpents, notwithstanding the high encomiums that have been passed on it. In pulmonary or bronchial irritation, and spasmodic cough, olive oil is sometimes taken in the form of emulsion (made with gum, honey, or alkali) with benefit; but in such cases, almond oil is generally preferred. As an anthelmintic, olive oil is occasionally used.

Olive oil is a frequent constituent of laxative enemata, especially in dysentery, or irritation of the bowels or of the neighbouring viscera.

Externally it is used in the form of liniment (as the linimentum ammoniacum and linimentum ammoniacum sesquicarbonatis; see p. 304 and 318). Smear over the body, it has been recommended by Berkeley and others as a safeguard against the plague. It may be employed also to relax the skin and sheath irritable surfaces. Fritters of olive oil have been employed in ascites and anasarca.

In pharmacy, olive oil has been employed in the preparation of liniments, ointments, cerates, and plasters. In surgery, it is used for besmearing surgical instruments, as bougies, &c.

Administration.—The dose of olive oil as a laxative is from 0.5 to 1.5.

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1 Pharmacol. vol. i. p. 97, 6th edit.
EUROPE' A, Persoon, L.—EUROPEAN FLOWERING ASH.

Fraxinus Ornas, Linn. D.

Gen. Syst. Diandria, Monogynia.

Actuarius is believed to be the earliest writer who' ur manna. The nature of the substance called manna is quite unknown. Under the names of honey-dew, aerial honey-oil (αμυδα, and αμυδα, Galen; εμιδα, Dioscor; Pliny), the ancients have been supposed to include our it is difficult to believe they were unacquainted with it, Sophrastus speaks of two kinds of ash (Melia, Fraxinus), ch (αινορις, humilior) is supposed to be Ornus europaea.

Gen. Char.—Calyx very small, four-cleft. Corolla divided into linear segments. Pericarp a winged samara, not de.indley.

Leaves lanceolate, attenuated, stalked, serrated.

Tree. Leaves opposite, large, pinnated in three or four sets ovato-long, pointed, large, irregularly toothed. Panicles many-flowered. Flowers small and polygamous. Corolla white, greenish-white. Fruit flat, wedge-shaped, smooth, south of Europe; especially Calabria and Sicily.

TUNDIFOLIA, considered by some as a variety of Ornus europaea, and also yields manna. Féé says that manna is probably from Fraxinus excelsior and parefolia.

SECTION OF MANNA.—In Calabria, manna is obtained by mak-nas in the stem of Ornus europaea. In Sicily it is also in a similar manner. Houel, who has described and de-method of extracting it, as practised at Cinesi, near says, the collection of manna commences about the 15th of d terminates at the end of September, when the rainy sea-

The incisions are made with a hooked knife, first in the of the stem, and are repeated daily, extending them peri-upwards. Each incision is about two inches long. A ter (some describe it as a thickish white juice) exudes, and concretes to form manna. Beneath the lowest incision is of the Ornus, to convey the exuded liquor into a recep-
tacle formed of a leaf of the Indian Fig (Opuntia). In this way manna is obtained.

The fine cænulata is preferred by the Egyptians; it is obtained during the height of the season, when the juice flows vigorously. Murray (apparently on authority of Sestini) states that Ornus rotundifolius is the Ornus excelsior, of which manna in Sicily is the best. Fothergill 7 says that the Ornus yields its manna in clusters, or it is produced in countries other than Crete. Furthermore, the manna is said to be a natural product of the ash, but there are difficulties in the supposition. It is produced in countries other than Crete, but to be owing to a foreign action; either incision or the presence of a little hemipterous insect (Cicada Orni) common on this tree.

Description.—Several kinds of manna (manna) are described by pharmacologists. The finest of English commerce is called manna (manna cænulata). It is imported in deal boxes, havi-
tions, and frequently lined with tin-plate. It consists of pieces from one to six inches long, one or two inches wide, and from not an inch thick. Their form is irregular, but more or less lactic; most of the pieces being flattened or slightly hollow on one side (where they adhered to the tree or substance on which they concreted), and on this side they are frequently soiled. Their colour is white, or yellowish-white; they are light, porous, and the fractured surface presents a number of very small capillaries. The odour is somewhat like that of honey, and is to me unpleasant; the taste is sweet, but afterwards rather acrid.

7. Fothergill, op. cit.
of Sicilian Tolfa manna I have received an inferior kind, according to the manna in sorts (manna in sortis) of some phar- 
ners. From its name I presume it is brought from Sicily, it 
corresponds in quality to Tolfa manna, produced near 
acchia, and which Fée states is but little valued. The Sicilian 
manna occurs in small pieces, which seldom exceed an inch in 
each of these present the same appearances, with respect to 
e, colour, friability, and crystalline appearance, as the flake 
ners, however, are soft, viscid, brownish, and uncrystallized, 
of the next variety. The commonest kind of English 
is called Sicilian manna (manna siciliana). It appears to 
be common or fatty manna (manna pinguis) of some writers. 
of small, soft, viscid fragments, of a dirty yellowish-brown 
termixed with some few dark-coloured small pieces of the 
ty. It contains many impurities intermixed.

Manna is imported into this country principally from 
and Messina. It is also occasionally brought from other 
scy; viz. Lecce, Lipari, and Catania, Terra Nova, and 
Furthermore, Naples, Leghorn, Trieste, Genoa, and Mar 
other places of shipment of it. In 1809, duty (9d. per lb.) 
on 13,493 lbs.

Manna was analyzed in 1809 by Bucholz, who 
consist of mannite 60-0, uncrystallizable sugar (capable of 
m) with colouring matter (purging bitter matter?) 5-5, 
num 1-5, gummy extractive 0-8, fibro-glutinous matter 0-2, 
loss 32-0.

(Manna Sugar).—Is identical with Grenadin. It is extracted from 
boiling alcohol: the mannite crystallizes by cooling the solution. 
ot peculiar to manna, being found in many vegetables. It is distin 
common sugar by its incapability of undergoing the vinous fer 
see p. 48). It is white, crystalline, odourless, has a sweet and agree 
and is very soluble in water and in boiling alcohol, but is very much 
Id alcohol. Heated strongly it is decomposed like ordinary sugar. 
no account of the analysis of Liebig, of Carbo 39-8332, Hydrogen 
Oxygen 52-548; these numbers correspond with the formula C6H7O6. 
matches the laxative properties of manna, without the nauseous odour. 
it for children is 3J. or 3Jj.; for adults 3ss. or 3J.

Logical Effects. a. On Animals generally.—In moderate 
manna is nutritive, and is greedily devoured by some animals. 
burn tells us that vipers and martens are very fond of it. 
bases it acts as a mild laxative. The dose for carnivorous 
about two ounces dissolved in broth or milk. It is rarely 
orses, on account of the large dose required.

Man.—It has an analogous operation on man—that is, in 
iss it is nutritive, and in large ones mildly laxative. It acts

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*a* Cours d'Hist. Nat. ii. 366.

*b* Gmelin, Handb. d. Chem. ii. 1295.

*c* Pharm. Central-Blatt für 1834, S. 389.

*d* Travels in the Two Sicilies. 1788.

*e* Mourioud, Pharm. Véct.
on the bowels without exciting vascular irritation, and is, the
admissible in inflammatory cases. It is apt, however, to pro-
flatulence and griping. The fresher and less changed the man-
feeblert are said to be its laxative powers; and hence the Cali-
are enabled to use it frequently as an article of food. When
keeping and partial decomposition it has acquired an incr-
laxative powers, it is less easily digested, and is more apt to ex-
tulence. Hence also, we are told, the commoner kinds of man
more laxative and more apt to disagree with the stomach the
finer varieties. The older writers imagined that manna pro-
secretion of bile. Manna approaches tamarinds as a laxative,
is more nutritive and less refrigent, in consequence of pos
more mucilaginous and saccharine matter, and less free ve-
acids.

USES.—It is employed as a laxative, partly on account of th
ness of its operation, partly for its sweet flavour, in delicate p
as females and children. Dr. Burns recommends it for ne
infants, if the meconium do not come away freely. On ac-
its sweetness, it is frequently added to flavour purgative dr
and is used as a common laxative for children, who readily ea

ADMINISTRATION.—It may be taken in substance or dissol
warm milk or water.—The dose, for an adult, is from 3j. to 3
children, from 3j. to 3½j.

ORDER XLVI.—STYRACEÆ, Richard.—THE STYR.
TRIBE.

ESSENTIAL CHARACTER.—Calyx inferior or superior, with five divisions.
Calyx monopetalous, the number of its divisions frequently
from that of the calyx: with imbricated activation. Stamen
definite; definite, arising from the tube of the corolla, of unequal length, color
various ways, but generally in a slight degree only; anther
innate, two
bursting inwardly. Ovary superior, or adhering to the calyx, with five
to five cells; ovules definite, the upper ascending, the lower pendulous,
versa; style simple; stigma somewhat capitate. Fruit drupaceous, some
by or enclosed in the calyx, with from one to five cells. Seeds saccast
suspended, solitary, with the embryo lying in the midst of the albumen;
long, directed towards the hilum; cotyledons flat, foliaceous.—Trees of
Leaves alternate, without stipules; usually toothed, turning yellow in
Flowers axillary, either solitary or clustered, with scale-like bracts. They
often stellate (Lindley).

PROPERTIES.—Storax and Benjamin, obtained from the genus Styrax,
liance. Alstonia theiformis is used at Santa-Fé as tea. The properties
other species are but little known.
OFFICINAL STORAX.

STORAX OFFICINALIS, Linna. L. E. D.—THE OFFICINAL STORAX.

Sect. Syst. Decandria, Monogynia.

(Balsamum, L.—Balsamic exudation, E.—Resina, D.)

Hippocrates, Theophrastus, Dioscorides, and speak of a substance which they term Styra x (στρώχ). Dioscorides says it is the produce of a tree like the quince, and that the several varieties of it (all solid), and he mentions how it is stated. The best, he says, is unctuous, yellow, resinous, mixed thinish lumps, and forms a honey-like liquid when melted; it is edible, from Gabala [a Phoenician city], Pisidia, and Ciliciae of Asia Minor. This is evidently the sort which more pharmacologists denominate amygdaloid storax. A worse he says, is black, branny, friable, and covered with white. This sort I presume to be very analogous to, if not with, the common storax of the shops, the “mouldiness,” the efflorescent benzoic acid; indeed the only character in it differs is the colour; but as Pliny, who copies the description, Dioscorides, omits the word “niger,” it is probable that the was inaccurately described. A third kind mentioned by Pliny is a transparent tear-like gum, and emulating myrrh; but very scarce. Probably this was the variety which in modern times has been termed storax in the tear. The substances employed were borne by the sediment of the iris, wax, fat, &c.

Modern times various substances have been met with in commerce under the name of storax. Some of these are certainly proximate to the Styrax officinale, while others have been referred to Liquidambar (see Balsameae, p. 1070).

Gen. Char.—Calyx rather campanulate, nearly entire or parted. Corolla campanulate at the base, deeply three- to five-lobed. Stamens six to sixteen, seldom ten, exerted; filaments to the tube of the corolla, sometimes adhering at the base of the anthers linear, two-celled, opening by internal longitudinal style simple. Stigma obtuse, somewhat lobed. Drupe dry, imperfectly into two or three valves, with one, two, or three seeds solitary, erect, with a large, leafy, thin embryo, lying in a thick fleshy albumen with an inferior radicle (Lindley).

Mar.—Leaves ovate, beneath villous. Racemes simple, shorter than the calyx.

Small tree. Stem about twenty feet high; bark smooth. Leaves ovate, petiolated, ovate, blunt-pointed, entire; smooth and shiny...
above, whitish and downy beneath. Raceme of from four flowers. Calyx almost hemispherical, with five to seven subgiral teeth. Corolla white, externally hoary, with five, six, or segments. Fruit (capsule, Nees) coriaceous, downy, usually one seed.

**Storax Bark** is supposed to constitute the cortex thymianatis of some pharmacologists. It is probably the *Nux vomica* of Dioscorides. It is in the red, highly odorous fragments or shavings, frequently covered with a resineous deposit of benzoic acid. I am indebted for a sample of it to Professor (Hab.—The Levant, Palestine, Syria, Greece. Cultivated in the southern parts of Europe.

**Exudation.**—If incisions be made into the stem of this resinous juice exudes, which, when somewhat hardened, contains one or more of the balsamic substances denominated in the vernacular storex. Some writers state that the exudation arises from the interior of the stem by a little insect. Though this balsam exudes from the storax-tree in the south of France, yet that of commerce is a product of Asiatic Turkey. A liquid storax is obtained from the bark and young branches by pressure (see p. 1325).

**Description.**—The substances termed storax (storax senecio) are very numerous. With the exception of the first kind, the following varieties I have met with:

1. **Storax in the Tear** (*Styrax in grani*).—Yellowish-white dish-yellow tears, about the size of peas. White storax (*styrax in grani*) is formed of tears agglutinated so as to form masses somewhat resembling pale galbanum. Both sorts, however, are exceeding rare, and are unknown to our drug-dealers. I have never met with a single specimen in English commerce. White storax is also sold in Paris; for Professor Guibourt, to whom I wrote for a sample, sent me one fine specimen at a druggist’s in Paris, but not for sale. “I discovered it (says he) with great pleasure, for this was the first time that I have established the distinction of that variety only from a scrap of paper.”

2. **Amygdaloid Storax** (*Styrax amygdaloides*).—It occurs in masses, having a very agreeable odour, analogous to that of and a yellowish or reddish-brown colour. They are interspersed with white tears (giving the mass an amygdaloid appearance). This variety is very scarce. I have a fine sample, weighing nearly a pound of one quarter; it cost me, in Paris, 24 francs per ounce. There is (or was a few years since) a magnificent piece, in the session of a French pharmacist, who offered to sell it for 500 francs. Amygdaloid and white storax were formerly imported envelope of monocotyledonous leaf, under the name of canes or reed storax (calamita verus). A fine specimen (about the size and shape...
Storax; *Styrax liquidus.*—This has been already (p. 1070). On the authority of Petiver it is usually the produce of a species of *Liquidambar.* But Landerer, editors of the *Pharmacopoea Graeca,* has recently stated that the *buchu-* or *storax oil* is obtained at Rhodes from the *styrax officinalis,* which is there termed by means of longitudinal incisions the bark of the stems is in the form of small narrow strips, which being pressed sily adhere by means of their glutinous juice, and in this way are made up into bundles, of about 2 lbs. each. These are to pressure in warm presses (called *styraki*), by which they are obtained, having a butyraceous consistence, a grey colour, and a vanilla-like odour. Is this the liquid *storax* of English commerce?

*Styracina.*—Under this name I include several substances resembling *storax,* but which are evidently fine saw-dust impregnated with a resinous liquid (in some cases, perhaps, *idus*) to give them cohesiveness.

*Non Storax* (*Styrax vulgaris* seu *Styrax calamita,* offic.)—Imported in large round cakes, of a brown or reddish-brown fragrant odour. It is brittle and friable, being very easily reduced to a coarse kind of powder; yet it is soft and unctuous. Exposed to the air it becomes covered with an efflorescence of solid (which, to the superficial observer, looks like a whitish poudre de torte), and falls to powder. It appears to consist of a resin impregnated with some products of 2. Boiled with
dissipate its fragrance. At least I cannot conceive for what purpose the woody matter could be added; for it is too easily distinguishable to have been intended as an imposition.

β. Solid or Cake Storax (Storax solide ou Storax en pain, Gobour.)—Under this name I have received from Professor Guibourt a substance very analogous to the preceding; but the sawdust obtained by digesting it in spirit is not so intensely red.

γ. Drop or gum Storax.—Under this name I have once met with in English commerce, a storax which was highly valued. It was a cular cake, about a foot in diameter, and four or five inches thick; was blackish, with a greenish tint; had a pithy consistence, considerable tenacity, and a very agreeable odour. By keeping it been covered with an efflorescence of benzoic acid. Boiled in rectified spirit it gave an inky appearance to the liquid, and left a black sawdust.

δ. Hard, blackish Storax.—Under the name of brown Storax purchased in Paris a solid, heavy, compact, hard, blackish substance having the odour of liquid storax. Boiled in rectified spirit it yields an almost colourless liquid and a brownish sawdust. Is this Storax brun noirâtre which Guibourt says is made at Marseilles?

COMMERCE.—I find, on the examination of the books of a wholesale druggist, that all the storax (solid and liquid) imported into this country during seven years, came from Trieste.

COMPOSITION.—Neumann submitted common storax (styrax calamita, offic.) to a chemical examination. More recently Roesch analyzed three kinds of styrax calamita. In 1830, Bonastre analyzed a styrax from Bogota. The same chemist examined a fluid, which he termed liquid storax, but which was liquidanbar (see p. 1071).

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<tr>
<td>Volatile oil</td>
<td>7</td>
<td>9'5</td>
<td>4'4</td>
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<tr>
<td>Resin</td>
<td>41'6</td>
<td>53'7</td>
<td>14</td>
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<tr>
<td>Salveina</td>
<td>7</td>
<td>0'6</td>
<td>3'1</td>
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<tr>
<td>Benzoic acid</td>
<td>2'4</td>
<td>3'3</td>
<td>3'8</td>
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<tr>
<td>Gum and extractive</td>
<td>14'0</td>
<td>9'2</td>
<td>12</td>
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<tr>
<td>Matter extracted by potash</td>
<td>12'0</td>
<td>9'6</td>
<td>11</td>
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<tr>
<td>Woody fibre</td>
<td>23'0</td>
<td>20'2</td>
<td>27'</td>
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<tr>
<td>Ammonia</td>
<td>traces</td>
<td>stronger traces</td>
<td>strongest traces</td>
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<tr>
<td>Water</td>
<td>5'0</td>
<td>5'0</td>
<td>14</td>
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1. Volatile Oil of Storax.—Obtained by digesting the distilled water of storax with ether. The solid oil was white, crystalline, and fusible; its odour was agreeable; its taste aromatic and warm. The fluid oil had not so penetrating an odour.

2. Resin of Storax.—Is soluble in alcohol, but insoluble in water.

* Journ. de Pharm., X. xvii. p. 98.
OFFICINAL STORAX.

Acetic Acid.—See p. 413.

Art. 3 says that both white and amygdaloid storax, when treated by boiling leave (independently of impurities) a small quantity of an insoluble stance; and the filtered liquid becomes turbid on cooling.

PHYSIOLOGICAL EFFECTS.—Storax produces the before-described effects of the balsamic substances. Its stimulant properties are particularly directed to the mucous surfaces, especially to the tracheal membrane. Hence it is called a stimulating expectorant. Operation it is closely allied to balsam of Peru and benzoin, but more powerful than the latter.

—Internally storax has been principally employed in affecting the organs of respiration. In chronic bronchial affections, of the use of stimulants, it may be used as an expectorant. Also been employed in chronic catarrhal affections of the urino-membrane. Applied to foul ulcers in the form of ointment, it ses operates as a detergent, and improves the quality of the matter.

DISTILLATION.—Purified storax may be exhibited, in the form in doses of from grs. x. to 5.

STORAX COLATUS, L.; Extractum Styracis, E.; Strained Storax. Take storax in rectified spirit, and strain; then let the spirit distill a gentle heat, until it becomes of a proper consistence, L. Sections of the Edinburgh College are essentially the same, that the evaporation is ordered to be carried on by the vapour, until the product have the consistence of a thin extract).—This is intended for the purification of styrax vulgaris (styrax a, offic.). but Mr. Brande says it is inefficient. The strained product is usually produced from liquid storax (see p. 137). It is used in perfumery and in the preparation of tinctura styracis composita, and the pilula styracis composita.

STORAX COMPOSITA, L.; Pilula Styracis, E.; Pills of storax. (Strained Storax | Extract of Storax, E.; Storax Resin, j. [two parts, E.]; [Hard, L.] Opium [powdered, L.], 3; or, L.]; Saffron, 5. [one part, E.]. Beat them together until triturated [and divide the mass into 60 pills, E.].—These pills are valuable in chronic coughs, and some other pulmonary affections. They are valued also in another point of view: they sometimes
2. STYRAX BENZOEIN, Dryander, L. E. D.—THE BENJAMIN TREE.

Benzoin officinale, Hayne.

Sex. Syst. Decandria, Monogyne.

(Alsalmum, L.—Concrete balsamic exudation, E.—Resina, D.)

HISTORY.—As the ancients were acquainted with so many oriental vegetable products, we should have expected, à priori, that benzoin would have been known to them. But this does not appear to have been the case; at least we are unable to identify it with any of the substances described by the old writers.

BOTANY. Gen. Char.—Vide Styrax officinale.

Sp. Char.—Leaves oblong, acuminate, tomentose beneath. Racemes axillary, compound, nearly the length of the leaves.

Tree. Stem thickness of a man’s body. Leaves oval-oblong, entire. Calyx campanulate, very obscurely five-toothed. Corolla grey, of five petals, perhaps connate at the base. Stamens ten. Ovary superior, ovate; style filiform; stigma simple. (Condensed from Dryander.)

Hab.—Sumatra, Borneo, Siam, Java.

EXTRACTION OF THE BALSAM.—Benzoin is obtained in Sumatra as follows:—When the tree is six years old, longitudinal or some what oblique incisions are made in the bark of the stem, at the ends of the principal lower branches. A liquid exudes, which, by exposure to the sun and air, soon concretes, and the solid mass is then separated by means of a knife or chisel. Each tree yields about three pounds of benzoin annually, for the space of ten or twelve years. That which exudes during the first three years is white, and is denominated head benzoin. The benzoin which subsequently flows is of a brownish colour, and is termed belly benzoin. After the tree is cut down the stem is split, and some benzoin scraped from the wood; but its colour is dark, and its quality bad, owing to the intermixture of parings of wood and other impurities: this is called foot benzoin. The relative values of head, belly, and foot benzoin, are as 105, 45, 18. Benzoin is brought down from the country in large cakes (called by the natives tampangs) covered with mats. In order to pack it in chests, these cakes are softened by heat; the finer by exposure to the sun, the coarser by means of boiling water.

DESCRIPTION.—Benzoin (benzoinum; asa-dulcis) is met with in commerce of various qualities: these are sometimes distinguished by the terms firsts, seconds, and thirds. Frequently the finer kinds are called Siam benzoin, while the commoner kind is termed Calcutt benzoin.

1. Siam Benzoin, offic. Benzoin of first quality.—There are two...
Benzoin (Benzoinum in massas).—The finest kind consists of large rounded tears (white lump benzoin). More commonly we find these connected together by a brown, resiniform mass, which, when broken, presents an amygdaloid appearance, from the white and translucent benzoin. From my friend, Dr. Royle, I have a sample of Siam benzoin, whose properties are somewhat similar to the preceding. The small masses consist of agglomerated grains, instead of being white, are translucent, or, in a few instances, almost transparent.

He says that the benzoin of Siam is procured from Laos and the sea. He also says it was formerly procured from the massas of Xiang-nan, Chiang-mai, and La-Kun, is abundantly found in Siam. The benzoin of Siam cannot be, he thinks, the Styrax Benzoin, as it grows as far north as twenty degrees of latitude.

Benzoin, offic. Benzoin of second and third quality.—As benzoin is imported in chests from Calcutta, it occurs in large round blocks, marked with the impression of a mat, and covered with a cotton cloth. When broken, we observe but few large masses in it. The mass is principally made up of a brown matter, with numerous, white, small pieces or chips intermixed, which give the broken surface a speckled appearance, like that of a fine-grained granite. This kind corresponds to the common or brown benzoin (benzoinum commune seu in sortis) of writers.

Benzoin is usually imported into England from Singapore. It is employed in the same manner as the Siam benzoin. The ordinary benzoin is said to be superior to other varieties.
was published by Stoltze. Moreover, Mr. Brande and Underden have examined this substance.

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<tr>
<td>Volatile oil (aroma, John)</td>
<td>12.5</td>
<td>12.0</td>
<td>traces</td>
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<tr>
<td>Benzoi acid</td>
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<td>10.82</td>
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<tr>
<td>Resin</td>
<td>83.3</td>
<td>84.9</td>
<td>traces</td>
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<tr>
<td>Matter-like balsam of Peru</td>
<td>1.7</td>
<td>0</td>
<td>traces</td>
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<tr>
<td>Woody matter and other impurities</td>
<td>2.0</td>
<td>2.00</td>
<td>0.0</td>
</tr>
<tr>
<td>Water and loss</td>
<td>0.25</td>
<td>0.12</td>
<td>0.10</td>
</tr>
<tr>
<td>Salts (benzoates and phosphates)</td>
<td>0.75</td>
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1. **Volatile Oil of Benzoin.**—Distilled with water, benzoin does not produce any essential oil; but when exposed to heat without water, benzoin acid and empyreumatic oil are volatilized. This oil may be deprived of its empyreumatic oil by redistillation with water, and then smells agreeably of benzoin. It may be regarded as a product of the decomposition of the resin. An oil of benzoin is obtained by distillation, without any liquid, is used at Sumatra as a perfume.

2. **Resin of Benzoin.**—It is soluble in all proportions in alcohol. On addition of water to the tincture, a milky liquid (absurdly called virgin) is formed, owing to the precipitation of the resin in the form of a white powder, which may be obtained quite free from benzoin acid, and then constitutes the *magisterium benzes* of some old writers. The acids (acetate, hydrochloric, sulphuric) also precipitate the alcoholic solution. Sulphuric acid strikes a red colour with resin of benzoin. Benzoin resin colours the chloroform or alcohol of benzoin green, but does not cause any precipitate. This property would lead to the suspicion of the presence of either gallic or tannic acid, but neither has been detected. Stoltze makes two kinds of resin in benzoin: one of a yellow colour, soluble in ether; the other brown, and insoluble in this liquid. Undersol, however, makes three varieties: one (resina alba) is insoluble in carbonic acid, but soluble in ether; a second (resina beta) is insoluble in both, and soluble in carbonate of potash and ether; and the third (resina gamma) is feebly electro-soluble in carbonate of potash (forming a resinate of potash), and very soluble in ether.

According to Johnston, the colourless resin of benzoin is rendered more or less yellow by the formula C10H4O. Heat, boiling water, caustic potash, carbonated alkaline solutions, quicklime, and oxide of lead, effect a partial decomposition of this resin.

3. **Benzoin Acid.**—The preparation, properties, and uses of this acid have already been described (see p. 413). Several circumstances lead to the conclusion that very little benzoin acid exists, at least in the free state; in the resin of benzoin.

One of these deserves mention: dilute solutions of caustic soda in the cold readily dissolve crystallized benzoin acid; but triturate even boiling with such solutions, does not deprive benzoin of the power of yielding this acid when subjected to heat.

**Physiological Effects.**—Benzoin produces the general excitement of the balsams before mentioned (p. 188). Its power of producing local irritation renders it apt to disorder the stomach, especially

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† Nicholson’s Journal, x. 83.
‡ Poppendorf’s Annal. xvi. 179.
§ Medden, Sumatra, p. 184.
\* Phil. Trans. 1840, p. 383.
‖ Ibid. p. 389.*
acute inflammatory complaints, and its acridity prevents its entrance where there is much gastric irritation. Its use, therefore, better adapted for torpid constitutions. Trouseau and Pidoux have favourably of the effects of the balsams in chronic laryn- 

is, I have before noticed (p. 183). The mode of employing them in balsamic fumigations in this disease, has been before mentioned (see p. 183).

NISTRATION.—Benzoin is scarcely ever administered alone.—

The essence of it in powder is from grs. x. to 3ss. — On account of the unpleasant odour evolved when benzoin is heated, this balsam is frequently employed for fumigations, as in the ceremonies of the Roman Catholic church.

TINCTURA BENZOINI COMPOSITA, L. E. D.; Balsamum Trauma-

ticum Compound Tincture of Benjamin; Wound Balsam; Balsam of Tolu; Friar's Balsam; Jesuit's Drops; The Commander's Balsam. Benzoin, 3ij ss. [in coarse powder, 3iv. E.]; Storax, strained, 3ij ss. [in liquid spirit, 3iv. E.]; Balsam of Tolu, 5x. [Peru-balsam, 3ij ss. E.]; Aloes, 3x. [Indian Aloes, 3ss. E.]; Rectified Spirit, Oij. Macerate for 7 days [seven, E. D.] and filter. [Pour out the clear liquor, E.] and

The ingredients used by the Dublin College are the same as, or nearly identical with, those of the London College. — A stimulating expectorant: administered in chronic coughs, 5ss. to 5ij. It is decomposed by water. A very popular mode of exhibiting it is in the form of emulsion, prepared with tincture of aloes, and sugar, or yolk of egg. Tinctura Benzoini com-
2. FUMIGATING PASTILES. — (Benzoin, in powder, sixteen parts; balsam of tolu; sandal-wood, in powder, of each four parts; labdanum, one part; a light [linden] charcoal, forty-eight parts; nitrate of potash, two parts; tragacanth, one part; gum Arabic, parts; cinnamon water, twelve parts. F. S. A. a soft and dry mass, which is to be formed in to cones, with a flat, tripod base, at first in the air, afterwards by a stove). — By burning, these pastiles diffuse a very agreeable odour. They are employed to disperse overpower unpleasant smells.

The *Species ad sufiendum*, Ph. Bor., consists of benzoin, amber, of each lb. ss., and lavender flowers, 3 ij.

ORDER XLVII.—PYROLACEÆ, Lindley.—THE WINT GREEN TRIBE.

**Essential Character.** — *Calix* free four- more frequently five-partite, tent. *Petals* five, free or cohering, perigynous? with an imbricated margin. *Stamens* twice the number of the petals, to which they are separate; *anthers* bicellular, dehiscing by two pores. *Ovary* three-to five- seated on a hypogynous disk. *Style* one. *Stigma* roundish or lobed, times slightly indusiate. *Capsule* three- to five-celled, three- to five-loculicidal-dehiscent. *Placenta* adherent at the centre. *Seeds* indefinite, with a pellicle indusiate or winged. *Embryo* minute, at the \( \text{fleshy albumen, with moderately distinct cotyledons.} \) — *Herbs*, natives of the northern hemisphere, perennial or scarcely *under-shrubs*, smooth, round, naked, or leafy. *Leaves* simple, entire or dentate. *Flowers* racemose, somewhat umbellated, rarely solitary, white or rose-coloured. *Properties.—*See *Chimaphila umbellata*.

**CHIMAPHILA UMBELLATÆ, Nuttall, E.—PIPSISSEWA ; UMBELLATED WINTER GREEN.**

*Chimaphila corymbosa*, Pursh, L.—Pyrola umbellata, Linna, D.

_Sex._ Symp. Decandria, Monogynia.

(Delete, L.—Herb, E.—Herba, D.)

_History._ — The Pipsissewa was first employed medicinally by the aborigines of America. It was introduced to the notice of the profession, in 1803, by Dr. Mitchell.


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1 Henry and Gauvain, *Pharm. Raisin.* 1. t. i. p. 492.
2 See p. 397.
3 De Candolle, *Prod. vii.* 772.
5 De Candolle, *Prod. vii.* 775.
The fresh leaves exhale a peculiar odour when bruised: their tincture and astringent. The infusion of the dried herb is rennin (tannate of iron) by sesquichloride of iron.

**SOLUTION.**—The dried plant was analyzed, in 1817, by Elias Hilgard. It consisted of bitter extractive 18.0, resin 2.4, tannin 1.38, and, with a small portion of gum and vegetable calcareous salts, the principle has not been isolated. It probably resides in the sub-mucous tissue. The resin and tannin, however, must contribute to its astringent effect.

**LOGICAL EFFECTS.**—The fresh leaves appear to possess concretionary properties, probably due to some volatile constituent; but the tincture of the leaves, when bruised, they produce rubefaction, and desquamation, if applied to the skin.

Infusion of the dried leaves, when swallowed, acts as a tonic, giving an agreeable sensation in the stomach, and assisting the digestive process. It promotes the action of the secretions, more especially the kidneys, over which, indeed, it has a specific influence, increasing the quantity of urine secreted, and beneficially influencing several forms of dysuria. Indeed, this plant possesses, in its medical properties as in its natural-historical and chemical relations, qualities similar to those belonging to Uva-ursi.

The following are the principal diseases in which it has been used:—

**Dropsy,** accompanied with great debility and loss of appetite, useful as a diuretic, as well as on the account of its stomachic qualities. It was introduced to the notice of practitioners...
which the Uva-ursi frequently proves beneficial; such as cystic
and calculous complaints. It has also occasionally alleviated
cases of hematuria, ischuria, dysuria, and gonorrhoea.

3. In Scrofula.—We can readily believe that, as a tonic
remedy may be useful in various forms of scrofula. But it has
supposed by some to possess almost specific powers; and in
its reputation is so high, that in the provinces it acquired the
"King’s Cure." Dr. Paris says, that "an irregular practitioner
has persuaded a number of persons in this metropolis that he
possesses remedies, obtained from the American Indians, by which
enabled to cure scrofula in its worst forms," relies for success on
champhila. In some ill-conditioned scrofulous ulcers, pyroli
in the form of a wash.

ADMINISTRATION.—Chimaphila is given in the form of decoct
extract: the latter has been employed in doses of ten or fifteen

DECOCUT CHIMAPHILÆ, L.; Decoctum Pyrolæ, D.; Decocc
Umbellated Winter Green.—(Chimaphila, s.; [Distilled, L.]
Oss. [Oij. wine-measure, D]). Boil down to a pint, and strain
The Dublin College macerates it for six hours in water, then
and afterwards returns it to the water: the liquor is to be evapor
to a pint).—Dose, f5j. to f3ij.

ORDER XLVIII.—ERICACEÆ, Lindley.—THE HEAT
TRIBE.

ERICÆ, Juss.—ERICÆ, R. Brown.

ESSENTIAL CHARACTER.—Calyx four- or five-partite, almost equal, entire
herent to the ovary, persistent. Corolla perigynous or somewhat hypo-
gamopetalous, four- or five-partite, or with four or five distinct petals,
or more rarely irregular petals imbricated by avulsion. Stems or
equal or double in number to the petals, entirely or almost free from
corolla. Athers two-celled; cells hard, dry, separate either at the base,
often furnished with some appendage, dehiscing by a terminal
Ovary free, surrounded at the base by a disk, which is sometimes nectar-
Style single, rigid. Stigma undivided, toothed, or three-lobed. Fruit or
many-seeded, many-celled; dehiscence varies. Seeds inserted in a
placenta, small, indefinite; the testa firmly adhering to the nucleus. A
round, in the axis of fleshy albumen; the radicle opposite to the is
Shrubs or under-shrubs, rarely small trees. Leaves alternate, rarely sea
opposite or verticillate, without stipules, usually rigid, entire, evergreen

culated on the stem.

PROPERTIES.—The plants of this order are astringent and diuretic. One
of these properties they owe to the presence of tannic acid.

* Pharmacologia.
* De Candolle, Prodr. vii. 580.
TAPH’YLOS UVA-UR’SI, Sprengel, L. E.—THE BEARBERRY.

Arbutus Uva-ursi, Linna. L.

Sect. Syst. Decandra, Monogyne.

(Folia, L. E.—Leaves, E.)

ty.—Some doubt exists whether this plant was known to the Greeks and Romans. Bauhin and some others, think *pica* of Dioscorides; but the leaves are very unlike *ruscus aculeatus* (*οξυμοσινία*), to which he, as well as Pliny, them. The *φρέγαν σταφυλή* of Galen agrees better with the though the short description of it applies also to Ribes

y.—Gen. Char.—Calyx five-partite. *Corolla* ovate-urceolate; five-toothed, revolute, short. *Stamens* ten, inclosed; *filaments* what dilated at the base, hairy-ciliate; *anthers* com- borne, two pores at the point, laterally two-awned, awns re- *ovarium* globose-depressed, surrounded with three scales; t; *stigma* obtuse. *Berry* (or berries dually) globose, five-, seven-, or ten-celled; cells one-seeded (De Cand.)

r.—Procumbent. *Leaves* coriaceous, persistent, obovate, shining. *Flowers* disposed in terminal small racemes. beneath the pedicles, obtuse, small (De Cand.)


Indigenous. Northern parts of Europe, Asia, and America.

Tony, and alpine heaths.

PTION.—The dried leaves (*folia uvae ursi*) are of a dark, green colour, and have a bitter astringent taste, but no odour. der surface is reticulated. The leaves of *Vaccinium Vitis d Whortleberry* are said to be occasionally substituted for Uva-ursi; the fraud (which is unlikely to occur in this may be detected by the edges of the leaves being minutely and under surface dotted; whereas the edges are entire, under surface reticulated, in the genuine leaves. Further-

false leaves are deficient in astringency; and their watery s coloured green by sesquichloride of iron, but does not precipitate with gelatine; whereas the true ones are highly , and their watery infusion forms a blackish-blue precip-

the sesquichloride of iron.
Composition.—Uva-ursi leaves were analyzed, in 1809, by Melandri and Moretti, and in 1827 by Meissner. The constitution in 103 parts are, according to the last-named chemist, gallic acid is tannic with some gallic acid 364, resin 414, oxidized extractive, some citrate (?) of lime 08, gum with supermalates of lime and nit and traces of tannin and common salt, 33, chlorophylle 63, pectic acid (?) extracted by potash 171, extractive obtained by potash 176, lignin 96, and water 60 (excess 13).

Tannic acid is the active principle of the leaves. An aqueous infusion produces a bluish-black precipitate (tannate of iron) with the ferruginous salts, a yellowish-white one (tannate of gelatine) with a solution of isinglass. Gallic acid also contributes to the astringency of the leaves.

Physiological Effects. a. On Animals generally.—Most animals refuse to eat this plant; there are, however, some few exceptions to this statement. Birds, it is said, will eat the berries; a Murray tells us that two kinds of insects feed on the plant, one of which (a species of Coccus) yields a crimson dye. Girardi, says that an infusion of the leaves might be injected into the urinary bladder of animals with impunity; but when taken internally it excited vomiting, and contraction, and inflammation of the stomach.

β. On Man.—The most obvious effects of Uva-ursi are those of the vegetable astringents before described (see p. 188). But the remarkable benefit frequently obtained by the use of it in affections of the urinary organs—a benefit not equally procurable by the use of other vegetable astringents—leads to the belief that it has some particular influence over these organs; though the only effect observed in healthy persons is an alteration of the colour of the urine (shown that the colouring matter of the plant is absorbed), and a slight increase in the quantity of this secretion. Alexander found in doses of the powder acted as a mild diuretic (see p. 200). In large doses, the powder readily nauseates. As the astringent principle Uva-ursi has been detected in the urine, it is not improbable a part of the beneficial effects which this plant produces in affections of the kidneys and of the mucous membrane lining the urine organs, may be owing to the local action of the tannin, in its passage through and from the kidneys.

Uses.—As an astringent it is applicable to all the purposes for which the vegetable astringents generally are used (see p. 188). It has been employed as an antidote in poisoning by ipecacuana (see Ipecacuana). But the principal use of this remedy is in chronic affections of the bladder, attended with increased secretion of mucus and unaccompanied with any marks of active inflammation. In the latter stages of catarrhus vesicae, the continued use of Uva
frequently most beneficial. Combined with hyoscyamus, says it, and persevered in steadily for a considerable time, it fails to diminish the irritation and quantity of mucus, and mitigate the sufferings of the patients. "It undoubtedly," he adds, "considerable powers in chronic affections of the bladder, for which only it is adapted, its operation being slow, trying perseverance." Sir Benjamin Brodie, on the other hand, that "Uva-ursi has the reputation of being useful in cases of chronic diseases of the bladder, and in this [inflammation] among the rest. I must say, however, that I have been dissatisfied in the use of Uva-ursi, and that I have not seen those beneficial results produced by it which the general reputation of the medicine led me to expect. I have seen much more good done by a cissampelos Pareira. Such are the statements of the effects of this remedy, made by two of the eminent writers on diseases of the urinary organs. My own experience of it amounts to this: that in some cases the relief obtained by its use was most marked; whereas, in other instances, it was no avail. It is to be remembered, that its astringent properties fit it for acute cases, and that the alteration which it produces in the condition of the urinary organs is effected very slowly; so that to be beneficial, it requires to be exhibited for a considerable period. In calculous affections it has occasionally given good results. Haen and Van Swieten speak of the good effects of it in cases. It alleviated the pain, checked the purulent secretion, and restored the urine to its natural condition. Effects seem to have arisen from its influence over the kidneys, for it did not appear to affect the calculus. In chronic affections, with profuse mucous or purulent secretion, it is sufficiently serviceable. Dr. Bourne gave it in powder of from 8 to 20 grs. three times daily, in milk, with success. Insertion.—The dose of the powder is from 3 j. to 5 j. But powdered leaves of this plant are so bulky and disagreeable, one must bear to persevere long enough in theuse of the quantity; and the same is pretty much the same with the decoction. On this account the extract is frequently used.

Decoctum Uva Ursi, L. Decoction of Bearberry. (Uva-ursi, 5 j.; Distilled Water, Ojss. Boil down to a pint, and strain). 3 j. to 5 j., three times a day.

Extractum Uva Ursi, L. Extract of Bearberry. (Uva-ursi, 1 lb. 1 j.; Boiling Distilled Water, Cong. 1 j. Macerate for four hours; then boil down to a gallon, and strain the liquor.

On Affect. of the Urinary Organs, pp. 185 and 266, 2nd ed. 1825.
Commentaries, t. xvi, p. 300.
Cases of Pulmonary Consumption, &c. treated with Uva-ursi. 18.
Prout, op. cit. p. 188.
17. It is used to cover the unpleasant flavour of other medicines (Sarsaparilla, p. 1002). In the dose of a fluidounce it has cause

ORDER XLIX.—LOBELIACEÆ, Jussieu.—THE TRIBE.

Essential Character.—Calyx five-lobed, more or less adherent Corolla persistent, more or less gamopetalous; lobes or petals regular, sometimes almost regular; tubes entire or cleft longitudinally somewhat valvular. Stamens five, alternate with the corolla, usually free, but sometimes adherent to the tube of the corolla; anthers cohering, biseriate or one-celled, then with parietal placentas; style one; stigma surrounded by hairs. Fruit usually dehiscing at the apex by two valves above an operculum or laterally by three valves, or indehiscently; albumen fleshy; embryo straight.—Lactescent herbs or rarely small trees. Leaves alternate, without stipules. Flowers solitary, solitary, racemose. (Condensed from De Cand.)

Properties.—Dangerous or suspicious plants; mostly acrid or

LOBELIA INFLATA, Linn. L. E.—BLADDER-PODDED
INDIAN TOBACCO.

Sex. Syet. Pentandria, Monogynia.

(HERB, E.)

History.—This plant was employed by the aborigines of America, and after having been for some time used by quacks, was brought to the notice of the profession by the Rev. Dr. Cutler, of New Hampshire. It was introduced into England in 1829, by Dr. Benjamin Smith. It is said to have been introduced into Europe by the Dutch, in the 17th century.
the anthers barbed at the point. Ovary inferior or semi-
and (in species very much alike) somewhat free (De Cand.)
ar.—Stem erect, the lower part simple and shaggy; the up-
ter ramose and smooth. Leaves irregularly serrate-dentate,
the lower ones oblong, obtuse, shortly petioled; the middle
acute, sessile. Flowers small, racemose. Pedicels short,
acuminate bract. Calyx smooth, the tube ovoid; the lobes
cuminate, equal to the corolla. Capsule ovoid, inflated (De
al; height, a foot or more. Root fibrous. Stem angular.
scattered; segments of the calyx linear, pointed. Corolla
blue. Anthers collected into an oblong, curved body,
filaments white. Style filiform; stigma curved, and inclosed
anthers. Capsule two-celled, ten-angled, crowned with the
Seeds numerous, small, brown.
-North America, from Canada to Carolina, and the Mississippi.

dflower in July. The plant should be collected in August
ber.
ription.—The herb (herba lobelie inflata) is usually imported
country, prepared by the Shaking Quakers of New Lebanon,
aner. It has been compressed into oblong cakes, weighing
half a pound or a pound each, and enveloped in blue paper.
 Rendered herb is pale greenish-yellow; its smell is somewhat
s and irritating; its taste burning and acrid, very similar to
tobacco. Its powder is greenish.
osition.—No accurate analysis of lobelia has hitherto been
Dr. Colhoun* has announced the existence of a peculiar
of this plant. From a few experiments which I have re-
ade on lobelia, I find that it contains a volatile acid principle?
acid (peculiar?), resin, chlorophyll, gum, extractive,
ibre, and perhaps caoutchouc.
late Acid Principle (Volatile Oil of Lobelia? Lobeliania?—Water
from lobelia has the peculiar smell and the nauseous acrid taste of the
one experiment I obtained a thin film of what appeared to be a solid
The distilled water of lobelia is unaffected by acids, sesquichloride
and tincture of nutgalls.
belina (?).—The substance described by Colhoun is said to resemble the
Berzelius. It is soft, brown, and deliquescence; and has the acid taste.
It is soluble in alcohol, scarcely so in ether; with acids it forms
houn). By evaporating the tincture of lobelia, and digesting the resi-
nate hydrochloric acid, I have obtained a yellowish-brown extract (im-
chlorate of lobelina?), soluble in alcohol, insoluble or nearly so in
having an acrid taste, like that of lobelia, but stronger. Tincture of
added to the aqueous decoction of lobelia causes slight cloudiness (tan-
belina?)

Acid (Lobelia? acid).—A decoction of lobelia reddens litmus, and ben-
the addition of sesquichloride of iron, dark olive-brown; and in
a precipitate is formed (lobeliate? of iron). A solution of isinglass
obvious change in the decoction, showing the absence of tannic

* Journ. of the Philadelphia Coll. of Pharm. p. 300.
(For other chemical characteristics, see above.)

**Physiological Effects.** — An accurate account of the effects of this plant on man and animals is yet wanting. But from observations hitherto made its operation appears to be very similar to that of tobacco (see p. 1248); and from this circumstance, it has been called the *Indian Tobacco*. I have before remarked in its taste and in the sensation of acridity which it excites in the throat, it resembles common tobacco. This analogy between tobacco, henbane, and lobelia, originally noticed by the American physician, is confirmed by Dr. Elliotson.

1. On Animals generally. — Horses and cattle have been known to be killed by eating it accidentally. An extraordinary increase of saliva is said to be produced by it on cattle.

2. On Man. — a. In small doses it operates as a *diaphoretic* and *expectorant*. Mr. Andrews, who speaks from its effects on himself, says, it has "the peculiar soothing quality of exciting and cooling the nerves, without the pain of coughing."

β. In full medicinal doses (as 3 or 4 grains of the powder) it is powerful, nauseating *emetic*. Hence it has been called the "green vomit." It causes severe and speedy vomiting, attended with considerable distressing nausea, sometimes purging, copious sweating, and general relaxation. These symptoms are usually preceded by nervousness, headache, and general tremors. The Rev. Dr. M. Storer, in his account of the effects on himself, says, that taken during a paroxysm of asthma, it caused sickness and vomiting, an intense prickly sensation through the whole system, even to the tips of the fingers and toes. The urinary passage was perfectly opened, by producing a smarting sensation in passing urine, which was probably provoked by stimulus on the bladder. It is said, as in the Rev. Dr. Cutler's case, gives almost instantaneous relief.
IndiAN TOBACCO.

expiration, and universal relaxation, which result from a similar action of tobacco.

... In excessive doses, or in full doses too frequently repeated, its effects are those of a powerful acro-narcotic poison. "The melancholy consequences resulting from the use of Lobelia inflata," says Thacher, "as lately administered by the adventurous hands of noted empiric, have justly excited considerable interest, and furnished alarming examples of its deleterious properties and fatal effects. The dose in which he is said usually to prescribe it, and quently with impunity, is a common tea-spoonful of the powdered drug or leaves, and often repeated. If the medicine does not puke evacuate powerfully, it frequently destroys the patient, and sometimes in five or six hours." Its effects, according to Dr. Wood, are, extreme prostration, great anxiety and distress, and ultimately death, preceded by convulsions. He also tells us that fatal results have been experienced from its empirical use. These are more apt to occur when the poison, as is sometimes the case, is rejected by vomiting.

Uses.—Lobelia is probably applicable to all the purposes for which tobacco has been used (see p. 1251). From my own observation of its effects, its principal value is as an antispasmodic. Its use in asthma (especially the spasmodic kind) and other disorders of organs of respiration.—Given in full doses, so as to excite nausea and vomiting, at the commencement of, or shortly before, an attack of spasmodic asthma, it sometimes succeeds in cutting short the paroxysm, or in greatly mitigating its violence; at other times, however, completely fails. Occasionally it has proved serviceable in a few cases, and, by repetition, has lost its influence over the disease. To obtain the beneficial influence in asthma, it is not necessary, however, to give it in doses sufficient to excite vomiting. Dr. Elliott recommends the use of small doses at the commencement, and that these should be gradually increased, if neither headache nor vomiting occur; but immediately these symptoms come on, the use of the remedy is to be omitted. Given in this way, I can testify to good effects in spasmodic asthma. It has also been used in croup, whooping-cough, and catarrhal asthma, but with no very encouraging results.

2. In strangulated hernia, Dr. Eberle employed it effectually, instead of tobacco, in the form of enema.

3. As an emetic, it has been employed by Dr. Eberle in croup; its operation is too distressing and dangerous for ordinary use.

Administration.—It may be given in powder, infusion, or tincture (alcoholic or ethereal). Dr. Reece employed an oseum. The dose of the powder, as an emetic, is from grs. x. to grs. v.; as an expectorant, in gr. j. to grs. v. It deserves especial notice that the effects of

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* United States Dispensatory.
* Lancet, April 13, 1837, p. 144.
lobelia are very unequal on different persons, and that some are exceedingly susceptible of its influence.

1. **Tinctura Lobelliae, E.; Tincture of Lobelia.**—(Lobelia, dried and in moderately fine powder, 3v.; Proof Spirit, Oij. This tincture is best prepared by the process of percolation, as directed for the tincture of capsicum; but it may also be made in the usual way by digestion).—Dose, as an emetic and antispasmodic, from f5 to f5iij. repeated every two or three hours until vomiting occurs; as an expectorant, mx. to f5ij. For children of one or two years old, the dose is mx. to fxx.

2. **Tinctura Lobelliae Aethereae, E.; Ethereal Tincture of Lobelia.**—(Lobelia, dried, and in moderately fine powder, 3v.; Spirit of Sulphuric Ether, Oij. This tincture is best prepared by percolation, as directed for tincture of capsicum; but it may be also obtained by digestion in a well-closed vessel for seven days).—This may be used in the same doses as the alcoholic tincture.

With some persons the ether is apt to disagree, and for such the alcoholic tincture is preferred. Whillam's ethereal tincture, used by Dr. Elliotson, consisted of Lobelia, lbj.; rectified spirit, Oiv.; spirit of nitric ether, Oiv.; spirit of sulphuric ether, 3iv. Macerate in fourteen days, in a dark place.

**Other Medicinal Lobeliaceae.**

Lobeilia Siphilitica, a native of the United States, possesses emetic, cathartic and diuretic properties. It derived its name siphilitica from its supposed efficacy in syphilis, as experienced by the North American Indians, who considered it a specific in that disease, and from whom the secret of its use was purchased by Sir W. Johnson. Its antisiphilitic powers appear to have no foundation in fact. The root was the part used: it was given in the form of decoction.

**Order L.—Compositae, De Candolle.**

Syantheres. Richard; Mutisiacae, Cichoraceae, Asteraceae, and Cynaraceae, Lindl.

Essential Character.—Calyx gamosepalous; the tube adherent to the ovary; the limb generally degenerated into a pappus, or sometimes into a scale corollae, or entirely abortive. Pappus simple, pilose, ramose, or plumose; stipitate by the prolongation of the tube beyond the ovary or sessile. Corolla inserted into the upper part of the tube of the calyx, gamopetalous; the nerves of the tube being directed towards the sinuses; in appearance five, but really ten; which then proceed from the sinuses, along the margins of the lobes, to the apex, where they insinuate [neuramphipetalous]. Tube various in length; in the regular corolla, often funnel-shaped. Lobes generally five, valvate in aestivation. Corolla regular or irregular; the regular, of five equal lobes (tubular corolla); the irregular two-lipped (bilabiate corolla) or strap-shaped, five-dentate (ligulate corolla). Stamens generally five; in the female form

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* Elliotson, Lancet, June 1832, and April 15, 1837.
* Lancet, June 5, 1837.
COLTSFOOT.

Filaments adnate to the tube of the corolla; distinct monadelphous; articulated near the apex, the upper portion acting as a receptive. Anthers erect; connected in the tube, which is perforated by the slits (syngenesious or synnatherous). Pollen rough or smooth, globose or granular. Ovary adherent to the calyx, one-seeded. Style generally terete at the apex; the branches (commonly called stigmas) more or less flat above, convex beneath. Stigmatic glands (true stigmas) ranged in a single row along the margin of the branches of the style, more or less evident; the upper portion of the style, in hermaphrodite flowers, provided with hairs, which collect the pollen. Fruit consisting of an achene and calyx, siliquous, and enclosing the embryo; the achene one-celled, articulated to the receptacle, generally sessile; rostrate or not rostrate at the apex. Seed attached to the base of the fruit by a very short funiculus. Inner portion of the spermoderm (endopleurae of De Cand., albumen of Lessing) diaphanous, seed by the bifid funiculus. Embryo erect, with a short, straight, inferior samara, and an inconspicuous plumule. Florets collected into dense heads (capitules); either all hermaphrodite (homogamous) or the outer ones female or staminate, the inner being hermaphrodite or male (heterogamous); or the capitules entirely composed of florets of distinct sexes (monoecious, dioecious, heterogamous). Capitules with the florets sometimes all tubular (discoïd or flos-

TRIBE I.—EUPATORIACEÆ.

1. TUSSILAGO FARFARA, Linn. L. D.—COLTSFOOT.

Sex. Syst. Syngenesia, Polygama superfìua.

(Adapted and condensed from De Candolle.)

HISTORICAL.—This is the βόξιον of Hippocrates and Dioscorides, the Greeks and Romans it was smoked, to relieve obstinate cough (see p. 1241).

BOTANY. Gen. Char.—Head many-flowered, heterogamous; florets like ray females, in many rows, very narrowly ligulate; of the disc florets, few in number, tubular, with a campanulate five-toothed, ovate receptacle. Involutural scales in about one row, oblong, narrow. Anthers scarcely tailed. Styles of the disc inclosed, abortive of the ray bifid, with taper arms. Achene of the ray oblong, smooth; of the disc abortive. Pappus of the ray in two rows; of the disc in one row, consisting of very fine setae.

* Opera, p. 323 and 829, ed. Facc.
* Lib. iii. cap. 129.
Sp. Char.—The only species.


Hab.—Indigenous. Various parts of Europe and Asia. Flow in March and April.

Description.—The herb and flowers (herba et flores farfarae) have a bitterish mucilaginous taste. The dried leaves are odourless, but the flowers retain a slight odour. The water infusion becomes green (tannate of iron) on the addition of chloride of iron.

Composition.—No analysis of the plant has yet been made. Mucilage, bitter extractive, tannic acid, colouring matter, salts, woody fibre, are the principal constituents.

Physiological Effects.—The effects are not very obvious; they may be regarded as emollient, demulcent, and very slightly tonic.

Uses.—Employed as a popular remedy in pulmonary comp. (chronic coughs especially.)

Administration.—The decoction (prepared by boiling 3j, of the plant in Oj. of water to Oj.) may be taken in doses of 1/3 j., or ad libitum.

TRIBE II.—ASTEROIDÆ.

2. IN'ULA HELEN'IUM, Linn. L. D.—ELECAMPANE.

Secr. Syst. Syndecasis, Polygama superflua.
(Radicis, L. D.)

History.—This is the ἱλεινών of Hippocrates and of Diaries of Drides.

Botany. Gen. Char.—Head many-flowered, heterogamous; of the ray females, in one row, sometimes by abortion sterile, ligulate, rarely somewhat tubular and trifid; those of the disc maphrodite, tubular, five-toothed. Involucrus imbricated in rows. Receptacle flat or somewhat convex, naked. Anthers two setæ at the base. Achene without a beak, tapering. I. Helenium, four-cornered. Pappus uniform, in one row, composes capillary, roughish setae (De Cand.)

Sp. Char.—Stem erect. Leaves dentate, velvety-tomentose but acute; the radical ones ovate, greatly attenuated petiolate; of the stem semi-amplexicaul. Peduncles few, one-headed, setose at the apex (De Cand.)

Root perennial, thick, branching. Stem three to five feet Leaves large, serrated, veiny. Heads terminal. Flowers yellow.

Hab.—Indigenous. Various parts of Europe. Flowers in July and August.

2 Lib. i. cap. 27.
COMMCM CHAMOMILE.

DESCRIPTION.—The dried root ( radix helenii seu enule) of the plants of longitudinal or transverse slices, which are yellowish and have an aromatic or camphoraceous smell, and a warm taste. Iodine colours the root brown. Sesquichloride of iron, in the infusion, a green colour (tannate of iron).

POSITION.—The root has been analysed by John, by Funcke, and Schulz. The constituents, according to John, are—volatile e, elecampane-camphor 0.3 to 0.4, wax 0.6, acrid soft resin 1.5, triterpenic extractive 36.7, gum 4.5, inulin 36.7, woody fibre 5.5, oxidative with coagulated albumen 18.9; besides salts of lime, and magnesia.

ENMIX.—Elecampane-camphor.—Colourless, prismatic crystals, heavier than water, fusible, volatile, very soluble in ether, oil of turpentine, and boiling in alcohol.

Composition, therefore, is closely allied to that of creasote.

W.—Brown, fusible in boiling water, and soluble both in alcohol and ether; at room temperature, it has an aromatic odour. Its taste is bitter, astringent, and

IN (Alantin and Menyanthin, Trommsdorff; Elecampin, Henry; Dahlia, Payen).—An amylaceous substance, organized, according to Raschke, and common starch. It is very slightly soluble in cold water, but very soluble in boiling water, from which it is deposited as the solution cools. It is insoluble in boiling alcohol. Iodine gives it a yellow tint: this is derived from ordinary starch. Its formula is C12H10O16. In combination with water, it becomes C12H12O16.

Extraction.—In this resides the tonic property of elecampane.

PHARMACOLOGICAL EFFECTS.—An aromatic tonic. It acts as a gentle stimulant to the organs of secretion, and is termed diaphoretic, diuretic, and diaphoretic. Large doses cause nausea and vomiting. It is supposed to possess emmenagogic properties. In its action it is allied to sweet-flag (see p. 930) and senega.

It is rarely employed now by the medical practitioner. It is used in pulmonary affections (as catarrhal), attended with secretion and accumulation of mucus, but without febrile or heat of skin. In dyspepsia, attended with relaxation of the bowels, it has been administered with benefit. It has also been used in the exanthemata to promote the eruption.

Frustration.—Dose of the powder, 5 j. to 5 j. of the decoction by boiling 3 s. of the root in 8 j. of water, 3 to 5 j.

TRIBE III.—SENECIONIDEÆ

HEMIS NOBILIS, Linn., L. E. D.—COMMON CHAMOMILE.

St. Soc., Syngeania, Polygalia superbus, (Flores simplices, L.—Flowers, E.—Flowers, D.)

ETY.—The aνθημις of Dioscorides is Anthemis Chia.
BOTANY. Gen. Char. — Head many-flowered, heterogamous; flowers of the ray female, in one row, ligulate (rarely none, or somewhat tubular); of the disc hermaphrodite, tubular, five-toothed. Receptacle convex, oblong, or conical; covered with membranous pales between the flowers. Involucrè imbricated, in a few rows. Among the style without appendages at the apex. Achene tapering but subely four-cornered, striated or smooth. Pappus either wanting, a very short, entire, or halved membrane; sometimes auriculate; the inside (De Cand.)

Sp. Char. — Stem erect, simple, ramose, downy-villosu. Leaves downy, sessile, pinnatisect; segments split into many linear-setacéd lobes. Branches flowery, naked, one-headed at the apex. Scales of the involucrè obtuse, hyaline at the margin. Pales of the receptacle lanceolate, pointless, somewhat shorter than the floret, slightly crenate at the margin (De Cand.)

Roots shiny, with long fibres. Stems in a wild state prostrate, gardens more upright, a span long, hollow, round. Flowers of the disc yellow; of the ray white. Receptacle convex.

Anthemis nobilis flore pleno, De Cand. Double Chamomile. — In this variety the yellow tubular florets of the disc are entirely or partially converted into white ligulate florets.

Sir J. Smith* speaks of the discoid variety, destitute of rays, as being rare. It ought perhaps, he adds, to be preferred for medicinal use.

Hab. — Indigenous; on open gravelly pastures or commons. Perennial. Flowers from June to September. Cultivated at Mitcham and other places, for the London market.

Description. — The floral heads (flores chamaeelli romani; anthemidis nobilis) have a strong and peculiar odour, and a bit aromatic taste. When fresh, they exhibit a strong and peculiar fragrancy when rubbed. They should be dried in the shade. The single flowers (flores simplices, Ph. L.) are to be preferred, as they have the largest yellow discs, in which the volatile oil resides. The large double flowers (chamaeellum flore pleno, Lewis; chamaemeli nobili flore multiplex, C. Bankin), however, are usually the esteemed; but as their yellow discs containing the oil are smaller, scarcely any, they contain less volatile oil.

Composition. — These flowers have not yet been analyzed. The most important constituents are volatile oil, bitter extractive, maktannic acid.

1. Volatile Oil (see p. 1347).
2. Bitter Extractive. — The bitter principle of chamomiles is soluble in hot water and alcohol.
3. Tannic Acid. — The cold watery infusion of the flowers is darkend by a quichloride of iron, and forms a precipitate with gelatine.

COMMON CHAMOMILE.

althal* analyzed the dried flowers of the Common Wild Chamomile (Anthemis Chamomilla), and found them to consist of volatile oil 0°28, resin 7°89, racemose 8°57, gum 7°30, bitartrate of potash 5°31, phosphate of lime 0°97, re, soluble albumen, water, and loss 69°6.

iological Effects.—Chamomiles produce the effects of the c bitter tonics before alluded to (see p. 189): their aromatic s depend on the volatile oil, their stomachic and tonic qualities r extractive and tannic acid. In large doses they act as an

—Chamomiles are an exceedingly useful stomachic and tonic epsia, with a languid and enfeebled state of stomach and debility. As a remedy for intermittents, though they have considerable celebrity, they are inferior to many other medi-

. The oil is sometimes used to relieve flatulence, griping, and on ; and the warm infusion is employed as an emetic.

istration.—The powder is rarely employed, on account of the inconvenient bulk of the requisite quantity, and its tendency to causea.—Dose grs. x. to 3ss. or more. The infusion is the eagent preparation: this, as well as the extract and oil, are . Fomentations of Chamomile flowers consist of the infusion tion, and are used quite hot; but they present no advantage or of the same temperature. Flannel bags filled with chamowi soaked in hot water are useful topical agents for the appli- of moist warmth, on account of their retention of heat.

FUSUM ANTHEMIDIS, L. E. Infusum Chamomelli, D.; Infusion Chamomile; Chamomile Tea.—(Chamomile, 3v.; Boiling [distilled] Oj. Macerate for ten [twenty, E.] minutes [twenty hours, D.] nly-covered vessel, and strain [through linen, D.].) —It is warm, to excite gentle vomiting, or to promote the operation of tic. The cold infusion is usefully employed as a domesticic bitter and tonic in dyspepsia.—Dose of the cold infusion, [3ij.; of the warm infusion, ad libitum.

TRACTUM ANTHEMIDIS, E.; Extractum Chamomelli, D.; Ex- f Chamomile.—(Chamomile, ib.j.; boil it with a gallon of hown to four pints; filter the liquid hot; evaporate in the -bath to a due consistence, E.) —One hundred weight of the yields about forty-eight pounds of extract. The volatile oil pated during the preparation. The extract is a bitteric and tonic. It is generally used as a vehicle for the exhibiton of other tonics in the form of pills. Conjoined with the oil of snile, we can obtain from it all the effects of the recent flowers. s, grs. x. to Ej.

FUEM ANTHEMIDIS, L. E.; Oleum Chamomellorum Romani; Oleum melli; Oil of Chamomile; Oil of the Roman Chamomile. (Ob- by submitting the flowers to distillation with water).—One-
hundred weight of flowers yields from $\frac{3}{4}$ to $\frac{3}{8}$ of oil. The
the shops is frequently brought from abroad, and is probably the
duce of another plant (Matricaria Chamomilla). Oil of cham-
when first drawn is pale blue, but by exposure to light and air
comes yellow or brownish. Lewis $^3$ says it is yellow, with a
greenish or brown. Its sp. gr. is 0.9083. When fresh, its odor
strong and peculiar, and its taste pungent and nauseous. It is
plant and antispasmodic. It is a frequent addition to tonic
and cathartic pills; it communicates stimulant qualities to the food
and is believed to check the griping caused by the latter. It is
sionally exhibited in the form of elaeosaccharum.—Dose, $\frac{1}{4}$ j.

4. ANACY'CLUS PYRETHRUM, De Cand. E.—PELLITORY
SPAIN.

Anthemis Pyrethrum, L. D.
(Radix, L. D.—Root, E.)

HISTORY.—Dioscorides $^3$ was acquainted with πυρεθρον, and
of its use in toothache. The word pyrethrum is mentioned once
by Pliny $^7$.

BOTANY. Gen. Char.—Head many-flowered, heterogamous. A
of the ray female, sterile, ligulate or somewhat so, very rarely two
of the disc hermaphrodite, with five callous teeth. Receptacle egg
or convex, paleaceous. Involucr in few rows, somewhat cam-
late, shorter than the disc. All the corollas with an obcomp
two-winged, exappendiculate tube. Style of the disc, with ex-
diculate branches. Achene flat, obcompressed, bordered with
entire wings. Pappus short, irregular, tooth-letted, somewhat
uous with the wings on the inner side (De Cand.)

Sp. Char.—Stems several, procumbent, somewhat branched, j
cent. Radical leaves, expanded, petiolated, smoothish, pinnate
the segments pinnatifid, with linear subulate lobes; the caul
leave sessile. Branches one-headed. Involucral scales lance-
acuminate, brown at the margin. Receptacle convex, with o
ovariate, obtuse paleae (De Cand.)

Root fusiform, fleshy, very pungent, and when fresh, produces
sensation of extreme cold, followed by heat when handled. P
of the ray white on the upper side; purplish beneath; of the
yellow.

Hab.—Barbary, Arabia, Syria, and perhaps Candia.

DESCRIPTION.—The root (radix pyrethri) is imported from
Levant packed in bales. It consists of inodorous pieces, abo
COMMON WORMWOOD.

and thickness of the little finger, covered with a thick brown
aded with black shining points, breaking with a resinous
and presenting internally a radiated structure. When
excites a pricking sensation in the lips and tongue, and a
heat. None has been imported since 1886, when duty (6d.
was paid on 420 lbs.

POSITION. — It was analyzed by John*, by Gautier†, by
and lastly by Koene‡. Perisal obtained acrid matter (py-
insulin 25, gum 11, tannin 0·55, colouring matter 12, lignin
ide of potassium 0·79, silica 0·85, and iron a trace.

RIN; Acrid Principle: Resin.—In this resides the activity of the root.
A greater abundance in the bark than in the wood. It is brown, soft,
and acrid taste, is insoluble in water, but soluble in ether and alcohol;
so in acetic acid, and the oils (volatile and fixed). Koene says,
consists of three substances:—

Hem acrid resin, soluble in alcohol, insoluble in water or caustic potas.
acrid brown fixed oil, soluble in potash.
low acrid oil, soluble in potash.

PHYSICAL EFFECTS.—Pellitory is an energetic local irritant.
to the skin, it acts as a rubefacient.
—Scarcely ever employed internally. Its principal use is to
rincture for the relief of toothache. As a masticatory and
it is chewed in some rheumatic and neuralgic affections of
and face, and in palsy of the tongue. In relaxation of the
is occasionally employed in the form of gargle. It was for-
ployed internally as a gastric stimulant.

PRESCRIPTION.—Dose, as a masticatory, 5ss. to 5j.; Tinctura
(compounded of pyrethrum, water, of each, one part; rectified
parts) is used to relieve toothache.

EMISIA ABSINTHIIUM, L. E. D.—COMMON WORMWOOD.

Sex. Synt. Syngenesia, Polygynia supperius.

(Herb, B.—Summitates florentes, D.)

ETY. — In all probability this plant is the ἀψίνθων of Hippoc
Dioscorides. The term wormwood occurs several times
translation of the Old Testament†; but the plant meant would
both bitter and poisonous.

ETY. Gen. Char.—Heads discoidal, homogamous or heteroga-
Florets of the ray in one row, usually female and three-
with a long bifid protruding style; of the disc five-toothed,
modite, or by the absorption of the ovary, sterile or male.
Scales imbricated, dry, scarios at the edge. Receptacle

† Journ. de Pharm. iv. 49.
‡ Ibid. xii. 251.
‡ Lib. iii. cap. 26.
+ Deut. xxxix. 18; Prov. v. 4.
without paleæ, flattish or convex, naked or fringed with hair, obvate, bald, with a minute epigynous disc (De Cand.)

**Sp. Char.**—An erect undershrub. Leaves silky, hoary, tritsect; the segments lanceolate, somewhat dentate, obtuse. The small, racemose-paniculate, globose, nodding. Exterior of the involucræ somewhat silky, linear, lax; interior ones rounder, somewhat naked (De Cand.)

_Herb_ covered with silky hoariness, intensely bitter, with a peculiar odour. _Stems_ numerous, about a foot high. _Leaves_ greener on the upper side; lower ones on long footstalks; all shorter, broader, somewhat winged ones. _Florets_ pale or buff.

**Hab.**—Indigenous; in waste grounds. Perennial. _Flowers_ August.

**Description.**—The dried herb with the flowers, or the top (seu _summitates absinthii_), have a whitish-grey appearance, a strong aromatic and somewhat unpleasant odour, and an exuberant bitter aromatic taste. The cold watery infusion becomes olive-green, and turbid (tannate of iron) on the addition of chloride of iron.

**Composition.**—This plant has been analyzed by Kunzer by Bracconot⁹, and by Haynes⁴. The extract was examined by Leonardi⁵. Bracconot found _volatile oil_ 0.15, _green resin_ 0.02, _bitter resin_ 0.233, _albumen_ 1.250, _starch_ 0.133, _azoited having little taste_ 1.333, _bitter azoited matter_ 3.0, _wood 10.833_, _absinthe of potash_ 0.917, _nitrate of potash_ 0.333, _of potash and chloride of potassium traces_, water 61.2.

1. **Volatil Oil (Oleum Absinthii).**—Green, sometimes yellow or brown; having a strong odour of wormwood, and an acid, bitter, peculiar taste. _sp. gr._ is 0.972. Nitric acid colours it green, then blue, afterwards brown.

2. **Bitter Principle (Absinthin).**—Caventour⁶ obtained what he calls the _bitter principle_ by precipitating an infusion of wormwood by acetate of lead, separating the excess of lead by sulphuretted hydrogen. The liquor was evaporated to dryness, and the extract digested in alcohol mixed with and the solution abandoned to spontaneous evaporation. The product was a very bitter matter, in brown ramifications. By heat no crystalline salt could be obtained.

3. **Absinthisc Acid.**—May be precipitated, according to Bracconot, from a watery infusion of wormwood by acetate of lead. It is very acid, unecrable, and deliquescent. It does not precipitate the solutions of the nitre, lead, mercury, and silver; but causes flocculent precipitates when dropped on barites or lime-water. _Absinthise of ammonia_ crystallizes in quadrangular prisms, insoluble in alcohol.

4. **Salt of Wormwood (Sal Absinthii).**—This is impure carbonate of potash obtained by incinerating wormwood.

**Physiological Effects.**—In moderate doses it produces the customary effects of the _aromatic bitter tonics_ (see p. 189). Its bitter

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⁹ Bull. de Pharm. r. 569.
⁹ Guigné, _Handb. d. Pharm._ ii. 1500.
⁴ Journ. de Pharm. xiv. 620.
Moxa-Weed.

Moxa becomes absorbed; hence the flesh and milk of animals fed on it are rendered bitter. Borrich \(^6\) says that the milk rendered bitter by it proves noxious to the infant.

Large doses irritate the stomach and excite the vascular system. A specific influence over the nervous system, characterized by headache, giddiness, &c. has been ascribed to it \(^5\). This has usually been supposed to depend on the volatile oil; but a similar power has been ascribed to the bitter principle.

Uses.—Wormwood is but little employed in medicine. It is used for dyspepsia occurring in debilitated and torpid constitutions. It was at one time celebrated for the cure of intermittents; it has been superseded by other and more powerful febrifuges. It is said to be efficacious as an anthelmintic, but is very rarely employed as such.

Administration.—Dose of the powder, 3 dj. to 5 j.; of the infusion prepared by macerating 5 j. of the dried herb in 10 j. of boiling water, to 10 dj.

Extractum Artemisae Absinthii, D. Extract of Common Wormwood.—(Prepared in the usual way from the tops of wormwood, by distillation.)—It possesses the bitterness of the plant, but is devoid of the odor, flavour, and aromatic qualities dependent on the volatile oil. It is stomachic and tonic.—Dose, gr. x. to 3 j.

6. Artemisia Moxa, de Cand.—Moxa-Weed.


Folia; Moxa.

History.—The moxa is a small mass (usually cylindrical or pyramidal) of combustible vegetable matter, employed for effecting cauterization (moxablation of Percy \(^*\)). It has long been known that Chinese and Japanese prepared it from a species of Artemisia. \(^9\)

Dublin College has adopted A. chinensis and A. indica as yielding. But Dr. Lindley \(^1\) says it is from the A. Moxa, De Cand., and from A. chinensis, that it is prepared; and Dr. Roxburgh \(^3\) observes, that the A. indica has none of the soft white down on the underside of its leaves, of which moxa is made in Japan and China.


tab.—China.

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\(^1\) see Lindley, in Murray, App. Med.; and Kraus, Heilmittel, p. 422.


\(^3\) Loureiro, Fl. Cochinchinensis. ii. 492; Thunberg, Voyages au Japon, &c. iv. 74.

\(^4\) Fl. Med. 483.

\(^5\) Fl. Ind. iii. 429.
PREPARATION.—The Chinese and Japanese moxa is said by some to be prepared from the cottony or woolly covering of the leaves of Artemisia. Thunberg, however, states, that in Japan the dried leaves are beat till they become like tow: this substance is then rubbed betwixt the hands till the harder fibres and membranes are separated, and there remains nothing but a fine cotton.

European moxas are usually made either with cotton-wool [or has been soaked in a solution of nitrate or chlorate of potash] of the pith of the sun-flower (Helianthus annuus), which contains nitrate of potash. Their shape is either cylindrical or conical: size is variable. Percy's moxas, prepared by Robinet, are used and found in the London shops. They consist of pith, rolled in cotton and enveloped in muslin.

PHYSIOLOGICAL EFFECTS.—These are two-fold, primary and secondary.

1. Primary Effects.—The moxa first excites an agreeable sensation of heat. This is speedily followed by pain, which progressively increases until it becomes most severe, and the vitality of the part is destroyed. The parts immediately around the eschar are irritated. The eschar may be deep or superficial, according to the pressure of the moxa is kept in contact with the skin. The action of the heat differs from that of the metallic actual cautery in this important particular, that the heat acts slowly, increases gradually, and penetrates to a greater depth.

2. Secondary Effects.—These consist in the production of inflammation, by which the eschar is separated, and establishes suppuration more or less profound, according to circumstances.

USES.—Moxa is employed in the treatment of diseases, on the principle of counter-irritation, before explained (p. 145). Indeed, has been denied by those who consider the production of discharge as the only mode of effecting counter-irritation.

Moxa is adapted for chronic diseases and maladies characterized by lesions of sensation or motion. It is, on the other hand, injurious in all acute inflammatory diseases.

The following is a list of the principal diseases against which moxa has been employed; and for further information respecting them I must refer the reader to the writings of Larrey, Boyle, Wallace, as the limits and objects of this work do not admit of further details.

1. Paralysis of the sentient or motor nerves.—Great benefit has been obtained by the use of moxa in this class of diseases. Anaesthesia, deafness, loss of voice and speech, hemiplegia, and especially aphasia, have been relieved by it.

2. Painful affections of nerves, muscles, or the fibrous tissues; neuralgia, sciatica, lumbago, and chronic rheumatism.

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2 See Boyle, Treat. on Moxa, p. 88, 1823.
4 Op. supra cit.
5 Physiol. Enq. resp. Moxa, 1821.
COMMON TANSY.

3. Spasmodic diseases, either of particular parts, or of the general system; as spasmodic asthma, epilepsy, &c.

4. Diseased joints and spinal maladies; as chronic articular inflammation, white swelling, stiff joints, hip-joint disease, curvature of the spine, &c.

5. Visceral diseases; as organic diseases of the brain, phthisis laminalis, chronic hepatitis and splenitis, &c.

APPLICATION.—In the employment of moxa, two points deserve special attention: first, the parts proper or otherwise for its use; and secondly, the mode of applying it.

1. Parts proper or improper for its application.—The moxa has been applied to nearly every part of the body. Larrey, however, considers the following parts improper for its application:

1. All that part of the skull covered by skin and pericranium only.
2. The eyelids, nose, ears, larynx, trachea, sternum, glandular parts of the lungs, linea alba, and parts of generation.
3. Over the course of superficial tendons, articular prominences, where there is danger of injuring the articular capsules, and projecting points of bone.

2. Mode of application.—The moxa is to be set on fire at the summit, and its base is then applied (by a porte-moxa, pair of forceps, or other convenient instrument) to the skin. To prevent the surrounding parts being burnt by sparks, Larrey recommends them to be previously covered with a wet rag, perforated in the centre, to admit the base of the moxa. If the combustion flag, it may be kept up by the breath, blow-pipe, or bellows. After the combustion is over, Larrey recommends the immediate application of liquor ammoniae, to repress excessive inflammation and suppuration.

7. Tanacetum vulgare, Linn. D.—COMMON TANSY.

Sex. Syt. Syngenesia, Polygamia superflua.
(Folia, D.)

HISTORY.—Tansy was ordered to be cultivated in gardens by Paracelsus.

BOTANY. Gen. Char.—Heads either homogamous or heterogamous; usually, florets of the ray female, in one row, usually three- to four-toothed. Receptacle naked, convex. Involucre campanulate, imbricated. Corollas of the disc four- to five-toothed. Achene sessile, angular, smooth, with a large epigynous disc. Pappus either none, or membranous, coronet-shaped, minute; either entire or equally lobed, or somewhat unequal, being more evident on the external side (De Cand.)

Sp. Char.—Stem herbaceous, erect, smooth. Leaves smoothish, pinnatifid, the rachis and lobes inciso-serrate. Corymbus many-headed. Internal scales of the involucre obtuse, scariose at the apex. Pappus short, equal, five-lobed (De Cand.)
**ELEMENTS OF MATERIA MEDICA.**

Root moderately creeping. Stems 1/2 to 2 feet high. Leaves green. Florets golden yellow; the marginal ones often wanting. There are three varieties of it,—the common, the curled (generally ferred), and the variegated (chiefly for ornament).

**Hab.**—Indigenous; hilly pastures, hedges, road-sides. Cultivated in gardens as a medicinal or pot-herb, or for ornament.

**Description.**—The herb and flowers (herba et flores Tanacetii) have an disagreeable, aromatic odour, and a nauseous, strong, acrid, bitter taste. The infusion is rendered dark green and turbid (taste of iron) by sesquichloride of iron.

**Composition.**—Both leaves and flowers have been analyzed by Fromherz and by Peschier. The constituents of the leaves according to Peschier, are volatile oil, fatty oil, wax or stearine, chrysophyllum, bitter resin, yellow colouring matter, tannin with gallic acid, bitter extractive, gum, woody fibre, tanacetic acid.

1. **Volatile Oil. (Oleum Tanacetii).**—Yellow, sometimes green. Has a peculiar odour of the plant; and a warm, bitter taste. Its sp. gr. is 0.932.

2. **Bitter Matter.**—This is the substance usually denominated extractive, but, according to Peschier, it is in part resin.

3. **Tanacetic Acid.**—Crystallizable. Precipitates lime, barya, and as lead. With a solution of acetate of copper it causes a precipitate.

**Physiological Effects.**—Tansy produces the usual effects of aromatic bitter tonics (see p. 181). “A fatal case of poisoning occurred last year in half an ounce of oil of tansy is recorded in the Medical Magazine (1834). Frequent and violent clonic spasms were experienced with much disturbance of respiration; and the action of the heart gradually became weaker till death took place from its entire suspension. No inflammation of the stomach or bowels was detected upon dissection.”

**Uses.**—The young leaves are occasionally employed by the country people as an herb to give colour and flavour to puddings, and in omelettes and other dishes. In medicine the plant is rarely employed by the regular practitioners, but it has been recommended in dyspepsia, intermittent fever, and gout. Its principal use, however, is as a vermifuge.

**Administration.**—**Tansy tea** (prepared by adding 3/4 of the oil to boiling water) may be taken in doses of from 3/4 to 1/2 an ounce, and two or three drops of the oil may be added to vermifuge powders and syrup. The seeds have been used instead of semina santonici.

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8. **Arnica Montana, Linn. D.—Mountain Arnica.**

Sez. Syst. Syngenesia, Polygamia superflua.

(Flowers, Foliis, et Radix, D.)

**History.**—This plant does not appear to have been known to the ancients; at least no undoubted mention of it occurs in their writings.

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3. Culpen, New Med. 11.
BOTANY. Gen. Char.—Head many-flowered, heterogamous. Florets the ray in one row, female, ligulate; of the disc, hermaphrodite, clar, five-toothed. Involucrè campanulate, in two rows, with ar-lanceolate equal scales. Receptacle fringed, hairy. Tube of corolla shaggy. Rudiments of sterile stamens sometimes remaining in the ligule. Style of the disc with long arms, covered by downing a long way down, and truncated or terminated by a short. Achene somewhat cylindrical, tapering to each end, somewhat ed and hairy. Pappus in one row, composed of close, rigid, hair (De Cand.)

Char.—Radical leaves obovate, entire, five-rowed; the cauline in one or two pairs. Stem one- to three-headed. Involucres, with glands (De Cand.)

Stem hairy, about one foot high. Florets yellow, ed with brown.

ab.—Meadows of the cooler parts of Europe, from the sea-shore to the limits of eternal snow.

Description.—The root (radix arnicæ) consists of a cylindrical lex, from two to three inches long, and two or three lines thick, which many fibres arise. It is brown externally, has a digestive yet aromatic odour, and an acrid nauseous taste. The dried fibres (flores arnicæ) are yellowish, and have a similar taste and ill to the root. The leaves (folia arnicæ) have a like smell.

Composition.—Pfaff found in the root volatile oil 1.5, acrid a 5.0, extractive 32.0, gum 9.0, and woody fibre 5.5. The root also been examined by Weisseneburger. Chevalier and Lassagne analysed the flowers, and found in them resin, bitter acrid ter (cytisin), yellow colouring matter, gum, albumen, and gallic t. In the ashes were salts of potash, and lime, and silica. Dr. T. Thomson is of opinion that the igasurate of strychnia (or cia) exists in the plant.

Volatile Oil.—The oil obtained from the root, by Pfaff, was yellowish, ter than water, and had a burning aromatic taste. The volatile oil of the trees is blue.

Resin (Arnicin).—The acridity of the root and flowers resides, according to if, in the resin, which is soluble in alcohol.

Extractive Matter. — According to Chevalier and Lassagne, this is acous, acrid, bitter, and soluble in both water and spirit. They consider it analogous to cytisin.

Physiological Effects. a. On Animals.—The effects of the others of Arnicia on horses have been examined by Viborg. An infusion of six drachms of the flowers quickened the pulse, and acted a diuretic. An infusion, thrown into the veins, caused insensibility.

b. On Man.—Jörg and his pupils have submitted themselves to the influence of this plant. From their observations, as well as from the

* Journ. de Pharm. t. v. p. 248.
* Ibid. S. 228.
testimony of others, Arnica appears to possess acrid properties. When swallowed it causes burning in the throat, nausea, and gastric pains, and loss of appetite. The active principle is absorbed, quickens the pulse and respiration, and promotes diuresis and diuresis. Furthermore, it appears to exert a specific influence over the nervous system, causing headache, giddiness, disturbed sleep. Sundelin considers it to be closely allied in action to senega, from which, he says, it differs in its stimulating influence over the nervous system, and in its causing constipation.

Use.—Arnica is indicated in diseases characterized by dyspepsia, torpor, and inactivity. It is administered as a stimulant to the general system in various debilitated conditions, and in fevers; to the nervous system in deficient sensibility, as amnesia to the muscular system, in paralysis; to the vascular system, secreting organs when the action of those is languid, and requires an increased energy, as in some forms of dropsy, chills, amenorrhœa, asthenic inflammation, &c. Furthermore, it has also employed empirically, as in diarrhoea, dysentery, &c., and rarely employed in this country.

Administration.—Dose of the powder grs. v. to grs. x.; infusion (prepared by macerating 3 ss. in Oj. of water), from f3fj.

OTHER OFFICINAL SENECIONIDÆ.

1. Wormseed.—The substance kept in the shops under the name of B (semen santonicum, semen cina, semen contras, semen semenita, &c.), is erroneously declared by the Dublin College to be the seeds (semina) of Artemisia Scop. A very superficial examination shows that the substance sold under the name consists, not of seeds, but of broken peduncles, mixed with the calyx and buds. Furthermore, the plant which Dr. Woodville has denominated Santonine is said by De Candolle to be A. maritima, var. B. suaveolens. As it describes three kinds of wormseed; but I am acquainted with one kind which is imported from the Levant (semen cina levanticum). It has been used by both Trommsdorff and Wackenroder, and found to contain volatile and oleoresin. A crystalline substance called santonine (C10 H6 O2) has been isolated from it. It is used as a vermifuge, in doses of from gr. x. to 5ss., repeated morning, and succeeded by a brisk purge.

2. Artemisia vulgaris or Mugwort has been used in epilepsy, infantile convulsion, chorea, hysteria, and amenorrhœa. Judging, however, from its volatile qualities, it can possess but little virtue. Its powder, infusion, and decocto, have been administered.

3. Guizotia oleifera, De Cand.; Verbesina salicina, Roxburgh; Joleifera, Royle. The fruit of this plant is "called by the Canarese Nuts Yell in Dukhanie, Ram Tilla." They are smooth, nearly four-sided, with the
COMMON BURDOCK.

1857

did and tapering to the base. By expression they yield an oil which is much
for dressing food in Mysore, and as a common lamp oil.1

It says that the grains of this plant are extensively imported into France
Calcuta, under the name teel or till, on account of the oil which they yield.
Seeds imported into England under the name of teel seeds are the produce
orientale (Nat. Ord. Pedaliaceae, Sex. Syst. Didynamia Angiospermia),
ve of India, whose seeds, used in Eastern countries for dictical purposes,
abundant fixed oil (Gingili oil), which has been sometimes substituted in
oil for almond oil. Two kinds of sesamum seeds are known,—one brown
and the other pale (whitish or yellowish). The first is produced by a
of Sesamum called kala til, the second by another variety termed sudded tilb.

Seneio Jacobi or Common Ragwort is a bitter aromatic indigenous plant,
ly in repute for various diseasescc. It has recently been recommended, on
ient evidence as I believe, as a remedy for gonorrhoea.

TRIBE IV.—CYNAREE.

AP'PA MINOR, De Cand.—COMMON BURDOCK OR CLOT-BUR.


turnum Lampe, D.

Sex. Syst. Syngenesia, Polyantha equalis.

(Semina et Radix, D.)

story.—This, according to Sprengel, is the drapion of Theon,
the driesios of Dioscorides.

bany. Gen. Char.—Head homogamous, many-flowered and equal-
red. Involucrimum globose; the scales coriaceous, imbricated,
pressed at the base, then subulate, with a horny, hooked, indi-
point. Receptacle rather leathery, flat, with stiff subulate fringes.
bas five-cleft, regular, with a ten-nerved tube. Stamina without
ose filaments; the anthers terminated by filiform appendages,
with subulate tails at the base. Stigmas free at the apex, diver-
curved outwards. Fruit oblong, laterally compressed, smooth,
versely wrinkled; the areola at their base scarcely oblique. Pappus,
in many rows; the hairs deciduous, filiform, not collected
ring (De Cand.)

Char.—Involucrimum smooth; the scales serrulate beyond the mid-
smooth at the base only; the inner ones few, not radiating. Heads
what racemose (De Cand.)

not tapering, fleshy. Stem erect, three feet or more high. Leaves
ed, cordate; the radical ones very large, and often slightly
ed. Flores purple.

w.—Indigenous; waste places and way-sides; common. Flowers
ly and August.

PHYSIOLOGICAL EFFECTS.—The root and leaves have been con-
posed to possess mild resolvent, diaphoretic, and diuretic proper-
Lieutaud says, the root promotes the lochial discharge. The
are diuretic, and, according to Linnæus, purgative.

1 Heyne, Trecs on India, p. 49.
2 Jour. de Pharmacie, xxiii. 349.
3 Boyle, Illustrations of the Botany of the Himalayan Mountains, p. 294.
8 Ibid. iv. 107.
11 Mat. Med.
Uses.—The root, leaves, and seeds, have been employed as diuretics and resolvents in gouty, rheumatic, calculous, and other complaints.

Administration.—The decoction of the root (prepared by boiling 3 jij. of the recent root in Oij. of water down to Oij.) may be taken in the extent of a pint daily. The dose of the seeds is 5 jij.

10. **Cnicus Benedictus**, Linn. D.—**Blessed Thistle**

Centauræ's benedictæ, Linn.

(Folia, D.)

History.—Sprengel* thinks that this plant is, perhaps, the same as the plant of Theophrastus

Botany. Gen. Char.—**Involucre ovate**; the scales close-packed, coriaceous, extended into a long, hard, spinous, pinnate appressed, and the lateral spines conical and distant. **Corollas** of the ray slender, almost as long as the disc. **Fruit** longitudinally and axially striated, smooth; with a broad, lateral areola. **Pappus** as it were, the outer being the horny, very short, crenated margin of the fruit; the intermediate consisting of ten long stiff setae; the inner of ten short setae; all the setae alternating with each other (De Cand.)

Sp. Char.—The only species.

An annual, branched, woolly herb. **Leaves** amplexicaul, somewhat decurrent, nearly entire or deeply pinnatifid. **Heads** terminated by a teat. **Florets** yellow.

Hab.—South of Europe, the Levant, Persia; introduced into this country.

Composition.—The herb was analyzed by Soltmann,* a German, and leaves by Morin.* The latter found volatile oil, bitter principle, chlorophyl, fixed oil, uncrystallizable sugar, gum, albumen, and ashes, among which the shortest was lime, several mineral salts, some metallic oxides, and the whole was composed of sulphur.

1. Bitter Principle (Cnicin).—A brown, bitter substance, soluble in ether, and boiling water; insoluble in fixed oils. Its aqueous solution precipitates on the addition of diacetate of lead. It gives no trace of phosphorus when decomposed by heat.

2. Resin.—Brownish, insipid, inodorous; very soluble in alcohol and ether, but is insoluble in water.

Physiological Effects.—The herb is tonic and mildly diuretic; its decoction causes vomiting. The seeds are diaphoretic.

Uses.—The cold infusion is employed as a tonic in debilitated conditions of the stomach. Taken warm in bed, the infusion has been given as a sudorific in various chronic diseases. The decoction has been employed to promote the operation of emetics.

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* Hist. Rei Herb. i. 102.
* Hist. Plant. vi. 4.
* Pfläff, Mat. Med. vi. 171.
* Lewis, Mat. Méd.
 Administration.—The infusion (prepared by digesting 3 ss. of the
aves in 0. j. of water) is given in doses of from faj. to 3ij., as a tonic.
be decoction (made with double or treble the quantity of leaves) is
ed in the same dose.

 **OTHER OFFICINAL CYNAREÆ.**

The flowers of the *Carthamus tinctorius* are im-
ported, for the use of dyers, in flaky masses, from the
East Indies and other places, under the name of Saf-
flower, or *Bastard Saffron*. They contain two colouring
matters—one yellow, soluble in water, the other red
(carthamin or *carthamic acid*), soluble in alkaline solu-
tions. Safflower is used to adulterate *hay-saffron*, and
in the manufacture of *cake-saffron* (see p. 1006). The
mode of detecting the fraud has been already pointed
out.

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**Tribe V.—CICHORACEÆ.**

1. *TARAXACUM DENS LEONIS*, Deff. E.—COMMON DANDELION.

*Leonopterus* *Tarax* *acum*, *Linn*. *L.D.*

*Sex. Ssp.* Syngenisia, Polygama aquiliis.

(Radix, L.—Root, E.—Herba et Radix, D.)

**History.**—As this plant is a native of Greece, it must have been
brought to the ancients. Sprengel thinks that it is *Δαδυεν* of Theo-
Drastus.*

**Botany. Gen. Char.**—*Head* many-flowered. *Involucrum* double; *ex-
ternal* scales small, closely pressed, spreading, or reflexed; *internal*
set in one row, erect; all frequently callous-horned at the apex.

**Aepacte** naked. *Achenes* oblong, striated, muricate near the small
*Pappus* spinellose at the apex, terminating in a long beak. *Pappose*
many, in many rows, very white (De Cand.)

**Sp. Char.**—Quite smooth. *Leaves* unequally and acutely runcinate;
leaves triangular, toothed inwardly. *Scales of the involucre* horned,
the external ones reflexed. *Achenes* muricate at the apex
(De Cand.)

**Root** perennial. *Leaves* numerous, bright shining green. *Scapes*
se or more, erect, brittle. *Heads* expanded in the morning and in
weather only. *Florets* golden yellow.

**Hab.**—Indigenous; meadows and pastures every where. Flowers
the summer.

* See *Prod. Pl. Greece*, ii. 129.
* Hist. Rei Herb. i. 100.
* Hist. Plant. viii. 81.
DESCRIPTION.—The fresh root (radix taraxaci) is tap-rooted, branched, fleshy, abounding in milky juice. Externally it is yellow or brownish, internally white. It is without odour; taste is bitter (especially in the summer). If dug up in the fall, the root loses on drying 75 per cent. of water. The cold water solution of the dried root deposits a dirty-gray flocculent precipitate on the addition of sesquichloride of iron.

COMPOSITION.—The milky juice of the root has been analysed by John*; who found in it caoutchouc, bitter matter, traces of resin, and gum, free acid, phosphates, sulphates, and hydrochloric acid, potash and lime, and water. The root also contains 12 per cent. of inulin. Mr. Squire† says, the expressed juice contains gum, a gluten, an odorous principle, extractive, and a peculiar crystal, a bitter principle, soluble in alcohol and water.

The root washed, crushed, and pressed, yields about half its weight of juice. Except in the months of April and May, when it is very aqueous, this juice coagulates, and becomes of a fawn-colour. The quantity of juice obtained from the juice varies at different seasons*.

<table>
<thead>
<tr>
<th>Juice Yield</th>
<th>In January and February</th>
<th>4 to 5 lbs.</th>
<th>In March</th>
<th>6 to 7 lbs.</th>
<th>In April and May</th>
<th>8 to 9 lbs.</th>
<th>In June, July, and August</th>
<th>6 to 7 lbs.</th>
<th>In September and October</th>
<th>4 to 5 lbs.</th>
<th>In November and December</th>
<th>4 lbs.</th>
</tr>
</thead>
</table>

It is obvious, then, that the expressed juice is richest in solid constituent in the months of November and December. It is remarkable, however, that this juice possesses the greatest bitterness in the summer months; while in spring, and late in the autumn, it has a remarkably sweet taste*. Squire considers this change to be effected by the frost.

PHYSIOLOGICAL EFFECTS.—Its obvious effects are those of a stimulant, and tonic. In large doses it acts as a mild aperient; its diuretic operation is less obvious and constant. In various chronic diseases its continued use is attended with alterative and reducing effects. But where the digestive organs are weak, and readily deranged, taraxacum is very apt to occasion dyspepsia, flatulence, and diarrhoea.

USES.—It is employed as a resolvent, aperient, and tonic, in chronic diseases of the digestive organs, especially hepatic affection, jaundice, chronic inflammation, or enlargement of the liver, depending on hepatic obstruction, and dyspepsia, attended with deficient biliary secretion. In some very susceptible conditions of the stomach, it proves injurious. It has been employed in affecting the spleen, chronic cutaneous diseases, uterine obstructions, &c.

ADMINISTRATION.—It is employed in the form of either decoction or extract.

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‡ Squire, op. cit.
§ Geiger, Hand. d. Pharm.
GARDEN LETTUCE.

POCKET TARAXACI, E. D.; Decoction of Dandelion.—Tarax-kerb and root, fresh, 3vij. [3iv. D.]; Water, Oij. [wine measure, oil together down to a pint, and strain].—Aperient and tonic. f3ij. to f3ij. To increase its aperient property, a saline pur- may be conjoined.

TRACTUM TARAXACI, L. E. D.; Extract of Dandelion. — Root of Taraxacum, bruised, lb. ijss. [lb. j. E.]; Boiling Dis- tater, Cong. ij. [Cong. j. E.]. Macerate for twenty-four hours, il down to a gallon, and strain the liquor while hot; lastly, te to a proper consistence, L.—"Proceed as for the prepara-extract of poppyheads," E.—The Dublin College employed erb and root).—Extract of taraxacum should be brown, not r its taste is bitter and aromatic: that of the shops is more or less sweet. It should be completely soluble in -Dose, grs. x. to 3ss.

ACTU'CA SATIVA, Linn. L. E. D.—THE GARDEN LETTUCE.

Sex. Syst. Syngenesia, Polygamia aequalis.

cus spissatus, L.—Inspissated juice of L. virosa and L. sativa, E.—Herba, D.)

ORY.—The Spioč, or Lettuce, was well known to the ancient and Romans. It is mentioned by Hippocrates both as an and medicine. "The sedative powers of Lactuca sativa, or 9 were known," observes Dr. Paris, in "the earliest times; he fables of antiquity, we read that, after the death of Adonis, threw herself on a bed of lettuces, to lull her grief, and re- er desires."

NY. Gen. Char.—Heads many- or few-flowered. Involuc- ical, calycate-imbricate, in two or four rows; outer rows Receptacle naked. Achene plane, obcompressed, wingless, y terminating in a filiform beak (De Cand.)

Char.—Leaves not concave, erect, oblong, narrowed at the base, at the keel. Stem elongated, leafy (De Cand.)

al. Stem erect, simple below, branched above, one or two th, smooth. Leaves rounded or ovate, semi-amplexicaul, fre- wrinkled, usually pale-green; varying much in the different s. Flowers yellow.

oudon enumerates no less than fourteen varieties cultivated by gar- or the table. Seven of these are Cabbage Lettuces (Lactuca capitata), and are Cos Lettuces (Lactuca romana).

—Native country unknown: perhaps the East Indies. Ex- y cultivated in Europe.

* De dieta, ii. p. 339; and De Morb. Mul. i. 629 and 637.
Pharmac. vol. i. p. 13, 6th ed.
Encycl. of Gardening, p. 355.
Preparation of Lactucarium.—Before the flower-stem shoots up, the plant abounds with a cooling, bland, pellucid juice; afterwards it contains an intensely bitter, milky juice, which resides in the root, cortical portion of the stem and of the branches, and in the involucrum. When incisions are made in the flowering-stem, the milky juice exudes. When collected and dried it constitutes lactucarium or lettuce opium. It is (or was) prepared on a large scale by Mr. Young, of Edinburgh.

Properties.—Lettuce opium (Thidace seu Lactucarium), as found in commerce, occurs in roundish hard masses, of a brown color, with an opiate smell and a bitter taste. That made in Edinburgh from L. sativa occurs in large oval lumps as big as the fist.

The term lactucarium has been applied indiscriminately to various and different preparations of L. sativa and virosa; viz. to the substance above described, to the ininspissated expressed juice, and to extracts (watery and alcoholic) obtained from the lettuces. But the only preparation that I am practically acquainted with, and which I have found in commerce, is the one described in the text.

Composition.—Lactucarium has been analyzed by Klink, Schrader, Peschier, Peretti, and by Buchner.

<table>
<thead>
<tr>
<th></th>
<th>Klink's Analysis</th>
<th>Buchner's Analysis</th>
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<tbody>
<tr>
<td>Bitter extractive</td>
<td>53%</td>
<td>Odorous matter</td>
</tr>
<tr>
<td>Wax</td>
<td>10%</td>
<td>Undetermined</td>
</tr>
<tr>
<td>Resin</td>
<td>6%</td>
<td>Lactucin, with colouring matter</td>
</tr>
<tr>
<td>Caoutchouc</td>
<td>17%</td>
<td>Gummy extractive</td>
</tr>
<tr>
<td>Water</td>
<td>13%</td>
<td>Soft Resin, with waxy matter</td>
</tr>
<tr>
<td></td>
<td>105.9</td>
<td>Waxy matter (myrcin)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gluten or albumen</td>
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1. Odorous Matter.—The nature of this substance has not been determined; it is probably similar to that of the odorous principle of opium. When lactucarium is submitted to distillation with water, the odorous principle passes off with the latter.

2. Bitter Principle: Lactucin.—A saffron-yellow, almost odourless, very bitter, combustible substance. It is very slightly soluble in cold water, readily soluble in alcohol, less so in ether. Infusion of nutgalls renders a solution of it in very dilute spirit, turbid.

3. Empyreumatic Oil of Lettuce.—Dr. Morries says, the empyreumatic oil of lettuce differs from that of opium only in being more fusible.

A strong though unfounded suspicion appears to have been entertained, that morphia was contained in lactucarium. But in none of the before-quoted analyses was it to be found; neither was Caventou able to detect an atom of either morphia or narcotin in lactucarium.

Characteristics.—The cold aqueous decoction of lactucarium becomes, on the addition of sesquichloride of iron, olive-brown [see next page for further content].

2 Duncan's Edinb. Dispens.
5 Bulke, Pruss. Pharm. ib. p. 623.
6 Pfaff, Central Blatt für 1831, S. 457.
7 Ibid. für 1833, p. 37.
9 Journ. de Chim. Méd. i. 300.
GARDEN LETTUCE.

Tincture of nutgalls renders the decoction slightly acid. Heated with lactucarium, colourless nitric acid acquires an age-yellow tint, and evolves binoxide of nitrogen. The alcoholic tincture of lactucarium becomes slightly turbid on the addition of water.

Physiological Effects.—Lettuce leaves, eaten as a salad, are easily digested, but they yield only a small portion of nutritive matter. They probably possess, in a very mild degree, soporific properties. The ancients considered them anti-aphrodisiac.

Lactucarium possesses anodyne and sedative qualities: but its virtues have, I suspect, been over-rated. Ganzeil states, that ten drops introduced into the cellular tissue of a dog’s leg, caused deep sleep, with occasional convulsions, but no dilatation of the pupil. Meeus, who made a considerable number of trials of it, observes that it contains neither a narcotic nor an intoxicating principle; but that it allays pain, diminishes the rapidity of the circulation, and, in consequence, reduces the animal heat, and places the patient in a condition more favourable to sleep. Its modus operandi is different from that of opium; for the latter substance accelerates the pulse, produces either delirium or stupor. It is more allied to hyoscyamus, from which, according to Fisher, it is distinguished by its power of directly diminishing sensibility, being preceded by irritation of the nervous system. A more extended experience of the use of lactucarium, however, is requisite to enable us to form accurate conceptions as to the precise nature and degree of its powers.

Uses.—Lettuce leaves are employed at the table as a salad. As they appear to possess slight hypnotic properties, they may be taken with advantage at supper, to promote sleep. Galen, who in his old age was troubled with watchfulness, was relieved by the use of lettuce leaves. On the other hand, prudence points out the propriety of abstaining from the use of this plant, if there be any tendency to opherty.

Lactucarium is employed as an anodyne, hypnotic, antispasmodic, and sedative, where opium is considered objectionable, either from similarities on the part of the patient or from the nature of the case. Thus it may be used where there is morbid excitement of the nervous system, in which condition opium is usually contra-indicated. But though it is free from several of the inconveniences which attend the use of opium, yet it is much less certain in its operation. It may be given with advantage to allay cough in phthisis and other pulmonary affections; to relieve nervous irritation and watchfulness; in febrile disorders in which opium is not admissible.

De aliment facult. lib. ii. cap. 40.
Duncan, Observe, on Puls. Compress. 1813.
nervous disorders. Vering* found it especially useful in spasms of the uterus; and Angelot gave it to repress seminal discharges.

**Administration.**—The usual dose is from grs. iij. to grs. v., it has been given in very much larger quantities. According to Trousseau and Pidoux*, four drachms have been taken during one day.

1. **Tinctura Lactucarii, E.; Tincture of Lactucarium.**—Lactucarium, in fine powder, 3iv.; Proof Spirit, Oij. This tincture is prepared by percolation, as directed for tincture of myrrh; but also be prepared by digestion with coarse powder of lactucarium. Each f3j. of this tincture contains grs. vi. of lactucarium, from mxx. to f3j.

2. **Trochisci Lactucarii, E.; Lozenges of Lactucarium.**—Prepared with lactucarium in the same proportion and in the same manner as the Opium Lozenge. Each lozenge weighs ten grains and contains nearly one-sixth of a grain of lactucarium.

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13. **Lactuca Virosa, Linn. E. D.**—**Strong-Scented Lactuca.**

**Sex. Syst.** Syngenesia, Polygama aequalis

(Reinspissed Juice, E.—Folium, D.)

**History.**—According to Sprengel*, this is the Spica; but Dr. Sibthorp* suggests that Lactuca Scandens is the plant referred to by Dioscorides.

**Botany.** **Gen. Char.**—See Lactuca sativa.

**Sp. Char.**—Stem erect, round; the base smooth or prickle-pointed; the apex paniced. Leaves horizontal, prickle-pointed at the keel, acutely denticulate, obtuse, at the base shaped; the lower ones sinuate. Achenes striated, nearly than the beak (De Cand.)

Herb abounding in fetid milky juice. Root tap-shaped. S to four feet high. Leaves distant. Florets yellow.

**Hab.**—Indigenous; about hedges, old walls, and borders or not uncommon. Biennial. Flowers in August and September.

**Preparation of Lactucarium.**—The lactucarium prepared by Mr. Duncan, of Edinburgh, is obtained from this plant, which occurs in distinct tears or lumps, which are seldom larger than about three times as much as L. sativa. This kind of lactucarium is obtained in distinct tears or lumps, which are seldom larger than

**Composition.**—The milky juice of this plant was analyzed by Klink*, who found in it resin 7.5, wax 8.75, caoutchouc 22.5.

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* Ibid. S. 110.
* Trait de Thérap. i. 269.
* Hist. Rei Herb. i. 185.
* Lib. ii. 185.
* Pradr. Fl. Graeca, ii. 126.
OTHER USEFUL CICHORACEAE.

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OTHER USEFUL CICHORACEAE.
ORDER LI.—VALERIANACEÆ, Lindley.—THE VALERIAN TRIBE.

**Valerianee, De Candolle.**

**Essential Character.**—Tube of the calyx adnate to the ovary; the lirious, either dentate or partite, or changed into a pappus, which is at first lute, afterwards expanded. *Corolla* tubular, funnel-shaped; usually five rarely three- or four-lobed; lobes obtuse; tube equal or gibbous, or cleft at the base. *Stamens* adnate by their filaments to the tube of the corolla at the apex; alternate with the lobes of the corolla; five (the type three, two, or solitary; anthers ovate, bilocular. *Style* filiform; stigma three, free or cohering. *Fruit* membranous or somewhat succulent, indehiscent, crowned, at least when young, with the limb of the calyx three-celled (two cells being empty) or one-celled. *Seeds*, in the fruit, solitary, pendulous, exalbuminous; *embryo* erect, with a superior and two flat cotyledons (De Cand.).—Annual or perennial *herba*, rare, base somewhat shrubby. *Roots* of the perennial species odorous, opposite, without stipules. *Flowers* cymose-corymbose.

**Properties.**—The roots of the perennial species are highly odorous. Possess nervine and antispasmodic properties, and have been used in epilepsy (*Valeriana officinalis*). Their odour is for the most part disagreeable.

**Valeriana officinalis, Linn., E. D.—GREAT WILD VALERIAN.**

Valeriana officinalis (sylvestris), L.

*Sex. Syt.* Triandria, Monogyenia.

(Radix, L. D.—Root, R.)

**History.**—The earliest writer who notices this plant is Pliny. The φοῖ of Dioscorides 3 is not the Valeriana sylvestris, as has been supposed, but the *V. Dioscoridis* 4.

**Botany.** *Gen. Char.*—Limb of the calyx involute during flower, then unrolled into a deciduous pappus, consisting of many pappose setae. Tube of the corolla obconical or cylindrical, equal at the mouth, or gibbous, without a spur; limb obtusely five-cleft, rarely three. *Stamens* three. *Fruit* indehiscent; when ripe one-celled, one-seeded (De Cand.)

*Sp. Char.*—Smoothish, erect. *Stem* furrowed. *Leaves*, nearly so, pinnatisect; the segments, seven or eight pairs, lanceolate-serrate. *Corymbus* at length, somewhat panicked. *Fruit* a (De Cand.)

*Root* tuberous. *Stem* from two to four feet high. Inflorescence coarsely serrate, those of the radical leaves broadest, apex ovate; but there is no remarkably large terminal leaflet. Odour roseate or white.

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1. Lib. i. cap. x.
several varieties of this species are described. Dufresne mentions four:—

V. excelsa.—The largest kind; above six feet high.

V. latifolia seu media.—The commonest kind; usually from two to four high. Both grow in marshy places.

V. tenella.—Of this there appears to be two sub-varieties:—

a. V. officinalis (sylvestris), Ph. L. V. officinalis a folis angustioribus, Woodville. V. sylvestris major montana, Bauhin.—In this sub-varieté the root is more odorous, and is, therefore, preferred for medicinal use. The stem does not exceed two feet in height. The caulinar leaves are very narrow, and often entire.

63. V. pratensis.—Grows in marshy places at Heidelberg, near the Rhine.

V. lucida.—Cultivated in botanical gardens, at Paris.

ab.—Wet places in most parts of Europe.

DESCRIPTION.—The root (radix valerianae minoris seu sylvestris) consists of a short, tuberculated rhizome, from which issue numerous ed, tapering, root-fibres, which are from two to six inches long, the internally, and, when fresh, grayish or yellowish-white exter- r, but when dried yellowish-brown. They give origin to other fibres: their odour, both fresh and dry, is strong, very acrid, and highly attractive to cats; their taste is warm, phorous, slightly bitter, somewhat acrid, and nauseous. Hill says that the heaths of Kent and Essex furnish a great deal of it. don says that it is cultivated for medicinal use at Ashover, in Derbyshire. The roots are dug up in the autumn, when the leaves decayed.

COMPOSITION.—According to Trommsdorff, 100 parts of dry vale- root consist of volatile oil 1·2, peculiar resinous extractive 12·5, my extractive 9·4, soft resin 6·2, woody fibre 70·7.

VOLATILE OIL OF VALERIAN.—When valerian root is submitted to distilla- with water, the distilled products are water and oil, both of which contain oleic acid. If the acid oil be mixed with carbonate of magnesia, and dis- ec, the pure oil passes over, and valerianate of magnesia is left in the retort. pure oil is pale green, or yellowish and limpid; it has a penetrating cam- ceous odour, and an aromatic, bitter, camphoraceous, but not acrid taste. gr. is 0·934. According to Bonastre, nitric acid makes it blue, and con- it ultimately into oxalic acid.

VALERIANIC ACID.—A volatile fatty acid, obtained by adding sulphuric acid erianate of magnesia, and distilling. As thus obtained, the acid is in the of hydrate; but by careful distillation it may be deprived of water. When it is a colourless, limpid, oleaginous liquid. Its odour has considerable with that of the oil; from which, as well as from other circumstances, epected to be formed by the oxidation of the oil. It is liquid at —6· F., 270°, is soluble in 30 parts of water, and in all proportions in alcohol ther. The anhydrous acid consists, according to Etting, of C10H14O2; nitric weight, therefore, is 133. Valerianic acid is a product of the action of is pellach on corn spirit oil (see p. 348). All the neutral valerianates are e.

RESIN.—Is black, has an acrid taste, and an odour of leather. It is soluble ohol, ether, and oils, but not in a solution of soda.

RESINOUS EXTRACTIVE.—Is soluble in water, but is insoluble in ether and tate alcohol. It is precipitated from its solution by almost all the metallic ons.
Under its influence these animals roll themselves on the ground, "outrageous playfulness," and are violently agitated. Its before-mentioned effects of valerian on the nervous system are by no means constant; whence practitioners have long used it as a remedial agent. "Yet I have met with some Dr. Heberden," whom it threw into such agitation as to cause chills and heat, as plainly showed that it is by no means inert. It is not the produce of organs, while in some cases it has accelerated the pulse, augmented the respiration, and promoted the secretions, in others it produced these effects. Large doses often create nausea.

Uses.—Valerian may be employed as a nervine: where stimulants are admissible, as an antispasmodic, formerly in repute, it is now but little used. It has been celebrated in epilepsy. It came into use in modern times under the recommendation of Fabius Columba, who reported having used it successfully. Though it appears he suffered a relapse. Its employment has found numerous advocates and opponents; but at the present time most practitioners regard it as a medicine of very little value. In the few cases in which I have employed it, it has failed to produce any relief. In some of the milder and more recent cases, where the disease is not accompanied with plethora, it may occasionally prove beneficial. In chorea, and other spasmodic affections, it has been found to be of variable success. I have found temporary benefit from its use in cases of hypochondriasis and hysteria. Of nervous stimulants in the low forms of fever, we have an abundance of cases in this country. In Germany, where it is more extensively used, its employment in these cases is spoken highly of.

Administration.—The dose of the powder is from 1 to 2 drachms. Though objected to by some, it appears to be a useful medicament.
roody fibre which it contains, it is, when well and recently
an efficacious form for administration.

**SUM VALERIANÆ. Infusion of Valerian, D.**—(Valerian in
powder, 3ij.; Boiling Water, 13vij. Digest for an hour, and
liquor when cold).—Dose, 1/2ij. or 3ij. This preparation is
tless apt to disturb the stomach than the powder.

**TURA VALERIANÆ. Tincture of Valerian, L. E. D.—(Valer-
sed, in powder, D.], 3v.; Proof Spirit, Oij. Macerate for
seven, D.] days, and strain, L. “Proceed by percolation
as for tincture of cinchona,” E. The relative propor-
tion and spirit used by the Dublin College are the same as
the other Colleges).—Dose, 1/3j. to 1/2jv.—Though this pre-
possesses the virtues of valerian, it is scarcely sufficiently
produce the full effects of the root, without giving it in
large as to be objectionable, on account of the spirit con-
cerned.

**TURA VALERIANÆ COMPOSITA, L.**; **Tinctura Valeriana am-
E. D.; Ammoniated Tincture of Valerian.**—(Valerian,
v.; Aromatic Spirit of Ammonia [Spirit of Ammonia, E.],
cerate for fourteen [seven, D.] days, and strain, L.—“Pro-
percolation or by digestion in a well-closed vessel, as di-
tincture of cinchona,” E.—The relative proportions of
and spirit of ammonia used by the Dublin College are the
hose of the other Colleges).—Dose, 1/3j. to 1/2j. The stimu-
luence of the valerian is greatly increased, and its ther-
efficacy oftentimes augmented, by the ammonia in this

**OTHER MEDICINAL VALERIANACÆ.**

Root of **Nardostachys Jatamansii**, De Cand. (Valeriana Jatamansii,
Roxburgh) appears from the proofs adduced by Sir
W. Jones and Dr. Royle to be the Spikenard (Nápbor
'Vìbáy, Dioscorides*) of the ancients. It is highly
esteemed at the present day throughout the East,
both as a perfume and as a stimulant medicine. The
root is long, hairy, and tap-shaped. Stems peren-
nial, very short. Branches erect, a few inches high.
Leaves obovate-lanceolate. Flowers pale pink, clus-
tered in the axils of the upper leaves. The plant is
a native of the mountains of the North of India.

2. **Valeria'na Dioscoridis**, Fl. Græc. is the φυό
of Dioscorides, and is the strongest of the Valerians.
It is a native of Lycia.

* Aviat. Research, ii. 405; and iv. 109.
* Illustr. 247.
* Lib. i. cap. 6.
ORDER LII.—RUBIACEÆ, Jussieu.—THE CINCHONAT

CINCHONACEÆ, LYCOGLOSSEACEÆ, AND STELLARIEÆ OF GALLACEÆ, Lindley.

Essential Character.—Tube of the calyx adherent to the ovary; limb truncate or many-lobed, frequently regular; the lobes as many as the corolla, rarely intermixed with accessory teeth. Corolla gamo inserted into the top of the tube of the calyx; lobes usually four to eight; contorted or valvate in estivation. Stamens as many as the lobes of the corolla; more or less adnate to the corolla; anthers oval, bilocular, turned inwards. Ovaries within to which it coheres, usually two- or many-celled, rarely by abortion crowned with a fleshy urceolus, from which a single style arises, usually two, distinct, or more or less coherent, rarely many, distinct. Fruit baccate, capsular, or drupaceous, two- or many-celled; one-, two- or many-seeded. Seeds in the one-seeded cells attached to the wall, or usually at the base; in the many-seeded ones, connected with a centra, usually horizontal: albumen horny or fleshy, large; embryo somewhat curved, in the midst of albumen; the radicle terete, tumescent; the cotyledons foliaceous (De Cand.).—Trees, shrubs, or herbs simple, quite entire, opposite, or rarely verticillate, with stipules arranged variously, rarely unisexual by abortion.

Properties.—The roots often abound in colouring matter, and hence in dyeing; as some of those belonging to the genera Rubia, Glandularia, Genipa, Galium, Asperula, Palicourea, Oldenlandia, &c. possess emetic properties, as those of Cephaélia, Psychotria, Riberia, Spermacoce, Manella, Chiocoea, &c.

The barks are often bitter, astringent, and somewhat aromatic, eminently distinguished for their tonic, febrifuge, and antiperiodic properties as those of Cinchona, Exostema, Coutarea, Cosmibuea, Remija, typhon, Pinkneya, &c.

The important use of the torrefied albumen of Coffea arabica is
It is probable that the albumen of other species possesses analogous properties: that of Psychotria herbacea has been used for similar purposes.

1. CINCHO'NA De Candolle.—SEVERAL SPECIES YIELD

PERUVIAN BARK.

C. cordifolia, lancifolia, and oblongifolia, L. D.—C. condaminia, micrantha, and other species, E.

Sex. Syt. Pentandria, Monogynia.

(Cortex, L. D.—Cinchona corona; Cinchona cinerea; Cinchona flava; and Cinchona parviflora.)

History.—The precise period and manner of the discovery and therapeutic power of cinchona is enveloped in mystery. It is doubtful whether the Indians knew it previous to the 1st century. Geoffroy 1 says, that the Indians were acquainted with this herb long prior to the arrival of Columbus; but from the intense hatred which they conceived against the Spaniards, the secrets of this valuable specific, the heart of this species, the cinchona, was imparted to the Governor of Loxa, the secret of this valuable specific. Humboldt 2, however, says that it was first collected by the Jesuit Father Raspe, a naturalist, who published an account of it.
ese statements; for in Loxa, and other parts far around, he found natives ranked Cinchona among poisons, and were totally unacquainted with its uses. "In Malacatis only," says he, "where many bark-peelers live, they begin to put confidence in the Cinchona bark." Ulloa also asserted, that the Peruvians were ignorant of the medicinal uses of cinchona. The traditions, therefore, of the supposed discovery of the remedy by an Indian being cured of an ague by bathing at a pool into which some Cinchona trees had fallen, as well as the more improbable story told by Condamine, of the Indians saving lions ill with ague eating Cinchona bark, must be fabulous. The assertion, says Humboldt, that the great American lion (Panthera concolor) was subject to fever, is as bold as that made by the habitants of the pestilential valley, Gualla Bamba, near Quito, that the vultures (Vultur aura) in their neighbourhood were subject to that disorder. Moreover, in the Cinchona forests, lions are not and, though the puma (Felis andicola of Humboldt, the petit lion Volca de Pichinch, of Condamine) has been met 2,500 toises (10,000 feet) above the level of the sea.

Humboldt tells us of an old tradition, current in Loxa, that the Jesuits having accidentally discovered the bitterness of the bark, an infusion in tertian ague, and in this way became acquainted with its valuable properties. This he thinks a much less improbable invention than that which ascribes the discovery to the Indians. The bark when first introduced into Europe is usually stated to be 1640; but Sebastian Badus gives an extract from a letter of a Spanish physician, D. Joseph Villeroel, from which it appears that it was imported into Spain in 1632, though no trial was made of it till 1639.

The statement of Condamine, that the Countess of Chinchon, wife the Viceroy of Peru, brought some bark to Europe on her return to South America, in 1639, is not improbable; and from this circumstance it acquired the names of the Cinchona Bark and the Countess's Powder (Pulvis Comitis). About ten years afterwards it was brought by the Jesuits to Rome, and by them distributed among the members of the order, who carried it to their respective stations, and used it with great success in agues. Among those most active in promoting its employment was Cardinal de Lugo. In this way it acquired the names Jesuit's Bark, Pulvis Patrum, Jesuit's Powder (Pulvis Jesuiticus), Pulvis Cardinalis de Lugo, &c. It fell, however, to disuse, but was again brought into vogue, in France, by Sir Robert Talbot, who acquired great reputation for the cure of intermittent agues by a secret remedy. Louis XIV. purchased his secret

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1 Voy. de l'Amer.-mérid. 1. 271.
5 Quoted by Bergen, Monogr. 84.
7 Geoffroy, Mat. Med.
(which proved to be Cinchona), and made it public. Hence it became known in France as Talbor's powder, or the English Remedy.

BOTANY. Gen. Char. —Calyx five-toothed. Corolla hypogynous form, with a five-parted limb, valvate in aestivation. Anthers included, inserted within the tube, and not projecting, unless in a very slight degree. Capsule splitting through the dissemination into two open at the commissure, and crowned by the calyx. Seeds glabrous, by a membranous lacerated wing (Lindley).—Trees or shrubs, an aromatic, bitter, astringent, eminently febrifuge bark. Leaves shortly petioled with plane margins. Stipules ovate or oblong, caducous, free, deciduous. Flowers paniculate-corymbose, terminal, white or roseate-purplish.

Species. —Dr. Lindley mentions twenty-six species; of which twenty-one are well known.

§ 1. Limb of the corolla supposing. Leaves scrobiculate.

1. C. Micrantha, Fl. Peru. ii. 52, t. 194; Ruiz and Pav. Quinol. Suppl. De Cand. Prodr. iv. 354. C. scrobiculata, Humb. and Bonpl. Pl. aquin. i. 147; De Cand. Prodr. iv. 352. High, cool, and wooded mountains near Chicoplaya, Monzon, the Pueblo de San Antonio de Playa grande, P.; forests in the province of St. Jaen de Bracamoros, H. and B. The mentioned travellers were told that it also occurs at Chirriñas Tabaco, Ignacio, and Tambobapa, Cuchero, Póppig.

This species yields Síbuer or Gray Cinchona. From the young branches obtained the Pata de Gallinazo (Póppig). Humboldt and Bonpland, as does Ruiz and Pavon, declare that from C. scrobiculata (which Dr. Lindley has identified with C. Micrantha) is obtained Cascarilla fina.


According to Ruiz, this species, like the last, yields Cascarillo or Quinoa.

3. C. Condaminíe, Humb. and Bonpl. Pl. aquin. i. 33, t. 10. Quinquingsiam. In Act. Par. 1738. —Near Loza, in the mountains of Cajamarca, and in those of Boqueron, Villanaco, and Mesio: it is also found near Chimbamba and Ayavaca, in Peru. It always grows on micaeous schist, and it is high as 7,500 feet above the level of the sea, first appearing at the elevation of 5,700 feet; so that it occupies a zone of 1,800 feet, Humboldt.

This species yields Cascarilla fina de Uritisanga, our Crown or Loza Bark.

§ 2. Limb of the corolla not supposing. Leaves not scrobiculate.


Some years since a very inferior yellow bark, with a whitish epidermis, imported into London, and was known to our dealers under the name of Spurios Yellow Bark. I sent a specimen of it to Professor Guilbault, who noticed it as the bark described by him as Quinquinga de Carthagea speciosa, has subsequently found it to be identical with the Orange Cascarola (Quina naranjada) of Mutis, lodged in the Muséum d'Hist. Naturelle de Paris, by Humboldt. It is, therefore, the produce of C. lanceolata.

Bergen found, in Ruiz's collection, a bark said to be the produce of C. lanceolata Mutis, and which agreed with the False Loza Bark, Bergen.

* Talbot, English Remedy. 1882.
CINCHONA.

MAFOLIA, Pavon. in herb. Lambert. C. stupea, Idem.—Loxa, in Peru, perhaps, forms part of the Quina fina de Loxa.

ZEOLATA, Fl. Peru. ii. 51; iii. t. 223. Casarillo lampino, Ruiz—Cold, elevated, mountainous situations, in groves on the Andes, in of Muna, Panas, Pillas, and Cuchero, R. and P. At the distance of forty leagues from the city of Huaynaco, Ruiz MSS. Bolivia.

of this species is called Quina Antenda, Casarilla Amarilla, and Cas.

Ruiz suspects it to be Calisaya bark, i.e. Yellow Bark of English


of this species is not much esteemed. It is known as the White

muca.

ZA, Fl. Peru. ii. 52, t. 195. Casarillo pallido, Ruiz, Quinol. 74.—

illaterated groves, in the hotter parts of the foot of the Andes, near Panas, ten leagues from Huaynaco, R. and P.

one was found by Bergen to be identical with the bark of C. ovata

Ruiz’s collection.


Loxa, in Quito, Pavon.


 nec, Humb.

of this species is the Quina amarilla or Yellow Cinchona of Mutis, Bergen and Guiourt have ascertained to be Hard Cathageno Bark. It is 4 confounded with the Yellow Bark of English commerce, from 
ite of quina is prepared.

RUSCENS, Vahl. in Act. Hafn. i. 19, t. 2. Lambert’s Description, 21,
purea, Fl. Peru. ii. 52, 193. Casarillo morado, Ruiz, Quinol. 67.—

 lower parts of the Andes, where it is cool at night, in the districts

Pati, Muna Iscutunam, Casapi, Casapillo, and Chihuamasala, R.

utana ranges of Panaturas, Loxa, Jaen, and other provinces; on

iz MSS. Cuchero, Poppiq. Santa Fé.

es yields the Casarilla boba colorada, which Reichel ascertained to

elles Bark of European commerce.

SUOTA, Fl. Peru ii. 51, t. 192. Casarillo delgado, Ruiz, Quinol. 60.

mountains of the Andes, in high and cool places near Pillas and Acopi P., and various other stations in the province of Panaturas, near

south of the line, Ruiz.

a kind of Casarilla fina, formerly employed in medicine, under the

nr delgadilla, or delgada. Dr. Lindley thinks it perhaps forms part

Yellow Bark of the shops.

ANDULIFERA, Fl. Peru. iii. l. t. 324. Casarillo glanduloso, Ruiz

C. Mutisii, b. Lambert’s Illustrations, p. 29.—Woody moun-

near Chilocopaza, R. and P.—Mountains of Panaturas and Hu-

hose of Monzon and Chilocopaza, Ruiz, MSS. Cuchero, Poppiq.

tegrated Casarilla negrilla, is said by Reichel to be equal to the finest

Bark. It formerly came among the Lima barks.

LOSA, Pavon, MSS. C. Humboldtiana, Lamb. Illustrations, 7.—St.

Loxa, Pavon.

as known of the bark.

LONGIFOLIA. Lambert, Illustrations, p. 12; not of Mutis.—Jaen de

is quite unknown. The London College, therefore, has no ground

Red Cinchona to it.
§ 3. Limb of the corolla smooth, or only downy at the edge.

16. C. acutifolia, Fl. Peruv. iii. 1. 53, t. 225. - Cascarillo de Hoja aguda and P. Quinol. Suppl. 8. - Low groves of the Peruvian Andes, in Chicopia, the river Tasso, R. and P. - Mountains of the Andes, near Chicopaya, Mo and other places in the provinces of Panatagua and Huamalies, Ruiz, MS.

The bark is of a very bad quality for medicinal purposes.


The bark is, according to Ruiz, the Quina roza of Santa Fé, the Red C., of Mutis, which both Bergen and Guibourt have shown to be the Cinchona of European pharmacologists.


No use is made of the bark.


Bark unknown.


Bark unknown.


Bark unknown.

** Species imperfectly known. **

Dr. Lindley mentions.—22. C. dichotoma (which is said to yield one Quinas fiuia); 23. C. macrocalyx; 24. C. crassifolia; 25. C. Pelalba; 26. C. Muzonensis, as species which are imperfectly known.


** Hab. ** The Cinchona species inhabit the Andes from 11° N. 20° S. lat. at varying elevations. It is difficult to assign limits to these elevations, since the statements of Humboldt on this subject are not uniform. Thus the lowest true Cinchonas are variously stated, by himself and Kunth, to grow at an elevation of from 1200 to 3599 toes (2154 feet); while the highest are said to grow from 1487 to 1680 toes (8922 feet) to 1680 toes (10,080 feet). The temperature of the Cinchona districts necessarily varies with their altitude; perhaps the average is about 68° F.

** Bark-Preparation. ** The mode adopted by the Cascarilloes, or bark-peelers, of obtaining cinchona, varies somewhat in different districts. The Indians," says Mr. Stevenson, "discover from the nences where a cluster of the trees grow in the woods, for they are easily discernible by the rose-coloured tinge of their leaves, and appear at a distance like bunches of flowers amid the deep-green foliage of other trees. They then hunt for the spot, and, having found it out, cut down all the trees, and take the bark from
Cinchona: 1875

and he adds, "after the Indians have stripped off the arum carry it in bundles out of the wood, for the purpose of it." Popig says that the stems are not peeled for three or four after they are cut down; and that the bark when removed is speedily dried, or its value is quickly deteriorated. This action of collecting the barks is somewhat different to that by Mr. Gray from the papers of the late Mr. Arrot, who cut the bark is cut from the trees as they stand. According to Mr. Gray and Popig, the peelers commence their operation about when the dry season sets in.

CINCHONA. Cinchona is imported in chests (which are sometimes with hides) or serons (packages formed of an ox-hide, somed by a coarse cloth). The duty is 1d. per lb. The quantities, and those retained for home consumption, in the years 1827, 1830, and 1831, were as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Total imported</th>
<th>Quantity retained for home consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>1827</td>
<td>385,600 lbs.</td>
<td>179,313 lbs.</td>
</tr>
<tr>
<td>1830</td>
<td>556,290 lbs.</td>
<td>50,679 lbs.</td>
</tr>
<tr>
<td>1831</td>
<td>235,678 lbs.</td>
<td>112,773 lbs.</td>
</tr>
</tbody>
</table>

Cin-ona is imported from various ports of the Pacific coast of America. Arica, Valparaiso, Lima, Callao, and Payta, are the places of shipment. In consequence of an apprehended that the trees yielding bark would be exterminated, the cent of Bolivia has prohibited the cutting of bark in its territories, commencing January 1st, 1838. This event had

1. to the 1st, Mag. No. viii. p. 244.
3. Int.?
4. Int. to Messrs. Gibbs and Co. of Lime Street, for a copy of this decree. The following is a copy of it:

Santa-Cruz, Grand Citizen, Restorer, and President of Bolivia, General of her Armies, Grophone of Colombia, Grand Marshal Pacifactor of Peru, Superior Protector of the South Peruvian States; decorated with the medals of the Liberating of the Liberators of the chencha, of Junin, and that of the Liberador Simon Bolivar, Grand Officer of the honor of France, Founder and Chief of the Bolivian Legion of Honor, and the National Honor of Peru, &c. &c. &c.

1st. That the unlimited cutting and exportation of the Cascarilla (Cinchona) has remarkable injury to this country, by its excessive abundance in the European markets; for the woods beginning already to be drained, great difficulty is experienced in obtaining which are more distant, causing well-founded fears of the approaching extinction of whose preservation and reproduction we ought so carefully to provide;

2nd. The Congress of 834, which passed a law for the formation of a society for the prevention of Cascarilla (Cinchona), said it could have no effect without the Government suspended its exportation, for which there is a provision in the 13th article of the said law.

At the opinion publicly manifested by the meeting of the neighbouring proprietors and as well as by the provincial directive committee of the Cascarilla (Cinchona) Society, suspension of the cutting in the mountains, as the only means of saving this exclusive for commerce from approaching ruin:

1st. It is forbidden to cut Cascarilla (Cinchona) in the mountains of the Republic, or the extreme time which shall be allowed for the exportation from this Republic, or
long been expected. In 1836 I observed that, "when we take in consideration the immense consumption of Cinchona bark (Pellet alone in one year consumed 2000 quintals, equal to 200,000 lbs of yellow or Calisaya bark, in the manufacture of the sulphate of quin that the trees yielding it are confined to one part of the world, that no care is taken of their preservation; it is not at all improbable that in a few years this valuable drug may totally disappear from commerce. Indeed, a report has been prevalent among the dealers, that the Cascarilloes, or bark-collectors, had arrived at limits of the forests containing the yellow or Calisaya bark, butther this be true or false, I know not. I am acquainted with a dealer who has laid in a large stock, on the speculation of the of this report."

"If," says Mr. Stevenson, "the government of America does attend to the preservation of the quina, either by prohibiting the felling of the trees, or obliging the territorial magistrates to ensure cutters to guard them from destruction, before a sufficient supply will allow of those tracts of woodland becoming personal property, this highly-esteemed production of the new world will be swept from the country."

Description. a. General Description.—Before describing the various kinds of cinchona met with in commerce, it will be necessary to offer a few remarks on the general characters of barks (more especially of Cinchona bark). These may be noticed under the following heads:—Cryptogamia found on, structure, quilling, colour, taste, and fracture of, cinchona barks.

Cryptogamia found on Cinchona Barks.—These, especially the Lithostrobus, have been elaborately examined by Féjo and by Zincke.

a. Musci, or Mosses.—We frequently find mosses on Cinchona barks; they are never met with in fructification, it is almost impossible to determine the genus to which they belong. They are probably species of Hypnum.

that which has been already cut, shall be the last day of the month of December in the year.

And that this prohibition shall endure for five years, counting from the 1st of January during which date (or period) no Custom-house shall have the power of granting permits for the exportation of this vegetable.

And that five years having elapsed, the Government shall make such regulations as are judged expedient for the regulation of the cutting and exportation of Cascarilla (Cinchona), the better guidance of the Society for the exportation of Cascarilla (Cinchona).

And that Transgressors shall be punished with the fines (or punishments) which the law inflict on the exporters of prohibited articles or goods.

And that in conformity with the provisions of the fifth article of the law of the 14th of Nov 1834, the directive Society is declared to be established.

And that the Prefect of the Department shall make a list of the names of all the stock-holders who have presented themselves up to this date; considering themselves obliged to draw out two years (in factoriae), ordered in the sixth article of the expressed law, and to deposit with the Government since 550, a thousand francs of mercury at the cost price.

And that the Directive Committee of the Cascarilla (Cinchona) Society shall be empowered to the Governors of the provinces in which this vegetable is produced, in taking every possible and positive measure to the accomplishment of this decree.

And that the Prefect of the Department is charged with the execution, and the General Director to see that it is printed and published.

Given at the Palace of Government in Ayacucho, the 10th of April, 1837, in the 29th Year of Independence."

Andrew Santis Ch
Mariano Herrer Ch
General M

3 Résumé sur les Cryptog., 1834.
CINCHONA.

2. These are found in great abundance, especially on Loxa or Crown barks, conveniently arrange them, according to Zenker, in four sections: Eoiontheces, or the pulvinate lichenes (Lichenes pulvini).—In this class, the most remarkable is the Hypothecia rubro- ochracea, classed among the Fungi by Fée, and found in the finest specimens of quilled yellow bark. Doloiotheces, or the crustaceous lichenes (Lichenes crustacei).—These are abundant on the Crown or Loxa barks. The most common species are Parmelia, Sticta, and Collema. The P. coronata is a beautiful and one frequently met with. So also the Sticta aurata, remarkable in colour. Sect. 4. Dendrotheces, or the filamentous lichenes (Lichenes foliacei).—These are good examples of this section: they are abundant on the Crown barks. Two species are met with—U. floridana, etc.; a variety of the latter is curiously articulated.

3. Jungermannias are found on Cinchona barks, but in too broken to determine their species. Fée, however, examined Humboldt’s and found four.

As Fungi usually grow on weakly or dead trees, their presence on bark is a bad characteristic. Very few, however, are met with.

4. Those barks known to druggists by the name of coated barks are the following:—an epidermis, the rete mucosum, and cortical innermost of which is termed the liber.) The epidermis and rete together form what is technically called the coat.

This is the most external portion of the bark, and is variable. The barks of commerce are said to be coated (cinchona cum are of Bergen) when the epidermis is present, but when this is absent, so part or the whole of the next layer (rete mucosum) has been removed, the barks are called uncoated (cinchona nudata of Bergen). As the epidermis, or nearly so, in a medicinal point of view, uncoated barks are valued, since the epidermis increases the weight of the bark, without adding to its real value. In reference to this layer, there are several reserving of attention in judging of the quality of bark: thus, Cinchona, with a whitish epidermis, are, I believe, for the most part, inferior. But a whitish coating given to a brown bark some crustaceous lichenes must not be mistaken for a genuine white bark. The term warty or knotty (cinchona nodosa of Bergen) is applied as in which we observe prominences on the epidermis, corresponding to the subjacent parts. These are frequently observed in some red barks, as well as in the kind called Humalves. Bark is termed barred (cinchona rimosata of Bergen) when we observe cracks or furrows that are regarded merely as larger kinds of cracks) on it. When longitudinal or transverse elevations, we say the bark is wrinkled

mucosum; cellular envelope; medulla externa.—This is a cellular layer, immediately beneath the epidermis. It is tasteless, and is of no medicinal value (particularly old red barks), it is often much developed: in some it is sometimes, though not always, absent.

Layers, or cortex.—These are beneath the rete mucosum, and, in the essential part of the bark. One layer is formed annually, and the number, and consequently the thickness of the bark, depends on the tree from whence it is taken. The last formed layer, that is the term liber. Every one of the cortical layers has medicinal virtue, to the most. The reason for this will be readily comprehended by the physician of exogenous plants. The succus communis of these are by the alburnum, or sap-wood, to the leaves, where it undergoes changes by the agency of the atmosphere, in consequence of which it is to what is called succus proprius, the proper juice of the plant, and by medicinal activity which the latter possesses usually resides. Now
this succus proprius descends in the liber; hence this part may always be expected to possess the proper medicinal activity of the tree from which it is taken.

Quilling of the Bark.—Bark, little or not at all curled, is called by commerce flat bark (cinchona plana). The absence of the curl arises from one or more circumstances—the age of the stem from which the bark is taken, or the degree of flexibility of the bark even in the fresh state. When bark is rolled or pressed flatly in a quilled form, it is termed quilled bark (cinchona tubulata). In this case the quill speaks of several kinds of quilling; namely, the partially quilled (cinchona convoluta), when the two edges of the quill approximate; the closely quilled (cinchona convoluta), when the edges of the quill overlap each other, forming a tube; and the doubly quilled (cinchona involutata), both edges of the quill are rolled together, so as to form two cylinders, which, seen from the back, appear as one.

Fracture.—The transverse fracture of bark furnishes an important character. Bergen admits three kinds of it:—1st, smooth, even, or short fracture (planula); 2ndly, resinosum fracture (fractura resinosum); and, 3rdly, fibrosa (fractura fibrosa). Bark with a resinosum fracture is usually to be preferred.

Colour, Taste, and Smell.—Little need be said of these characters: the same kind of bark often varies in its colour, while several kinds may have the same tint. Moisture usually deepens the colour.

β. Classification.—A botanical classification of the Cinchona is quite impracticable; and moreover, if it were practicable, it would be, in a commercial and pharmaceutical point of view, useless, since the barks are never accompanied by the flowers or fruits of the tree from which the botanical characters are drawn.

A chemical classification, I think, cannot be at present attempted with any great chance of success. The arrangements found in chemical composition, adopted by Goebel and Geiger, do not seem to have been noticed hereafter. Even if a perfect chemical classification could be effected, it would not be available to ordinary commercialists.

An arrangement founded on the physical characters of the barks will be for the present, perhaps, the most useful, and is the one generally followed.

Von Bergen admits nine species; viz.—

1. China rubra, or Red Bark.
2. China Laxa, or Crown Bark.
3. China Humaecos, or Grey or Silver Bark.
4. China regia, or Yellow Bark of English Commerce.
5. China flavo dura, or Hard Carthagenensis Bark.
6. China flavo fibrosa, or Woody Carthagenensis Bark.
7. China Huamalies, or Rusty Bark.
8. China Jaca, or Ash Bark.

Professor Guibourc has described no less than thirty-seven
of Cinchona barks, which he has arranged under five heads, as

1. Gray Cinchonas.
2. Yellow Cinchonas.
3. Red Cinchonas.
4. White Cinchonas.
5. False Cinchonas.

posed arrangement.—A considerable number of barks have enominated *cinchona* barks. Of these some are obtained from the genus *Cinchona* De Cand., others from neighbouring and allied species. The first are *cinchona* barks, properly so called; the second are barks falsely called cinchonas. According to De Candolle* an eight genera, including forty-six species, have been con

d with the name of Cinchona; and the barks of all these gen

era are endowed, more or less, with febrifuge qualities. The referred to are *Cinchona*, De Cand., *Buena Pohl* (*Cosmibusena* and Pav.), *Remipia De Cand.*, *Lucilia Sweet*, *Hymenodictyon* etc., *Exostemma De Cand.*, *Danais Comm.*, and *Pinkneya* etc.

Div. I. Cinchona Barks properly so called.

These are barks obtained from the genus *Cinchona* De Cand. of them have a brown epidermis, others a whitish one. This latter forms the basis of a subdivision of them into two sections.

Sect. 1. Epidermis normally brown.

The epidermis of the barks of this section is naturally reddish, brown, or blackish, cracked and rugous. It frequently has a

orn appearance, owing to the adherent crustaceous lichens. By ng, however, we readily detect the subjacent brown epidermis, hereby easily distinguish this lichenoid coat from a white epidermis.

The barks of this section have been divided into *pale* or *gray*, and *red*. As these terms are well understood, it is advisable to

fusion of pale bark does not deposit any sulphate of lime on the addition of a solution of the sulphate of soda.

Class 2nd. Yellow Bark of English Commerce; Cinchona jambulacca Ang. offic. — In English commerce the term yellow cinchona is confined to the quilled and flat varieties of Calisaya or regia bark. The French and German pharmacologists, however, include under this denomination several of the yellow barks, with a white epidermis, which in England are termed false or spurious yellow bark. The yellow bark of English commerce occurs in quills or flat pieces; the quills being, on the average, larger and much rougher than the largest quills of pale barks. The texture is more fibrous; and the powder is orange or fawn yellow. The Calisaya or royal yellow contains both quina and cinchonia, but the first in by far the larger quantity. A strong infusion of this kind of bark produces a precipitate (sulphate of lime) on the addition of a solution of the sulphate of soda.

Class 3. Red Cinchona of English Commerce; Cinchona rubra Ang. offic. — Only one kind of red bark is usually found in English commerce. It is met with in both quills and flat pieces; it has a more fibrous texture, and a redder colour than either of the foregoing kinds. It contains both quina and cinchonia. It is very bitter and astringent. Its powder is more or less red.

Sect. 2. Epidermis whitish (yellowish) and micaceous.

This section includes cinchona barks sometimes called, on the continent, White Cinchonas (Cinchona albae); but which in English commerce are always regarded as spurious or bastard cinchona bark. They are distinguished by an epidermis which is naturally white or pale yellowish, micaceous, smooth, or not cracked, and adhering to the cortical layers. They yield little or no cinchonia and quina. One of them contains a peculiar vegetable alkali (aricina).

We may arrange them in three classes corresponding to those of the preceding section.

Class 1. Pale Barks with a whitish epidermis. — This includes a kind found among Loxa or Crown bark, and which has been termed Guibourt Loxa White Cinchona. Some of the young Huamark barks approach closely to this class (See Gray Corky Huamark Bark).

Class 2. Yellow Barks with a whitish epidermis. — This class includes barks which correspond, and have been confounded, with Calisaya Royal Yellow Bark. It includes the following barks: — Hard Phragmenia Bark; Fibrous Carthagena Bark; Cusco Bark; Orange Cinchona of Santa Fé. To these also must be perhaps added the White Cinchona of Mutis.
3. Red Barks with a whitish epidermis.—These are barks which and have been confounded with Genuine Red Bark of commerce. This class includes the following barks: Red a of Santa Fé; and Red Cinchona with a white and mica-dermis.

Div. II. Barks falsely called Cinchonas.

For this division have been placed those barks which have been ed into commerce as Cinchonas, but which are not obtained y species of Cinchona De Candolle. Their physical char- for the most part very different from those of the genuine: r, they are not known to contain quina, cinchonia, or aricin.

the exception of Pitaya Cinchona, I have never met with him in English commerce. The following are those best and which I have in my collection:

CINCHONA DE SANTA LUCIA; St. Lucia Bark; Quinquina Pitom, or Q. de "Sante Lucie" Guiourot; Bark of Exostema floribundum, a native of the West India islands.—Its bitter principle is called Montanin.

CINCHONA CARIBEA; Caribeaum or Jamaica Bark; Quinquina caraibe, Gui- burt; Bark of Exostema caribeum, a native of most of the West Indies and Mexico.

CINCHONA [Falsa] PERUVIANA; Peruvian [false] Cinchona: Ecorce de Exos- java du Pérou, Guiourot; Bark of Exostema peruvianum, a native of the other parts of Peru, between the river Chota and the village of Quero- tillo.

CINCHONA BRASILIANA; Brazilian Cinchona; Ecorce d’Exostema du Brésil, Guiourot; Quinquina de Pinhii; Bark of Exostema Souzanum, a native ofrazil.—It yields an organic alkali, called Esenbeckina.

CINCHONA PITAYA; Pitaya Cinchona; Quinquina bicolore, Guiourot; bark from an uncertain tree [Exostema? Malanea racemosus?].—It has been analyzed by M.M. Folchi and Peretti, who discovered a new alkaline principle in it, which they have termed Pitaina.

CINCHONA DE RIO JANEIRO; Rio Janeiro Bark; Bark of Buena hexandra? 1

1. CINCHONA CORONÆ, E.—CROWN OR LOXA BARK.

Cinchona officinalis, D.

(Cinchona lanceolata; Cortex, D. D.—Bark of Cinchona Condaminea, E.)

1 NYMES.—Quinquina de Loxa, Guiourot. China Loxa; Kron-China, Ber- tokerz Chinæ fusca, seu corona, s. de Loxa, s. peruvianus, Goebel.

Dyry.—Loxa bark, if not the first, was one of the earliest kinds of Cin- bark introduced into Europe. It was, probably, the bark which Horbuis, 1 denominated Cascavilla della Viva, but which Condamine more correctly Corteza, or Caucau de Loxa. Some doubt, however, has existed in the of pharmacologists, whether the bark known in commerce by the name of bark, is identical with that formerly called by that name. Hayne 2 has

1 Bergen, Monogr. S. 313.
pointed out some differences between the Loxa bark of commerce and found in Humboldt's collection, marked Quina de Loxa, and which has been selected from the C. Condamineae: the peculiar characteristics of the latter: warty prominences, the transverse cracks, which do not form rings, the tint of the outer surface, and a more astrigent taste. In a chest of commerce Loxa bark, Goebel found only three ounces of bark corresponding to the description here given of the true Loxa bark.

Loxa bark received the name of crown bark in consequence of its use by the royal family of Spain. In October 1804, a Spanish galley, returning from Cadiz, among the treasures found were many parcels of Cinchona bark, two sorts of which were distinguished: the others by their external appearance and mode of packing. Two were marked "Para la real familia," i.e. "For the royal family," and were lined with sheet iron: they contained fine quills, of thirteen inches long by means of bass into bundles of about three inches in diameter. Von Straten, he received from England, in 1824, similar bundles, under the title of "second crown. The other sort was marked "Para la real corte," i.e. "royal court."

Botany.—Loxa bark is undoubtedly the produce of C. Condamineae. Goebel examined the young barks of this species, brought by Humboldt, and found them undistinguishable from Loxa cinchona. Furthermore, he found specimens of cinchona, sent over by M. Joseph de Jussieu, the colleague of Damiani, as being the bark of the tree described by that celebrated academian similar to the crown bark of commerce.

Commerce.—Crow or Loxa bark is imported in serons (holding from sixty to ninety lbs.) and in chests (containing about one hundred lbs.)

Essential Character.—Coat thin, firm; cracks numerous, annular; under surface smooth; colour cinnamon-brown (Bergeron).

Description.—Loxa or Crown bark is met with in the form of coarse barks only, neither flat nor uncoated pieces being known. These quills vary in size from six to fifteen inches; in diameter from two lines to an inch; in thickness from one-third of a line to two lines; they are both singly and doubly divided. The outer surface or epidermis of this bark is characterised by numerous transverse cracks, which, in the fine and middling quills, are often distant from each other only from one to one and a half lines, and frequently extend over the whole circumference of the quill. The edges of the quill, as well as the shorter cracks, are a little elevated. In some of the fine quills, however, the transverse cracks are hardly visible; but we then observe longitudinal fractures. On the larger quills the transverse cracks are interrupted, and do not form rings, but are not set so closely together. Some of the thicker quills have almost the roughness of a grater, and occasionally pieces are met with that are knots or warts. The colour of the external surface of Crown bark depends principally on that of the crustaceous lichens. Gray, or grayish-brown, is taken as the predominating tint; the thin quills are mostly slate, ash gray. The larger quills vary still more, and, in addition to the color mentioned, they are sometimes blackish-gray, even passing, in places, into brown. The inner surface of Loxa bark is smooth, with small irregular papillae observed thereon: its general colour is cinnamon-brown, but transverse fracture of small quills is even, but of the larger and coarse fibrous. The powder of Loxa bark is of deep cinnamon-brown colour. The odour of this bark is like that of the quills; its taste astrigent, bitter, and somewhat aromatic.

Commercial and Other Varieties.—The slender, finest, thinnest, and quills, with a short transverse fracture, form the finest or picked crown bark.
CINCHONA.

1383

Cone corona electus). A somewhat larger quill, with a silvery appearance, epidermis, derived from the adherent crustaceous lichens, constitutes crown bark. A similar kind, but in which the external coat has a variegation from the whitish lichens, with the intermediate dark-brown epidermis, constitutes the leopard crown bark.

and white Loxa Cinchona, found in the serons of pale bark, are the different species of Cinchona. The young Huamalies Cinchona, some Havannah Bark, constitutes the rusty crown bark of some of our has scarcely any transverse cracks; and some subvarieties of it are hens. Its epidermis is spongy or corky, longitudinally furrowed in a manner, and of a grayish or brownish gray tint. The ferruginous if Guibourt is the same bark at a more advanced period of growth. ark is the produce of C. microphylla, and will be described more fully White Loxa Cinchona has a considerable resemblance to the young bark, with a whitish epidermis, and will be noticed among the so- Cinchonas.

r and Caventon's Analysis.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Cinchonia</td>
<td>0.36</td>
</tr>
<tr>
<td>Kino acid</td>
<td>1.17</td>
</tr>
<tr>
<td>Rinate of lime</td>
<td>1.30</td>
</tr>
<tr>
<td>Hard resin (red cinchone)</td>
<td>9.97</td>
</tr>
<tr>
<td>Bitter soft resin</td>
<td>1.36</td>
</tr>
<tr>
<td>Fatty matter, with chlorophyll</td>
<td>0.78</td>
</tr>
<tr>
<td>Tannin, with some chloride of cal- cium (?)</td>
<td>5.80</td>
</tr>
<tr>
<td>Gum</td>
<td>4.43</td>
</tr>
<tr>
<td>Starch</td>
<td>a little</td>
</tr>
<tr>
<td>Lignin</td>
<td>74.43</td>
</tr>
<tr>
<td>A</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>99.80</td>
</tr>
</tbody>
</table>

Bucholz's Analysis.

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<thead>
<tr>
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<tbody>
<tr>
<td>Cinchonia</td>
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<td>4.43</td>
</tr>
<tr>
<td>Starch</td>
<td>a little</td>
</tr>
<tr>
<td>Lignin</td>
<td>74.43</td>
</tr>
<tr>
<td>Commercial Loxa Bark</td>
<td>99.80</td>
</tr>
</tbody>
</table>

states, that one lb. of Loxa bark yields from one and a half to two sulphate of cinchonia. It is somewhat remarkable, that Von Sando Quina, and but little cinchonia, from Loxa bark, as the following

One lb. of Loxa Bark. Sulphate of Quina. Pure Cinchonia.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>ed. quills</td>
<td>5 grs.</td>
<td></td>
</tr>
<tr>
<td>thick quills and pieces</td>
<td>12 grs.</td>
<td>4 6 grs.</td>
</tr>
<tr>
<td>lodding quills</td>
<td>2 grs.</td>
<td>2 3 grs.</td>
</tr>
<tr>
<td>thick pieces</td>
<td>21 grs.</td>
<td></td>
</tr>
<tr>
<td>thin, heavy pieces, with grater-like bark</td>
<td>53 1 grs.</td>
<td></td>
</tr>
</tbody>
</table>

MIA.—The following is Fée's list of the Cryptogamia found on Loxa

TES.—Opegrapha globosa; O. Condaminea; Graphis fulgurata; inensigraphia; A. marginata; Glyphis fawulosa (rare); Chiodecton Pyrenula verrucarioideae; Ascidium Cinchonarum; Lepra flava; Pteridonia; Lecanora russula; L. subfusca; id. var. B pulvulenta; Pyrenula; P. glandulifera; Sticta aurata; Collema azureum; and

* Journ. de Pharm. vii. 70.  
+ Tract de Pharras, i. 603.  
+ Berget, Monogr. Tab. sur 3me Platte.
designated by the term similar to Calisaya. Pöppig says, the bark of Huanuco commenced in 1785; but that in 1815 it almost entirely disappeared. Yellow bark will be likely again, I should think, to pulse to it, as the quality of Huanuco bark is excellent.

BOTANY.—It is unnecessary to detail the speculations of botanists on the origin of this bark previous to Pöppig's discovery. This curious bark was brought to Europe a bark called *cascarilla provinciana*, and was introduced by Reichel, an apothecary at Hohe, and carefully compared it with his own collection of cinchona, and with that of Von Bergen at Hamburg, and declared to be identical with that of Huanuco or Silver Bark of commerce.

COMMERCE.—It is imported usually in chests containing 100 lbs. and also, though less frequently, in serons of from 80 to 100 lbs.

ESSENTIAL CHARACTER.—Coat moderately thin, hard; under surface predominating; under surface splintery; colour rusty brown.

DESCRIPTION.—It always occurs in the form of quills, not curls. These quills are larger and coarser than those of the cinchona bark, from which it is distinguished by the greater smoothness of their external surface. The quills is from three to fifteen inches; their diameter from a quarter, or even two inches; their thickness one-third of an inch. At the edge of most of the perfect quills we distinguish an oblique cut, made probably to loosen the bark. These oblique lines are more frequently found on other barks. The quills are frequently somewhat spread and oblique, and are not found on the epidermis transverse cracks, but they do not form a regular spiral. In Loza or crown Bark, and their edges are flat. On the thicker quills the furrows are observed; and in these cases the transverse cracks are wanting. The colour of the epidermis is whitish: in the smaller, a uniform whitish gray, while in the larger quills we observe a greyish covering. This whitish appearance, from which, indeed, and gray given to this bark are derived, depends on some other causes. The structure of the inner surface of this kind of bark is, in the smaller quills fibrous: the colour is rather reddish, or rusty cinnemon brown. The fracture is even, and resinous: the odour and which Bergen says is peculiar to this kind. The taste is astringent, and bitter; the powder of a deep cinnamon brown.

COMMERCIAL AND OTHER VARIETIES.—In this country we find...
allowing are the quantities of pure cinchonia and quina in this bark, according to the undermentioned authorities:

<table>
<thead>
<tr>
<th></th>
<th>Cinchonia</th>
<th>Quina</th>
</tr>
</thead>
<tbody>
<tr>
<td>In one lb. of bark</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>from 74 to 210 grs.</td>
<td>0</td>
</tr>
<tr>
<td>nitens</td>
<td>30 grs.</td>
<td>22 grs.</td>
</tr>
<tr>
<td>dis.</td>
<td>74 grs.</td>
<td>22 grs.</td>
</tr>
<tr>
<td>2nd sample</td>
<td>148 grs.</td>
<td>0</td>
</tr>
<tr>
<td>and Kirsch</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

OGAMIA.—Mosses and Jungermannias are never found on this bark, as lichens are much more scarce than on Loxa bark. The following is a list of the Cryptogamia:

- Opegrapha Ruiziana
- O. Condaminea
- O. rugulosa
- O. La
- Graphis Acharri
- G. serpentina
- Arthonia confusa
- A. diver
du
- A. obtusa
- Trypethelium variolosum
- Pyrenula mardela
- P. myrio
- P. mollis
- Verrucaria nitida
- V. theioplae
- Ascidiun Cinchonarum
- a tuberculosa

3. CINCHONA JAEN.—ASH CINCHONA.

(Bark of Cinchona ovata, Fl. Peruv.)


LILY.—Little is known respecting the history of Ash Cinchona, con-

siderably, probably, of its being confounded with other kinds of pale bark. It is a bark, therefore, at what period it was introduced into commerce. Bergen found it in an old collection of drugs made in 1770. Virey * refers to the name of pale gray or female Loxa cinchona: but it does not appear to have been known to the other French pharmacologists until I sent samples of bark to Professor Guibourt, who has described it, erroneously I think, as a variety of Loxa.

FY.—This kind of cinchona bark agrees with the one described in the work on Cascarillo pallido (C. ovata, Fl. Peruv.); a specimen of which, in collection of bark, was examined by Bergen, and found to be identical with Cinchona.

GERCE.—It is usually imported in chests of from 110 to 140 lbs.; but we have also in boxes of from 70 to 100 lbs.

DENTAL CHARACTER.—Coat thin, light, readily pulverized; cracks few; mostly crooked; colour dark cinnamon brown (Bergen).

DESCRIPTION.—This bark is met with in a quilled form only: the quills being of medium size, or somewhat thick; being from 4 to 16 inches long, from 3 to 1 inch in diameter, and from ¾ to 2 lines thick. A very remarkable character of this bark is the crookedness of the quills, which are more or less twisted; from which circumstance we may infer the probability of obtaining from a tree which grows in a damp situation. On the outer surface of this bark we observe a few transverse cracks, and some faint longitudinal cracks; but in these respects there is a manifest difference between this and the bark of Cinchona. The colour of the outer surface varies between ash grey, whitish or pale yellow, with blackish or brownish spots. The inner surface is even or splintery, and of a cinnamon brown colour. The fracture is uneven; the odour is tan-like; the taste feebly astringent and bitter; the powder is cinnamon brown.

† See his Hist. des Drogs. ii. 35-3
‡ Monogr. 319.
COMMERCIAL VARIETIES.—No division of ash cinchona is made by English dealers. Bergen makes two varieties of it, the pale and the dark; the latter also called False Loxa Bark, or Dark Ten China Cinchona (China Pseudo-Dunkel Ten China), a bark which has many of the properties of ash cinchona, and which is found mixed with the Loxa bark of commerce. It is principally distinguished from the pale ash cinchona by the irregular longitudinal wrinkles and transverse cracks, and by its darker colour. Guibourt regards it as an inferior kind of Loxa bark. Bergen says it agrees with a bark the collection of Ruiz, said to be obtained from the C. lanceolata of Mollal.

COMPOSITION.—Ash Cinchona has not been analysed. It appears to be markedly deficient in cinchona alkalial. Von Santen has failed to procure quina or cinchonia from it. Michaelis, and Goebel and Kirst, obtained following quantities of quina and cinchonia from it:

<table>
<thead>
<tr>
<th>1 lb. of Bark</th>
<th>Quina.</th>
<th>Cinchonia.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michaelis 1st sort (Cinchona fuscæ Ten)</td>
<td>44 gms.</td>
<td>12 gms.</td>
</tr>
<tr>
<td>2nd sort.</td>
<td>80 gms.</td>
<td>12 gms.</td>
</tr>
<tr>
<td>Goebel and Kirst</td>
<td>12 gms.</td>
<td>none.</td>
</tr>
</tbody>
</table>

CRYPTOGAMIA.—Few cryptogamic plants are found on this bark. The following is a list of them, according to Bergen.

LICHENES.—Graphis sculpturata; Porina granulata; Pyrenula verrucoides; Leccanora pustulca; Parmelia melanoleuca, and Usnea florides & Cie.

The Dark Ash Cinchona (Bergen), of all others, abounds most in lichens. Besides some of the foregoing, the following lichens have also been found on it:—Opegrapha scopella; Thelotrema terebratum; and Sticta aurata.

4. CINCHONA HUAMALIES.—HUAMALIES OR RUSTY BARK.

Bark of Cinchona purpurea.

SYNONYMS.—Quinquina de Huamalies, and Q. huamalies ferruginex, Guille, China Huamalies; Braune China, Bergen. China Huamalies, Guanalia, Abomalius, Goebel. Braune China; China Huamalies; China fuscæ, Grig.

HISTORY.—It is not known precisely when this kind of bark first came into Europe, Von Bergen thinks that it probably was introduced simultaneously with silver bark at the end of the last or commencement of the present century. In 1803 it was frequently carried direct from Lima to Hamburg. This bark was not used as a distinct kind in this country, and hence most druggists are not acquainted with it; but it is bought by some of our merchants for the foreign markets, especially for Germany.

BOTANY.—The bark of Cinchona purpurea, R. and P. (Cascarilla bolo y roda), brought from South America by Pöppig, was found by Reichel to be identical with the Huamalies bark.

COMMERCE.—It is imported in chests, never in seroons.

ESSENTIAL CHARACTER.—Coat thin and spongy; longitudinal wrinkles and warts which penetrate to the cortical layers (alburnum, Bergen); under-surface even; colour rusty-brown (Bergen).

DESCRIPTION AND VARIETIES.—This kind of bark presents very different appearances at different ages, so as almost to defy arrangement. Some of the finer quills might readily be mistaken by inexperienced persons for Crown Bark, while others greatly resemble white Loxa bark. The large flat pieces, on the other hand, I have known mistaken by an experienced dealer for what he terms "fimby" red bark.

Some of the finer quills (Huamalies simulating Crown Bark) greatly resemble those of Loxa or Crown Bark, but are paler externally, have fewer transverse cracks, are smoother, or finely wrinkled longitudinally, and, when broken, appear nearly white in the interior. Another kind (Gray-corky Huamalies Bark) I have frequently found in the Loxa Bark of commerce. It occurs in h
which have a whitish or grayish corky or spongy epidermis, which is
red or furrowed longitudinally, and may be removed by the nail. On some
pieces we observe rusty-coloured warts, which, when numerous, are dis-
in irregular longitudinal lines. A flat variety (White verrucous Huamalies)
have a whitish epidermis, with large red warts, from which the epidermis
have been removed. Another kind (Rusty Huamalies; Quinquina ferrugineus,
rust) is in quills or flat pieces, distinguished by the ochre-red or rusty
of its outer surface, the presence of warts, arranged for the most part
adulterated, and the almost total absence of transverse cracks.

Composition.—I am acquainted with any analysis of this bark. The fol-
lowing are the quantities of Cinchona alkaloids, according to Von Santen,
and Goebel and Kirst.

<table>
<thead>
<tr>
<th>1 lb. of Bark.</th>
<th>Cinchona. Quina.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Fine and middling-fine quills, and flat pieces (from Cadiz)</td>
<td>60</td>
</tr>
<tr>
<td>2. Thick warty quills, and flat pieces (from Lima)</td>
<td>75</td>
</tr>
<tr>
<td>3. Sorts (from Lima in 1803)</td>
<td>60</td>
</tr>
<tr>
<td>4. As No. 3 (another chest) rather heavy</td>
<td>42</td>
</tr>
<tr>
<td>5. As No. 3 (another chest) rather light</td>
<td>35</td>
</tr>
<tr>
<td>1st sort</td>
<td>0</td>
</tr>
<tr>
<td>2nd sort</td>
<td>48</td>
</tr>
<tr>
<td>3rd sort</td>
<td>60</td>
</tr>
<tr>
<td>4th sort</td>
<td>30</td>
</tr>
</tbody>
</table>

Cryptogamia.—The following cryptogamic plants are mentioned in Von
Santen as existing on this bark.

Cenpes.—Opegrapha enterotetura; Graphis duplicata; Verrucaria phae;
Sina papillata; Pyrenula discolor; P. mastoides; and P. verrucarioides;
Numula pumicn; Parmelia melanoleuca; and Usnea floridea & Cinchona.

5. CHINCHA CALISAYA SEU REGIA.—ROYAL YELLOW BARK.

Cinchona flavus, E. D.

Synonyms.—Quinquina Calisaya on Jauve royal, Guibour. China regia;
China regia, Cortega China regulus, s. flavus, s. leucus; Calisaya, Goebel.

Story.—Dr. Relph says, that in a letter from a Spanish merchant at Cadiz,
September 1789, it is observed that the yellow bark had only been lately
there. “The first parcel which arrived here was tried at Madrid, and
immediately bought by the King’s order for his own use.” In 1790 Murray saw
it at Framford on the Maine. He afterwards received it under the
title of cortex chinea flavus; and to prevent confusion he proposed to term it
yellow bark (cortex chinea flavus). Dr. Relph says it was unknown in
and till 1793; but this must be an error; for Murray, who died in 1791, had
lied it from London. It is not improbable it may be the amarilla
cinchoana mentioned by Arrot; by Condamine; and by J. D. Jussieu;
and cannot be ascertained now. The term Calisaya, applied to this bark in
Portugal, is the name of a province producing the bark.

—The species yielding this bark is at present unascertained.

Bergen, Mir., Monogr. Pl. v.

Pharm. Zoophytk. i. 74.

A. Brown, Ed. into the Med. Efl. of Yellow Bark, 1791.

App. Med. vi. 175.


Phil. Trans. 1738, p. 296.

Hist. de la Soc. de Med. 1779, p. 292.

Pl. Aquinox. i. 60.

Hist. de la Soc. de Med. 1736, p. 59.

Humboldt, in Lambert’s Illustr. p. 53.

Mr. Lambert also states that Quina amarilla Bogotan-
Quina nanajada (C. lanceifolia, Mutis), of Quina antea (C. lanceolata, Fl. Peru.), and of Quina peruiana (C. nitida, Fl. Peru.), all of which are varieties of our yellow cinchona (royal or Calisaya yellow bark). Guibourt tells us that great differences exist between our yellow cinchona and the other species (C. lanceifolia, Mutis).

Commodity.—It is imported in serons and chests. The whole sells at from 135 lbs. to 150 lbs. The chests contain 150 lbs.

Essential Characters.—Cortex very thick, brittle; furrows longitudinal and predominating, transverse; under-surface uneven; colour deep cinchona (Bergen).

Description.—In commerce, two varieties are distinguished; the quilled and the flat.

a. Quilled yellow bark (cinchona regia tubulata seu convoluta) varies in length from three to eighteen inches; in diameter, from two and a half to six inches; in thickness, from half to one inch. Very small quills, however, are rare; those usually met with have the length of one to one and a half inches, and a thickness of from three to five millimeters. Sometimes they are doubly, though in general they are singly, quilled are in general coated. On their external surface they show longitudinal wrinkles and furrows, and predominating transversely, often form complete circles around the quills, and whose edges are sharp. These furrows and cracks give a very rough character to this kind, which, indeed, it may be readily distinguished from the large quills or Huanuco bark. The colour of the epidermis is more or less brown. Those spots where the epidermis is wanting, the outer surface of the quill is of a clear brown colour. In other characters the quilled and flat characters agree.

The finest quills are selected for druggists' show-bottles.

b. Flat yellow bark (cinchona regia plana).—The pieces of this variety vary in length from eight to fifteen or eighteen inches long; from one to three inches in diameter, and from one to five lines thick. They are but little curved and general the pieces are uncoated (cinchona regia nuda).

Sometimes...
CINCHONA.

CINCHONA.

CINCHONA. 1389

The bark, called by Guibourt Quinquina Jaune du roi d’Espagne, is unknown in commerce. Guibourt says, that it has an odor like that of tobacco, that it consists principally of young barks, resembling Calisaya or Royal

Cinchona (the Yellow Cinchona of English commerce). It is the Cas-

sale hoja de Olea (Cinchona nitida, R. P.?) of Poppig?

Cinque’s Orange Cinchona of Santa Fé 1 once met with in the docks under the name of New Spurious Yellow Bark. This, as well as the Cusco and Carpathicus, is sometimes mistaken for the Royal Yellow bark, will be noticed among White Cinchonas.

IMPOSITION.—Pelletier and Caventou 4 found in this bark superkinicate of lime, red cinchonic, soluble red colouring matter (tannin), fatty

er, yellow colouring matter, lignin, and starch. In 1827, Pelletier 4 consumed 1 quintals of this bark in the manufacture of 90,000 ounces (French) of phate of quina: this is about three drachms of disulphate for one lb. of it; Soubiran 8 states that one lb. (French) of uncoated yellow bark yields three drachms and from 30 to 50 grains (French) of disulphate of quina; while same quantity of coated yellow bark yields three drachms (French) of disulphate. I have been informed, by some manufacturers, that an ounce of disulphate has been obtained from two lbs. of yellow bark; but this is beyond average produce.

CRYPTOGAMIA.—The following is Fée’s list of the cryptogamic plants found in his bark. 1

FUNGI.—Hypochmus rubro-cinctus; Trichinum Cinchonarum.

LICHENES.—Opegrapha perennis; O. Scaphella; O. ovata; O. rhizocola; Phis cinerea; G. cinnabarina; Arthonia obtita; Fissurina Dumastii; 

necton sphaerale; Trypethelium verrucosum; T. chiodectonoides; Pyrenula 

larix; Porina americana; Ascidium Cinchonarum; Lepra flava; Variolaria 

ara; Lecidea aurigera; L. tuberculosa; L. sordefera; L. punicca; Parm 

ula perlatat; Sitca macrophylla; Colema azureum; Soloria vitellina; 

ce florida et barbate.

HEPATICA.—Jungermannia atrata.

MUSCI.—Hypnum Langsdorfi.

6. CINCHONA RUBRA, E. D.—RED CINCHONA.

(Cinchona oblongifolia; Cortex, E. D.—Red Bark, from an undetermined species, E.)

SYNONYMES.—Quinquina rouge verrueux, and non-verruqueux, Guibourt.

a rubra; Rothe China, Bergen. China rubra; Cortex Chinae ruber, Goebel.

STORY.—It is probable, as Bergen suggests, that this red bark was known to early travellers in South America, who have noticed the cinchona bark; as well as Condamine, speak of a red bark (colorata) of the best quality.

1 Journ. de Pharm. vii. 89.
4 Dict. Nat. Méd. v. 608.
8 Traité de Pharm. i. 608.
4 Cours d’Histo. Nat. ii. 262.
Dr. Saunders states, that in the year 1702 a parcel of bark (which he was the red kind) was taken on board a Spanish vessel, and a portion of it fell to the hands of a celebrated London apothecary, Mr. D. Pearson. In 1722, an Spanish ship, bound from Lima to Cadiz, was taken by an English frigate, carried into Lisbon. Her cargo consisted principally of red bark, and was the most part, sent to Ostend, where it was purchased at a very low price by some London druggists, who, after some difficulty, contrived to get it into practice.

**Botany.**—The species which yields the red bark is at present unsettled. It has been usually, though erroneously, supposed to be the Cinchona aculeata, Mutis, which yields a bark called Quina roxa, or Quina Acabar or Santa Fé; and which was supposed to be our red bark. But Bergen examined the bark bearing this name in the collection of Ruiz, and finds it not our commercial red bark, but the *Quinquina nova* of the French pharma-
gists. Moreover, Schrader (who received a piece of the bark of the *C.
*oblongifolia* from Humboldt) declared it to be a new kind; and Guibourt that the red bark of Mutis, which was deposited by Humboldt in the Mus 
Natl. History of Paris, is not commercial red bark, but *Quinquina nova*
these statements may be added the testimony of Ruiz and Pavon, and of 
Boldt; the two first of which writers state, that the *Quina roxa* is obtained 
the *Cinchona oblongifolia*, but they do not know the origin of *Quina colora*
red bark of commerce; and Schrader states, that Humboldt declared he know the tree that yielded red bark.

**Commerce.**—Imported in chests; never in serows. Good samples are much larger sized pieces than are now met with.

**Essential Character.**—*Coat* thick, with wrinkles (longitudinal); and *warts*, but without any important impression on the *cortical* layers [al. Bergen]. *Inner surface* uneven; *colour* brownish-red (Bergen).

**Description.**—Red bark occurs in quills and flat pieces. The quills diameter from two lines to an inch and a quarter; in thickness from one-
two lines; in length from two to twelve or more inches. The so-called flat are frequently slightly curled; their breadth is from one to five inches thickness from one-third to three-quarters of an inch; their length from to two feet. Red bark is usually coated; its outer surface is rough, wrinkled, furrowed, and frequently warty. The colour of the epi-
varies; in the thinner quills it is grayish-brown, or faint red-brown; in quills and flat pieces it varies from a reddish-brown to a chestnut-frequently with a purplish tinge. As a general rule, it may be said that larger and coarser the quills and pieces, the deeper is the colour. Crypta plants are not so frequent on this as on some other kinds of bark. Tmucous is frequently thick and spongy, especially in large flat pieces; more so than in yellow bark. The inner surface of the bark is, in fine 
finely fibrous; in large quills and flat pieces, coarsely fibrous, or even splis its colour increases with the thickness and size of the pieces; thus, in fine it is light rusty brown; in thick quills and flat pieces it is a deep reddish-
plish brown. Some of the specimens of red bark, which I have received 
Von Bergen, approach yellow bark in their colour. The transverse fract 
fine quills is smooth; of middling quills, somewhat fibrous; of thick quill-flat pieces, fibrous and splintery. The taste is strongly bitter, somewhat 
matic, but not so intense and persistent as that of yellow bark; the co-
feeable, tan-like; the colour of the powder is faint reddish-brown.

**Commercial and other Varieties.**—The obvious and common distinct into *quilled red bark* and *flat red bark*. The warty pieces constitute the *pr.
verrucaus* of Guibourt; the pieces without warts are the *quinquina non-err*
of the same pharmacologist. In the red bark of commerce, we frequent

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8 *Observ. on the super. Efficacy of the Red Peruvian Bark*, p. vi. 1782.
9 *Hist. des Drogs.*, 59.
CINCHONA.

... with a white micaceous epidermis: these, which are probably the prototypes of a distinct species of Cinchona, constitute the quinquina rouge à épiderme et niaque (quinquina Carthayenne, 2nd ed.) of Guibourt; and will be described among the white cinchonas. The quilled red bark, called by Guibourt red Lima cinchona; the flat orange-cinchona, and the pale red cinchona of the same pharmacologist, are not distinguished in English commerce.

The consumption of red cinchona being very small, but little attention has been paid to it, and no distinctions are made of it, except in the quilled and the latter being sub-divided into coated and uncoated.

Preparation.—According to Pelletier and Caventon, red bark contains super of cinchona, superkinoate of quina, kinate of lime, red cinchonic, soluble colouring matter (tannin), fatty matter, yellow colouring matter, lignin, and so on. Sonbeirn states, that one lb. of deep-red cinchona yields two drachms of quina and one drachm of sulphate of cinchonia; while one lb. of red cinchona yields a drachm and a half of the sulphate of quina and one drachm of sulphate of cinchonia.

Following are the quantities of cinchona alkaloids obtained from this bark by Santen, Micheli, and by Goebel and Kirst.

<table>
<thead>
<tr>
<th>Cinchona.</th>
<th>Sulphate Quina.</th>
<th>Quina.</th>
</tr>
</thead>
<tbody>
<tr>
<td>70 grs.</td>
<td>77 grs.</td>
<td></td>
</tr>
<tr>
<td>99</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>97</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>150</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>184</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>—</td>
<td>64</td>
</tr>
<tr>
<td>65</td>
<td>—</td>
<td>40</td>
</tr>
</tbody>
</table>

CRYPTOGAMIA.—The following are the cryptogamic plants on red cinchona, according to Fée:

LICHENES.—Euphorbia Bonplandi; O. farinacea; Graphis Acharii; G. lins; G. frumentaria; Pyreuma verrucaroide; Verrucaria sinapisperma; Helotium varicolor; T. teretum; T. myriocarpum; and Lecidea conspersa.

7. CINCHONA LOXA ALBA.—WHITE LOXA BARK.

Quinquina blanc de Loxa, Guibourt.

This is found in the Crown or Loxa Cinchona of commerce; with which it agrees in general appearance, being essentially distinguished by its whitish epidermis. It has considerable resemblance to the quilled Huamalies with a whitish epidermis also to Carthagenan bark.

Guibourt’s White cinchona is a flat yellowish bark very dissimilar to the preceding, and is said to be the produce of Cinchona covafofolia, and to contain a peculiar alkaloid called blanquinic (see p. 1400).

8. CINCHONA DE CARThAGENA DURA.—CARThAGENA HARD CINCHONA.

(Bark of Cinchona cordifolia.)


History.—See Cinchona de Cathagenae fibrosa.
Dr. Saunders states, that in the year 1702 a parcel of bark (the red kind) was taken on board a Spanish vessel, and on the hands of a celebrated London apothecary, Mr. D. Pearson, a Spanish ship, bound from Lima to Cadiz, was taken by an E to Lisbon. Her cargo consisted principally of red bark, the most part, sent to Ostend, where it was purchased at some London druggists, who, after some difficulty, contrived into practice.

Botany.—The species which yields the red bark is at present known as a tree. It has been usually, though erroneously, supposed to be Quina, Mutis, which yields a bark called Quina roza, or Quina Santa Fe; and which was supposed to be our red bark. I examined the bark bearing this name in the collection of Ruiz, and found it to be the Quina Mutis, but not our commercial red bark, but the Quina Quina nova, a species of Quina Mutis. Moreover, Schrader (who received a piece of the oblongifolia from Humboldt) declared it to be a new kind; that the red bark of Mutis, which was deposited by Hb. Natural History of Paris, is not commercial red bark, but that these statements may be added the testimony of Ruiz and Humboldt; the two first of which writers state, that the Quina, the Quina oblongifolia, but they do not know the origin of the red bark of commerce; and Schrader states, that Humboldt know the tree that yielded red bark.

Commerce.—Imported in chests; never in serows. I am informed by an experienced dealer, that this bark is much larger sized pieces than are now met with.

Essential Character.—Coat thick, with wrinkles and warts, but without any important impression on the [Bergen]. Inner surface uneven; colour brownish-red.

Description.—Red bark occurs in quills and flat pieces, diameter from two lines to an inch and a quarter; in the two lines; in length from two to twelve or more inches, are frequently slightly curled: their breadth is from thickness from one-third to three-quarters of an inch to two feet. Red bark is usually coated; its surface rough, wrinkled, furrowed, and frequently warty. The color varies: in the thinner quills it is grayish-brown, or yellow; quills and flat pieces it varies from a reddish-brown, frequently with a purplish tinge. As a general rule, larger and coarser the quills and pieces, the deeper the color. Plants are not so frequent on this as on some other muceous is frequently thick and spongy, especially more so than in yellow bark. The inner surface of the quills is fibers; in large quills and flat pieces, coarsely. Its color increases with the thickness and size of the piece; it is light rusty brown; in thick quills and flat pieces, purplish brown. Some of the specimens of red bark, which is smooth; of middling quills, somewhat flat pieces, fibrous and splintery. The taste is aromatic, but not so intense and persistent as that of the yellow. The powder is faint red.

Commercial and other Varieties.—The obvious into guilled red bark and flat red bark. The warty pieces are of Guibourt; the pieces without warts are of the same pharmacologist. In the red bark of

---

1. Obscr. on the super. Efficacy of the Red Permick
2. Hist. des Drogs. n. 83.
in the manner of our Park. The bark, a discolor;

1 pieces may, but they may in their infu-
sion (Calisaya) be partially or The rete mucos-
ace is yellowish um and cortical which Guibourt
pound of bark).

a Bark (Écorce) become green on armed aricin. In and Aria bark: it is
Carthage fibrous usco cinchona. But
11. CINCHONA AURANTIACEA DE SANTA FE.—ORANGE CINCHONA OF SANTA FE.
(Bark of Cinchona lanceolata.)

This bark was formerly described by Guibourt as Carthaginea spongia (Quinquina de Cathagenea spongiosa). I have once met with it in England, the name of new spurious yellow bark. It was unsaleable, and in a ware at the London Docks. Its origin was unknown, until Guibourt found a specimen of it at the Muséum d'Histoire Naturelle of Paris, where it had been deposited by Humboldt as the orange cinchona of Mutis (Cinchona lanceolata). The outer layers are excessively fibrous, very slightly bitter, in some pieces almost sweet, and of an orange colour. The largest pieces are semi-cylindrical, 4 or 5 cm. broad, 8 cm. thick, above 12 inches long, covered in places with a yellowish-white, smooth, micaceous epidermis, presenting on the outer surface horizontal cracks. The smaller pieces are an inch and a half broad, and are externally from the numerous short cracks (longitudinal and transverse) to the epidermis. Guibourt says, that the epidermis is not cracked, but this statement does not agree with my specimen. Some small克的 risk in which I received this celebrated pharmacologist are tolerably smooth. The orange cinchona of Santa Fé is of little medicinal virtue, though Mutis declared it to be of value; and his opinions and errors on this and some other topics have unfortunately been adopted by Humboldt. The following observation of this celebrated pharmacologist shows the just estimate formed by, not the ignorance of the Spanish authorities respecting the value of this bark: "The effect of mercantile enterprise went so far, that, at the royal command, a quantity of the best orange-cinchona bark, from New Granada, which M. Mutis had caused to be purchased, for the expense of the king, was burned, as a decidedly inefficient remedy; it cannot be that all the Spanish field-hospitals were in the greatest want of the valuable product of South America." Soubiran says, 1 lb. of spongy Carthaginea (Quinquina de Cathagenea spongiosa) yields from 24 to 36 g. of sulphate of cinchonia; but I suspect he does not allude to this bark.

12. CINCHONA NOVA.—MUTIS'S RED CINCHONA OF SANTA FE.
(Bark of Cinchona magnifolia.)

This bark is the Kina nova or Quinquina nova of the French pharmacists. The evidence on which it is referred to C. magnifolia has been already (see p. 1390). I have only once met with this bark in London. It has been sent, mixed with several other barks, to a drug-mill to be ground to powder, and if it resembles any other cinchona barks with which I am acquainted, Guibourt, as it usually does, says: "Bark about a foot long, quilled when small, or almost flat when larger, having, in general, a perfectly cylindrical form, with its outer surface called candel cinchona (quinquina chandelier). Its epidermis is thin, smooth, and has scarcely any cryptogamia (one has the form of waxy, mamillated plates), without any other fissures than some transverse which extend to the liber, and appear to be the effect of desiccation; and the circular impression of quilled yellow cinchona, for example, depends on the organization of the bark. Sometimes the epidermis is wanting. The bark is properly so called, from one to three lines thick, of a pale carnauba, which becomes deeper in the air, especially at the outer surface, which, when deprived of epidermis, is always brownish-red; its fracture is foliated, short and fibrous internally; and when examined by a lens, we see between the fibres, and especially between the laminae, a great abundance of granular matters, one red, the other whitish, and which give the roseate appearance to the bark. Some pieces present in their fracture, and nearer the external

* Humboldt in Lambl's Illustr. p. 33.
* Traité de Pharm. i. 605.
* Hist. des Drog. ii. 90.
* The bark of the trunk is five or six lines thick, covered with a white, friable, unequal, or epidermis: in other respects it resembles that of the branches.
CINCHONA.

13. RED CINCHONA, WITH A WHITE MICACEOUS EPIDERMIS.

In February 1791, Fourcroy published an account of St. Lucia Bark (formerly called St. Domingo Bark), which was regarded as a model of vegetable analysis. In 1802, it was concluded, that as the active principle of cinchona was present in an infusion of nutgalls, it must be gelatine, and thereupon and employed the use of clarified glue as a febrifuge in fevers. In 1803, Dr. Duncan, jun., shewed that the active principle could not be gelatine, but must be a substance sui generis, and, therefore, termed cinchonia. In 1806, Vauquelin published experiments on seventeen kinds of cinchona. In 1810, Gomes de Lacerda isolated cinchonia, and obtaining it in a crystalline state in 1820, Pelletier and Caventou announced the existence of amicalkalis, cinchonia and quinina, in cinchona bark. In 1821, Pelletier and Coriol discovered a third alkali, aricina, in a red cinchona bark.

The following are the most important epochs in the chemical history of the cinchona barks.

The constituents of pale (Loxa ?), yellow, and red cinchona, are, according to Pelletier and Caventou, and other chemists, the following:

<table>
<thead>
<tr>
<th>Pale Cinchona</th>
<th>Yellow Cinchona</th>
<th>Red Cinchona</th>
</tr>
</thead>
<tbody>
<tr>
<td>cinchonia</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>quina</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>double red colouring matter (tannin)</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>double ditto (red cinchonic)</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>brown colouring matter</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>en fatty matter</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>cinchonia</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>cinchonia</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>cinchonia</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

Following are the chemical classifications of cinchona barks, according to Goebel, Geiger, and Pfläff, before (p. 1378) referred to.
1. VOLATILE OIL OF CINCHONA (Odorous, Aromatic, or Balsamic)

This was procured first by Fabbroni, afterwards by Trommsdorff, by distilling the barks with water to distillation. The distilled oil had the peculiar odour of the bark, and a bitterish acrid taste. The oil on the water was thick and butyrous, and had the peculiar odour of and an acrid taste. Zenneck says the cinchona odour is imitated by potash, as well as by chloride of iron.

2. TANNIC ACID (Astringent Principle; Soluble Red Colouring Matter)

is a constituent of the most valuable kinds of cinchona. Its presence is detected by the ferruginous salts, by a solution of emetic tartar, and by a solution of gelatine: the first produces a green colour or (tannate of iron), the second causes a whitish precipitate (tannate of the third also a whitish precipitate (tannate of gelatine). According to another principle in cinchona barks (resin, Bucholz) which precipitate with emetic tartar; for the quantity of precipitate produced bears no ratio to that occasioned by the solution of gelatine; in some being more, in others less. Cinchona tannin is remarkable for the opacity with which its solution absorbs oxygen, and becomes coloured when exposed to the air, especially under the influence of alkalis. The red insoluble which is formed is, according to Berzelius, red cinchonic. The combination of tannin with acids are more soluble than those of nutgall tannin.

3. RED CINCHONIC (Insoluble Red Colouring Matter).—This substance is considered by Berzelius to be a product of tannin altered by the air, and of tannin and apothéme. It appears to me to agree in most of its properties with catechine, a substance which is found in great abundance in another cinchonaceous plant (see Uncaria Gambir). It is inodorous, insipid, reddish brown colour. It is insoluble, or nearly so, in cold water, but is more soluble in boiling water. Acids favour its solution in water. It is in alcohol (especially when hot) but scarcely so in ether. Its aqueous solution has not, either with or without an acid, the power of forming a precipitate of gelatine, but it has with emetic tartar. If, however, red be dissolved in an alkaline solution, and then precipitated by an acid,
CINCHONA.

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of precipitating gelatine. But if it be heated with a solution of potash, it loses the power of precipitating gelatine.

CINCHONIC, CINCHONIC, or QUINIC ACID.—This acid is not peculiar to the cinchona, being also found, according to Berzelius, in the alburnum of Abies. As met with in commerce, cinchonic acid is in the form of a thick syrupy mass which may be crystallized, though with difficulty. It is soluble both in alcohol, and has an acid taste. When heated in closed vessels, it is said, pyrokinic acid is formed; and an odour of caramel evolved (like sugar or tartaric acid, when heated). Sulphuric acid dissolves it, gives a green tint, and, by the aid of heat, carbonizes it. It does not precipitate calcareous salts, nitrate of silver, or the neutral acetate of lead; but it will precipitate the diacetate of lead. In the solubility of its combinations it is alike to acetic acid, from which it is distinguished by its crystallizability, not volatilizing unchanged. The Kinoates are analogous to the acetates of silver in water: they are insoluble in pure alcohol. When dried, it has a gummy appearance; and when decomposed by heat, evolve an odour of pyrokinic acid does not precipitate the alkalies, lime, or barytes; it precipitates the salts of lead and silver; and lastly, it gives a beautiful green coloration to the salts of iron. Crystallized cinchonic acid consists of \( C_7 H_6 O_4 \): its specific gravity, therefore, is 95.

QUINIC ACID.—This acid was discovered by Pelletier and Caventou in Cinchona (see p. 1395). It has considerable analogy to stearic acid. It is a white, light substance, very little soluble in water, but readily dissolved in alcohol and ether. A solution of \( \text{cinchonate} \) of magnesia forms precipitates with solutions of acetate of lead, bichloride of mercury, and the salts of cinchona.

CINCHONA ALKALIS (Cinchonia, Quina, and Aricina).—It appears from the words of Henry and Plisson* that cinchonia and quina exist in cinchona combination with cinchonic acid, and also with red cinchonic. The quinechin and quina yielded by some cinchona barks is thus stated by J. Goebel's table has been already (p. 1396)

\[
\begin{align*}
\text{According to Soueiran.} & \quad \text{According to Von Santen.} \\
\text{Troy Grains.} & \quad \text{Apoth. Grains.} \\
\text{Coated Yellow (Calisaya)} & \quad \text{Coated Yellow (Calisaya) Bark} \\
202 \text{ to } 218 \text{ grs.} & \quad 160 \text{ grs. of Sulphate of} \\
218 \text{ grs.} & \quad \text{Quina, and } 2 \text{ grs. of pure} \\
of \text{Quina.} & \quad \text{Cinchonia.} \\
\text{Yellow (Calisaya)} & \quad 177 \text{ grs. of ditto.} \\
88 \text{ to } 118 \text{ grs.} & \quad 53 \text{ grs. of Sulphate of} \\
of \text{of Sulphate of} & \quad \text{Quina.} \\
\text{Quina.} & \quad 3 \text{ grs. of Sulphate of} \\
\text{Cinchonia.} & \quad \text{Cinchonia.} \\
\text{Lima) Bark} & \quad 118 \text{ grs. of Sulphate of} \\
88 \text{ grs. of ditto.} & \quad \text{Quina, and } 30 \text{ grs. of } \\
of \text{of Sulphate of} & \quad \text{Sulphate of Cinchonia.} \\
\text{Cinchonia.} & \quad 3 \text{ grs. of Sulphate of Cinchonia.} \\
\text{Loxa Bark} & \quad \text{30 grs. of pure Cinchonia.} \\
118 \text{ grs. of Sulphate of} & \quad 3 \text{ grs. of Sulphate of Cinchonia.} \\
\text{Quina, and } 30 \text{ grs. of Sulph.} & \quad 34 \text{ grs. of pure Cinchonia, } \\
of \text{of Sulphate of} & \quad \text{et } 30 \text{ grs. of Sulphate of Quina.} \\
\text{Cinchonia.} & \quad \text{Fibrous Carthagena Bark} \\
88 \text{ grs. of Sulphate of} & \quad \text{34 grs. of pure Cinchonia, } \\
\text{Quina, and } 30 \text{ grs. of Sulphate of} & \quad \text{et } 30 \text{ grs. of Sulphate of Quina.} \\
\text{Cinchonia.} & \quad \text{Huanalies Bark} \\
184 \text{ to } 203 \text{ grs. of Sulphate of} & \quad \text{95 grs. of pure Cinchonia.} \\
\text{Carthagena Bark} & \quad 1 \text{ gr. of Gallate of Quina.} \\
& \quad \text{False Loxa Bark} \\
\text{203 grs. of Sulphate of} & \quad \text{0} \\
\text{Cinchonia.} &
\end{align*}
\]

Cinchona and quina possess the following properties: when burned with ammonia they leave no mineral, earthy, or alkaline residuum. Their blue nature is shown by their restoring the blue colour of reddened litmus.

* Journ. de Pharm., xiii. 269, and 309.
* Trait de Pharm. 1, 605.
* Bergin, Monograph 75.
An iodate and hydriodate are formed when iodine and water is mixed with cinchonia or quina. Nitric acid does not colour either of these alkaloids; hence they are distinguished from morphia, brucia, and commercial strychnia. When solution of the nitrate of either cinchonia or quina is concentrated, the hydriodate separates under the form of oleaginous drops, which solidify on cooling and, if immersed in water, absorb this fluid, and become covered in a few hours with groups of crystals. Solutions of the salts of cinchonia and quina form precipitates on the addition of ammonia, ferrocyanide of potassium, carbonate of nutgalls, oxalate of ammonia, or of tartrate of potash. Cinchonia, and aricina, may be regarded as oxides of a common base (constituent C₃H₁₂N), which has been termed quinogen.

1 atom Quinogen ...... = 146
1 atom Oxygen .......... = 8
2 atoms Oxygen .......... = 16
3 atoms Oxygen .......... = 24
1 atom Cinchonia ...... = 154
1 atom Quina .......... = 162
1 Aricina ............ = 162

According to this hypothetical view cinchonia is a monoxide, quina a bisoxide, aricina a teroxide.

a. Quina (Quinine; Quinina; Quininum).—The simplest, readiest, and cheapest mode of procuring it, is by precipitating a solution of the disulphate of quina with ammonia, and collecting and drying the precipitate. Pelletier crystallized it by dissolving it in alcohol of sp. gr. 0·815, and setting the solution aside to evaporate spontaneously in a dry place.

Pure quina is white, indorous, very bitter, and fusible at about 300° F. Fused quina when cold is yellow, translucent, friable, and somewhat like a glass. Boiling water dissolves it 1 to 200th of its weight of quina; cold water dissolves much less quantity. It is readily soluble in alcohol (especially when hot), ether, and in water. Crystallized quina is a hydrate of quina, and contains one equivalent of water. The salts of quina are readily crystallizable, very bitter, and have a pearly aspect. They are, for the most part, soluble in water, alcohol, and ether. The oxalate, tartrate, tannate, and ferrocyanate, are the less soluble salts.

The following is the composition of quina—

<table>
<thead>
<tr>
<th>Atoms</th>
<th>Eq. Wt.</th>
<th>Per Cent.</th>
<th>Liebig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon</td>
<td>20</td>
<td>120</td>
<td>74·38</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>12</td>
<td>12</td>
<td>7·90</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>1</td>
<td>14</td>
<td>8·64</td>
</tr>
<tr>
<td>Oxygen</td>
<td>2</td>
<td>16</td>
<td>9·88</td>
</tr>
</tbody>
</table>

Anhydrous Quina ...... 1 ...... 162 ...... 100·00 ...... 100·00 ...... 100·00

1. Disulphate of Quina (see p. 1417).

2. Monosulphate of Quina; Neutral Sulphate of Quina.—This salt is formed by adding sulphuric acid to the disulphate. It is sometimes used in the manufacture of the latter salt, and remains, on account of its greater solubility, in the mother liquor, with the sulphate of cinchonia. It is also produced when we dissolve the disulphate in an aqueous liquid acidulated with sulphuric acid. This salt crystallizes in square prisms. It reddens litmus, but is not soluble in water. It is soluble in 22 parts of water at 55° F. or 11 parts at 70°. It is also soluble in alcohol. It is composed of—

<table>
<thead>
<tr>
<th>Atoms</th>
<th>Eq. Wt.</th>
<th>Per Cent.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulphuric Acid</td>
<td>1</td>
<td>40</td>
</tr>
<tr>
<td>Quina</td>
<td>1</td>
<td>162</td>
</tr>
<tr>
<td>Water</td>
<td>8</td>
<td>72</td>
</tr>
</tbody>
</table>

Crystallized Sulphate of Quina ...... 1 ...... 274 ...... 100·0

3. The Native Kinate of Quina is crystalline, very bitter, slightly soluble in alcohol, but very soluble in water. It is decomposed by ammonia, potash, or lime. The salts of lead and of silver slightly acidulated, do not produce it any apparent precipitate.

4. The Native Compound of Red Cinchonic and Quina is bitter, scarcely soluble in cold water, but more so in boiling water; the liquor becomes turbid as it cools. Acids promote its solution in water. It is readily soluble in alcohol. Alkalis decompose it, and precipitate the quina.
CINCHONA. (Cinchonae; Cinchonae; Cinchonii).—Obtained by precipitate from a salt of Cinchonia by ammonia. It crystallizes with facility from a solution of Cinchonia. Crystalized Cinchonia is anhydrous, colourless, inodorous, bitter. The form of the crystals is a four-sided prism, with oblique, terminal edges. When heated this salt does not fuse until it begins to decompose: it then furnishes a crystalline sublimate (cinchonia), gives out ammonia, and is a carbonaceous residuum. It is soluble in 2,500 parts of cold water, and somewhat less quantity of boiling water: the hot solution becomes opaque on cooling. It is soluble in alcohol, especially when hot: from the solution, on cooling, crystals are obtained. Its solubility in alcohol is, however, less than that of quina in this fluid. It is soluble in ether, but much less so in alcohol. It dissolves, though slightly, in fixed oils, somewhat more so in oil of turpentine, and in diluted acids.

Dissulphate of Cinchonia; Cinchonae Disulphates; Subsulphate of Cinchonia. Crystals are short, oblique prisms, terminated by bidental summits. Its taste is astringent. When heated it becomes phosphorescent: at 212° F, it fuses: at 248° F it loses its water of crystallization. It is soluble in 6 parts of alcohol of 0.85, and in 11 parts of absolute alcohol. It requires 54 parts of cold water to dissolve it. The following is its composition:

<table>
<thead>
<tr>
<th>Atoms</th>
<th>Eq. Wt.</th>
<th>Per Cent.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulphoric Acid</td>
<td>1</td>
<td>40</td>
</tr>
<tr>
<td>Cinchonia</td>
<td>2</td>
<td>386</td>
</tr>
<tr>
<td>Water</td>
<td>4</td>
<td>35</td>
</tr>
<tr>
<td>Crystallized Disulphate of Cinchonia</td>
<td>1</td>
<td>384</td>
</tr>
</tbody>
</table>

Salt has been frequently employed in medicine under the name of sulphate of cinchonia.

Neutral Sulphate of Cinchonia is not employed in medicine. It is prepared by distilling sulphuric acid to a solution of the disulphate. The crystals contain atoms of water of crystallization. They are much more soluble than those of the disulphate.

The Native Quina of Cinchonia possesses similar properties to the native quina; but ammonia produces with it a less flocculent precipitate, and it dissolves in alcohol, and is susceptible of crystallization.

**Comparative Table of some distinguishing properties of Cinchonia and Quina.**

<table>
<thead>
<tr>
<th>Cinchonia</th>
<th>Quina</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crystalline.</td>
<td>Amorphous (in the anhydrous state).</td>
</tr>
<tr>
<td>Bitter.</td>
<td>The hydrate is crystallizable, but with difficulty.</td>
</tr>
<tr>
<td>Insoluble when quite dry; when moist fuses, but at the same time decomposes.</td>
<td>Very bitter.</td>
</tr>
<tr>
<td>One atom contains only one atom of oxygen.</td>
<td>Fusible.</td>
</tr>
<tr>
<td>Dissolves in 2500 times its weight of boiling water.</td>
<td>One atom contains two atoms of oxygen.</td>
</tr>
<tr>
<td>Soluble; solution readily crystallizes.</td>
<td>Dissolves in 200 times its weight of boiling water.</td>
</tr>
<tr>
<td>Sparingly soluble; solution readily crystallizes.</td>
<td>More soluble than cinchonia; solution with difficulty crystallizes.</td>
</tr>
<tr>
<td>Four-sided prisms.</td>
<td>Very soluble; solution crystallizes with difficulty.</td>
</tr>
<tr>
<td>Soluble in 34 parts of cold water or 6 parts of spirit (sp. gr. 0.95).</td>
<td>Pearly silky needles.</td>
</tr>
<tr>
<td>Soluble in half its weight of cold water or one part of cold spirit (sp. gr. 0.95).</td>
<td>Soluble in 740 parts of cold water or 80 parts of spirit (sp. gr. 0.85).</td>
</tr>
<tr>
<td>Crystalizes in needles.</td>
<td>Soluble in 11 parts of cold water.</td>
</tr>
<tr>
<td>Scarcely crystallizable; aspect gummy.</td>
<td>More soluble in spirit than sulphate of cinchonia.</td>
</tr>
<tr>
<td>Scarcely crystallizable.</td>
<td>Crystalizes in silky or pearly tufts.</td>
</tr>
<tr>
<td>Very soluble; crystals small and granular.</td>
<td>Crystalizes in pearly needles.</td>
</tr>
<tr>
<td>A reddish solution.</td>
<td>Crystalizes in prismatic needles.</td>
</tr>
<tr>
<td>Less soluble; crystals in silky tufts, grouped in stars, &amp;c.</td>
<td>An emerald-green solution.</td>
</tr>
</tbody>
</table>
**ARCINA: Cusco-cinchonia; Cusconin.**—Discovered in Arica or Cusco by Pelletier and Coriol in 1829. It was procured from this bark by the same process that quina is extracted from yellow bark. It is a white crystallizable substance, analogous to cinchonia in many of its properties, but distinguished by its acquiring a green tint by the action of nitric acid, and also by boiling saturated solution of the sulphate forming, as it cools, a tremulous which by desiccation becomes horny. It consists of—

<table>
<thead>
<tr>
<th>Atoms</th>
<th>Eq. Wt.</th>
<th>Per C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon</td>
<td>20</td>
<td>120</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>Oxygen</td>
<td>3</td>
<td>24</td>
</tr>
</tbody>
</table>

**Arctica..........................** 1 ................................ 170 .............. 100

"* Several other alkaloids have been said to exist in the Cinchona, but further evidence is required to establish their existence. Dr. Müller, in his "Blauquinin to a supposed new alkaloid in white Cinchona (C. ovalifolia, see p. 1391). The Chinoidine of Sertuermer is, according to Henry fils and Delonrdre, merely a mixture of quina and cinchona yellow coloring matter. The alkaline matter of Cinchona nova (see p. 1381) requires further examination. The alkaloids of the false Cinchona barba have been already (p. 1381) referred to.

**CHEMICAL CHARACTERISTICS.**—The most important chemical characteristics of the cinchona barks are those derived from the action of the following reagents on infusions of bark: tincture of nativitâls, emetic tartar, gelatine, sulphate of iron, and neutral orate of ammonia. The first is a test for the alkaloids, the three following for tannic acid, and the last for lime. Tables of the changes produced by these and other tests have been published by Vanq. Von Santen, Guibort, and Martius. The following table is taken from the last mentioned pharmacologist:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. HARD CARTHAGENA BARK...........................................</td>
<td>Unchanged</td>
<td>Unchanged</td>
<td>Turbidness</td>
<td>Strong yellow-white turbidity</td>
</tr>
<tr>
<td>2. FIBROUS CARTHAGENA BARK.................................</td>
<td>Unchanged</td>
<td>Unchanged</td>
<td>Slight turbidity</td>
<td>Ditto</td>
</tr>
<tr>
<td>3. HUAMALIES BARK .............................................</td>
<td>Slight turbidity</td>
<td>Unchanged</td>
<td>Slight turbidity</td>
<td>Ditto</td>
</tr>
<tr>
<td>4. HUANUCO BARK ..................................................</td>
<td>Unchanged</td>
<td>Unchanged</td>
<td>Slight turbidity</td>
<td>Ditto</td>
</tr>
<tr>
<td>5. ASH CINCHONA ..................................................</td>
<td>Unchanged</td>
<td>Unchanged</td>
<td>Very strong yellowish-white turbidity</td>
<td>Ditto</td>
</tr>
<tr>
<td>6. LOXA BARK ........................................................</td>
<td>Unchanged</td>
<td>Unchanged</td>
<td>Very strong yellowish-white turbidity</td>
<td>Ditto</td>
</tr>
<tr>
<td>7. FALSE LOXA BARK ...................................................</td>
<td>Unchanged</td>
<td>Unchanged</td>
<td>Very strong yellowish-white turbidity</td>
<td>Ditto</td>
</tr>
<tr>
<td>8. YELLOW (CALSAYA) BARK ........................................</td>
<td>Turbidness</td>
<td>Unchanged</td>
<td>Turbid</td>
<td>Strong flocculent white turbidity</td>
</tr>
<tr>
<td>9. RED BARK .........................................................</td>
<td>Unchanged</td>
<td>Unchanged</td>
<td>Extremely slight turbidity</td>
<td>Ditto</td>
</tr>
<tr>
<td>10. CINCHONA RUBIGINOSA .........................................</td>
<td>Cloudy</td>
<td>Unchanged</td>
<td>Turbid</td>
<td>Ditto</td>
</tr>
<tr>
<td>11. CINCHONA NOVA ..................................................</td>
<td>Unchanged</td>
<td>Unchanged</td>
<td>Unchanged</td>
<td>Unchanged</td>
</tr>
</tbody>
</table>

1 Quart. Journ. of Science for April 1872, p. 579.  
2 Illel. des Drog. ii.  
3 Jour. de Pharm. xvi. 44.  
4 Ibid. 145.  
6 Berenj, Monogr.
The barks may be arranged, after Vauquelin, in three sets:—

1. Those whose infusions precipitate infusion of nutgalls, but not a solution of gelatine: ex. Carthagea barks. These contain the alkalis, but no tannic acid.
2. Those whose infusions precipitate a solution of gelatine, but not an infusion of nutgalls: ex. Cinchona nova. These contain tannic acid, but no appreciable quantity of cinchonia or quina.
3. Those whose infusions precipitate both a solution of gelatine and an infusion of nutgalls: ex. Loza Bark. These contain both alkalis and tannic acid.

Chemical Characteristics of the Goodness of Cinchona Barks.—The best cinchona barks are those which contain, in the upest abundance, the vegetable alkalis and tannic acid. For, though the essential tonic operation of cinchona depends on the cinchonia and quina, yet the astringency and part of the tonic effect from the tannic acid. “There exists a law in Sweden,” says Zelius, “in virtue of which every cinchona bark imported into this country is tested by the infusion of galls, the persulphate of iron, solution of gelatine, and emetic tartar; and it is proved by an evidence of more than sixteen years, that the most efficacious bark is that which precipitates the most strongly a solution of gelatine and tartar; in other words, that which contains the most tamin.” According the chemical tests for good cinchona bark are twofold,—1st, those which detect the tannic acid, and 2ndly, those which detect vegetable alkalis.

Tests for Tannic Acid.—These are three in number:—

1. A solution of gelatine, which occasions in infusion of cinchona a whitish precipitate (tannate of gelatine).
2. A solution of a sesquiferruginous salt (as persulphate of iron or sesquichloride of iron) which produces a green colour or precipitate (tannate of iron).
3. A solution of emetic tartar, which causes a dirty white precipitate (the nature of which has been before discussed, p. 1396).

Quinomometry.—Various alcaloimetrical processes, applicable to the cinchona barks, have been recommended. They are essentially of two kinds: some consist in the use of certain reagents or tests which precipitate the alkaloids from an infusion of the bark, others are processes for the extraction of the alkaloids, which are obtained either the free state or as salts (disulphates).

Processes by Tests.—a. Tannic acid is a very delicate test of the Cinchona alkalis, which it precipitates from their solutions, in the form of tannater. On this depends the value of infusion or tincture of nutgalls, employed as a test of the goodness of bark by Vauquelin, by Berzelius, and by O. Henry. d
b. Chloride of Platinum.—Duflos’s quinometrical method is founded...
on the property of the cinchona alkaloids to form with [neutral] eik platinum double salts (platinum-chlorides of the alkaloids) which are soluble in alcohol, and very difficultly soluble in cold water. One of these salts dried in the air contains about half a grain of the alkaloid.

γ. Bichloride of Mercury.—As bichloride of mercury forms with chlorates of quina and cinchonia, double salts (mercury-bichlorides of the alkaloids) which are only slightly soluble in water and in alcohol, perhaps be applicable, in some cases, as an alcaloimetric test.

2. Extraction of the Cinchona Alkaloids.—The methods of extracting cinchonia and quina from bark for alcaloimetric purposes are they may be referred to under four divisions:

a. By Alcohol.—Some chemists begin by preparing an alcoholic tincture of bark, without using in the first instance either acid or alkali. This is the method adopted by Pelletier and Cavé-Tilloy, and by Bonnet. From this tincture the alkaloids are extracted by various processes.

β. By Acidulated Liquids, without the previous use of alkaline solutions.—In some alcaloimetric processes the bark is digested in spirit, with sulphuric or hydrochloric acid, as in those of Henry Stoltze. In others acidulated water is used, as in the methods of Santen, Henry and Plisson, and Winkler.

γ. By acidulated Liquors, after the use of alkaline solutions.—Some method is founded on the property of red cinchonia and cinchonia (with both of which the cinchona-alkaloids are combined) to dissolve in strong caustic alkalis, and thereby to be extracted from the bark; the cinchonia and quina which are left behind may be subsequently removed by acidulated liquor. Badollier also employed caustic potash: a mixture of lime and water. In the process of the Edinburgh Pharmacopia for the manufacture of disulphate of quina, an alkaline carbonate of soda is used.

δ. By Water.—The Edinburgh Pharmacopia gives the following directions for ascertaining the good quality of yellow bark. A solution of 100 grains in two fluid ounces of distilled water gives a fluid ounce of concentrated solution of carbonate of soda, a process which, when heated in the fluid, becomes a fused mass, weight cold 2 grains or more, and easily soluble in solution of oxalic acid. In this process the native salts of quina extracted by the boiling water decomposed by carbonate of soda. By heat the quina fuses.

Of the above alcaloimetric processes I give the preference employed by the Edinburgh College in the manufacture of disulphate of quina.

The separation of quina and cinchonia, in order to estimate the quantity of each, is a matter of some importance. It is effected by different degrees of solubility of these alkaloids or their salts, the easy crystallizability of cinchonia.

1. Boiling Alcohol may be employed to separate these alkaloids; with a liquid, charged with the two alkaloids, cools, the cinchonia cry...
but the quina remains in the mother liquor. This mode of separation was adopted by Pelletier and Caventou.

Ether was used by Scharlau as well as by others, to separate the two alkaloids: quina is more soluble than cinchonia in this liquid.

Dissulphate of quina is less soluble in water than dissulphate of cinchonia; hence, when these two salts have been dissolved in boiling water, the first crystallizes as the solution cools, while the dissulphate of cinchonia remains in the mother liquor.

To manufacturers of dissulphate of quina it is of importance to have ready means of estimating the quantity of quina, as distinguished from cinchonia, which a bark yields. Sulphate of Soda is frequently used for this purpose. It has been found that the yellow (Calisaya) bark contains so much lime that an infusion (prepared by digesting twenty-four hours one part of coarsely-powdered bark in sixteen parts of cold water) yields, on the addition of sulphate of soda, a white precipitate of sulphate of lime; whereas those barks (as the kinds) which are deficient in quina give no precipitate with this reagent. Guibourt directs this test to be used thus: mix the powder of bark with water, so as to form a thin paste; which is to be filtered on a filter, and the filtered liquor tested with sulphate of soda (crystals).

Physiological Effects.—I. Of the Cinchona Barks.—The experiments of Dr. Adair Crawford on the effects of tonics in promoting cohesion of the animal tissues, have been already (p. 188) referred to. He found that a kitten’s intestines, which had been immersed in a quick mixture of cinchona bark and water, required a greater weight to break them than those immersed in water merely, in the ratio of 15 to 20.7. He found, moreover, that the same effect was produced by the blood-vessels and nerves; but an opposite effect on the skin, cohesion of which it diminished in the ratio of 24.5 to 7.9. Hence he inferred that cinchona bark strengthened the alimentary, blood-vessels and nerves, but had a debilitating or relaxing effect on the skin. The error pervading these inferences has been pointed out. Admitting that the dead animal tissues are variably affected by cinchona in the way Dr. Crawford states, the conclusion that living tissues would be influenced in the same way is supported by facts. Cold water relaxes dead, but corrugates living, animal tissues.

a. On Vegetables.—Leaves of plants, immersed in an infusion of bark, were dried, but not contracted, in twenty-four hours.

b. On Animals generally.—Dr. Freind states that an ounce and a half of a strong decoction of bark injected into the jugular vein of a dog, caused, in fifteen minutes, strong palpitations of the heart, and frequent spasms. Half an ounce more being injected, brought on anus and death. The blood was found after death liquid, the part red and turgid; the right ventricle was distended with blood,
the left contained scarcely any. Rauschenbusch* has also made experiments with cinchona bark. In animals to whom he had given for some days, he found the stomach and alimentary canals contracted, and the coats thickened, but no traces of inflammation. The heart was firmer, the lungs covered with red spots, the liver yellow, the bile watery and greenish. When the blood was exposed to the air, it remained dark coloured for a longer time than usual, less coagulable, and the serum separated more slowly: it appeared like that drawn in inflammatory cases. The pulse was stronger and fuller, the animal heat increased, and when the bark had been given for a long period, the muscles were pale, and their energy exhausted. Some experiments on the effect of cinchona on the blood of frogs were made by Leeuwenhoek, who found that the inferior bark divided some of the discs, and coagulated others.

γ. On Man.—The topical effects are astringent and slight. The astringency depends on tannic acid [and red cinchona?]: hence those barks whose infusions are most powerfully affected by gelatine and the sesquiferruginous salts, enjoy the greatest astringent power. Both Loxa and yellow (Calisaya) bark have this property in a pre-eminent degree: whereas Carthagena is deficient in it. The constitutional effects are principally marked by the disordered conditions of the vascular and cerebro-spinal systems. In some conditions of system, cinchona operates as a stimulant or stimulant; in others as a stomachic, tonic, and carabolic acid.

If a man in a state of perfect health take a small or moderate dose of bark, no obvious effects are produced,—or perhaps a little with some slight disorder of stomach, or a temporary excitement of appetite may be brought on. If the dose be increased, the alimentary canal becomes disordered (indicated by the nausea, vomiting, loss of appetite, thirst, and constipation, or even purging); a state of the system is set up (manifested by the excitement of the vascular system and dry tongue), and the cerebro-spinal system becomes disordered, as is shewn by the throbbing headache, and giddiness. The disturbance of the functions of the stomach is produced most strikingly when the bark is given in the more nauseating form of powder, also in the form of infusion or decoction or tincture. These symptoms indicate a stimulant operation, which is still more manifest when the bark is given to a person suffering with gastro-enteritis in an acute form accompanied with fever. All the morbid phenomena are exaggerated the febrile disorder is increased, and symptoms of gastritis come on. None of the effects now enumerated include those to which the tonic is properly applicable. These are to be sought for in persons suffering from debility, without symptoms of local irritation. In such we find cinchona improves the appetite, promotes the digestions, and increases the strength of the pulse. The system acquires more power, and the individual is capable of...
CINCHONA.

Greater exertion, both mental and bodily, than before; the tissues acquire more firmness to the touch, and lose their previous flabbiness: moreover, it has been asserted, and with great probability, that the quality of the blood improves.

The real stomachic, tonic, and corroborative effects of cinchona, as well as of other agents of the same class, are then only observed if they suit morbid conditions.

"The general operation of cinchona bark," observes Sundelin, "consists in the increase and exaltation of the tone of the irritable fibres and of the fibres of the vessels (hence by its use the pulse becomes fuller, stronger, and regular, and the muscular power increased); also in the general augmentation of the cohesion of the organic mass (hence it counteracts a tendency to liquefaction [Vesicatio] and disintegration [Disintegration], diminishes profusefluxions which proceed from atony of the extremities of the vessels, and of the secreting surfaces and organs, and improves generally the cohesion) and lastly, in the augmentation of the vital energy of the stable system. (By the last-mentioned property it restores sensibility, when defective or abnormally increased, and the property of reaction of the nervous system, to their normal state, and augments the influence of this system on the muscular fibre and on the reproductive system)." As these effects are not produced until the active constituents of the bark have been absorbed, they take place gradually, and by the long continued use of this agent.

The power possessed by cinchona of suspending or completely stopping periodical diseases, deserves to be noticed here, though it was to be again referred to hereafter. It is doubtless in some way related to the before mentioned effects; but the connection is, as yet, mysterious and incomprehensible.

Active principles of the cinchona barks.—The cinchona alkaloids are the essential tonic principles of bark. In them also resides the antiperiodic (specific, as it is frequently termed) power of this remedy (see p. 1410). The tannic acid confers astringent powers, and probably the tonic operation of the alkaloids. The red cinchonic may also slightly contribute to the general effects of the bark. The quinine (supposed by Deschamps to be the active principle of cinchona) is probably inert: it has neither bitterness nor stypticity, and is insoluble in alcohol. The aromatic flavour depends on volatile oil.

Comparison of cinchona with other tonics.—Cinchona scarcely as much of comparison with any other vegetable substance. It is preeminently distinguished by its great tonic and almost specific febrifuge properties. It is further distinguished from the simple bitters (as gentian, quassia, simaruba, calumba, &c.) by its astringency; from the powerful astringents (as oak bark, nutgalls, catechu, kino, &c.) by its extreme bitterness; from the aromatic bitters (as cascara, chamomile, wormwood, campane, &c.) by its astringency and comparative deficiency in volatile oil, and, consequently, in stimulant properties. Willow and gustura barks, perhaps, more closely approximate to cinchona than...
other vegetable substances in ordinary use. In regard to antisepic or febrifuge powers, arsenious acid is the only remedy that can be compared with bark.

Comparison of the cinchona barks with each other.—I do not insist on the superiority of genuine over false cinchona barks; the inferiority of those barks which have a whitish epidermis (e.g., Carthagenana barks, see p. 1391 et seq.) is shown by the small quantity of cinchona alkaloids which they yield. The anecdote before mentioned (p. 1394) proves that the Spaniards had long since ascertained the inferiority of one of these. Pale, Red, and Yellow Cinchonas are the kinds which have been principally examined in this country: their pre-eminence over all others is now universally admitted. The experiments and observations of Saunders, Kentish, Irving, and Skeete seem to have established the superiority of red bark to the pale or quilled kind. But in adopting this opinion we ought, if possible, to ascertain what kind of pale bark was used in making the above observations? And also to determine whether the red bark referred to be identical with that now in commerce? Dr. Relph afterwards asserted the superiority of red bark to both the pale and red kinds. His statements are buttressed by the almost exclusive consumption of this bark during the past twenty years.

2. Of the Cinchona Alkaloids. a. On Vegetables.—According to Goeppert, the leaves of plants plunged in a solution of sulphate of quina (gr. ss. of the salt to 3 ss. of water) presented evidences of action in six or eight hours.

b. On Animals generally.—As soon as Pelletier had discovered the alkaline nature of the bark, he sent some of them to Magendie for trial, who found that neither in the pure nor saline state was the bark poisonous; and he found that ten grains of the sulphate or acetate of quina might be injected into the veins of a dog without any ill effects. Hart unbeknownst to Pelletier found that three grains of quina, applied to a wounded rabbit, occasioned no ill effects.

c. On Man.—The constitutional effects of the cinchona alkaloids are similar to those of the barks, but more energetic. It will be clear that, therefore, to enumerate the symptoms caused by small doses of these substances is not to be expected to be more intimate acquaintance with the kind exercised by the barks.

In doses of from ten to twenty or more grains, disulphate of arsenic has produced three classes of effects:
CINCHONA.

Gastro-enteric irritation, marked by pain and heat in the gastric region, nausea, gripings, and purging. Occasionally ptalism has been observed. Constipation sometimes follows its use.

Excitement of the vascular system, manifested by increased frequency and fulness of pulse and augmented respiration. Furred tongue, and other symptoms of a febrile state, are also observed.

Disorder of the cerebro-spinal functions, indicated by headache, giddiness, contracted, in some cases dilated, pupils, disorder of the external senses, agitation, difficulty of performing various voluntary acts (as writing), somnolency, in some cases delirium, in others stupor.

A remarkable case is mentioned by Trousseau and Pidoux. A soldier took 48 grains of the disulphate of quina for the cure of an uma [spasmodic], which returned daily at a certain hour. Four hours after taking it he experienced buzzing in the ears, diminished sensibility, giddiness, and violent vomitings. Seven hours after taking a quina he was blind and deaf, delirious, incapable of walking on account of the giddiness, and vomited bile copiously. In fact, he was in a state of intoxication. These effects subsided in the course of the night.

**Difference in the operation of quina and cinchonia.**—When we take into consideration the analogy of composition and of chemical properties of these two alkaloids, we are led to suspect analogy of physiological effects. When they were in the first instance submitted to examination, cinchonia and its salts were thought, principally on the evidence of Chemel, to be much inferior in activity to quina and its salts. But the subsequent observations of Dufour, Petroz, Potier, Bally, Nieuwenhuis, Mariani, Bleynie, and others, have proved that the disulphates of these alcalis may be substituted for each other. Bally gives the preference to the disulphate of cinchonia, on the ground that it is less irritating than the disulphate of quina. That cinchonia is as active as quina might have been anticipated, *à priori*, when we recollect that those barks in which cinchonia is the predominant principle have been celebrated as therapeutic agents. This result of the equal value of cinchonia and its salts with quina and its salts, acquires some importance from the apprehended failure of the low bark, in which the quina abounds. Practitioners, however, have been so long accustomed to the use of the disulphate of quina, that as long as this can be procured, some difficulty will be experienced in the introduction into practice of the disulphate of cinchonia.

**Comparison of the Cinchona Alkaloids with their salts.**—Some of the salts of the cinchona alkaloids being more soluble than their bases, it has been inferred that they are, consequently, more active. It has been asserted by Nieuwenhuis, Mariani, Bleynie, and others, that the bases are equally active, and may be substituted for the salts with advantage. Acid drinks should be given to favour their solution in the stomach. Quina, in the crude or impure state, has been employed with success by Trousseau. Its advantages over the di-
sulphate, are, that it is less apt to purge; it may be exhibited in a smaller dose, and it loses but little bitterness. This last property facilitates the use of it, especially in children.

**Comparison of the salts of the cinchona alkaloids with each other.** I have already described the effects of the disulphate of quina. The **sulphate of quina** is formed when we dissolve the disulphate in water acidulated with sulphuric acid: it is somewhat more irritant than the last-mentioned salt. The **phosphate of quina** is said to be neither apt to disturb the stomach, nor to excite the vascular system, as the disulphate. Hence it is better adapted for cases accompanied with gastric irritation and febrile disorder. The **ferrocyanate of quina** has been recommended, in preference to the disulphate, in intermittent fevers, accompanied with inflammatory symptoms. The **tannate of quina** is declared, by Dr. Rolander, of Stockholm, to be the most powerful of the quina salts. The tannic acid, though not the peculiar febrifuge constituent of cinchona bark, yet contributes to its tonic powers, and thereby promotes the activity of the alkaloid. This statement is supported by the already referred-to remark of Ranzelius (see p. 1401), that the most active cinchonas are those which contain the largest quantity of tannin. The **nitrate, hydrochlorate, acetate, and citrate of quina**, have been employed in medicine; I am not acquainted with any remarkable advantages they possess over the sulphate. The **kinate of quina**, as being one of the alkali salts of alkaloid, deserves further examination. The **arsenate of quina** might, perhaps, be found available in some obstinate intercurrences, and well deserves examination. The **salts of cinchona, except the disulphate**, have been imperfectly examined.**

**Comparison of the cinchona barks with their alkaloids.**—It has been asserted, that the cinchona alkaloids possess all the medicinal properties of the barks, and may be substituted for them on every occasion ; but I cannot subscribe to either of these statements; for the first place, the alkaloids are deficient in the aromatic quality possessed by the barks, and which assists them to sit easily on the stomach; and it is to this circumstance that I am disposed to refer the fact which I have often observed, that disulphate of quina will at times irritate the stomach, occasion nausea and pain, and give rise to febrile symptoms, while the infusion of bark is retained without least uneasiness. Moreover, we must not overlook the tannic acid which confers on bark an astringent property. So that while we admit that the essential tonic operation of the barks depends on the alkaloids which they contain, yet the latter are not always equally efficacious. In some cases, however, they are of **great advantage**, as they enable us to obtain, in a small volume, the tonic operation of a large quantity of bark.

**Uses.**—From the preceding account of the physiological effects of cinchona, some of the indications and contra-indications for

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may be readily inferred. Thus its topical employment is obviously indicated in cases of local relaxation, with or without excessive secretion; also in poisoning by those agents whose compounds with tannic acid are diffusely soluble, and, therefore, not readily absorbed. But as a topical remedy, or astringent, cinchona is greatly inferior to many other agents which contain a much larger quantity of tannic acid. The contra-indications for the local use of cinchona, are, states of irritation (nervous or vascular), and of inflammation. In these conditions it augments the morbid symptoms.

The indications for its use, as a general or constitutional remedy, are debility with atony and laxity of the solids, and profuse discharges from the secreting organs. I have observed that it proves less successful, and often quite fails, when the complexion is chlorotic oremic (see pp. 5 and 830): in such, chalybeates often succeed where cinchona is useless or injurious. As contra-indications for its employment, may be enumerated acute inflammation, inflammatory fever, febrifuge, active hemorrhages, inflammatory dropsy, &c. To these may be added, an extremely debilitated condition of the digestive and assimilative organs. Thus, patients recovering from protracted fever are at first unable to support the use of bark, which acts as an irritant to the stomach, and causes an increase of the febrile symptoms. In such I have found infusion of calumba a good preparative for cinchona.

Hitherto I have referred to those indications only which have an obvious relation to the known physiological effects of cinchona. But the diseases in which this remedy manifests the greatest therapeutic power, are those which assume an intermittent or periodical type. Now in such the methodus medendi is quite inexplicable; and, therefore, the remedy has been called a specific, an antiperiodic, and a febrifuge. But the more intimately we become acquainted with the etiology of disease, and the operation of medicines, the less evidence have we of the specific influence of particular medicines over particular maladies. Some diseases, however, are exceedingly obscure; their seat or nature, and the condition of the system under which they occur, or the cause of their occurrence, being little known. There are also many medicines, the precise action of which is imperfectly understood, but which evidently exercise a most important, though to us quite inexplicable, influence over the system. Now it sometimes happens that imperfectly-known diseases are most remarkably influenced by remedies the agency of which we cannot comprehend; in other words, we can trace no known relation between the physiological effects of the remedy and its therapeutical influence. This incomprehensible relationship exists between arsenic and lepra; between the cinchona bark and ague. But though this connexion is to be mysterious (for I do not admit the various hypotheses which have been formed to account for it), we are not to conclude that it is necessarily more intimate than that which exists in ordinary cases.

1. In Periodical or Intermittent Diseases.—The system is subject to several diseases, which assume a periodical form; that is, they disappear and return at regular intervals. When the patient appears to
be quite well during the interval (i.e. when the intermission and regular) the disease is called an intermittent; whereas if remittent when the second paroxysm makes its appearance first has wholly subsided (i.e. when the disease presents intermissions and remissions, but not intermissions). The pathologo- affections is involved in great obscurity, and the cause of their periodicity are completely unknown. Various cures however, induce us to regard intermittent maladies as morbid affections of the nervous system; for the phenomena, both of morbid, of periodicity, seem to be essentially nervous.

One of the most curious circumstances connected with the diseases is the facility with which they are sometimes. It is well known that sudden and powerful impressions, both and corporeal (as those caused by terror, alcohol, opium, arsenious acid, &c.), made during the intermission, will prevent the return of the succeeding paroxysm; and occasionally from that time all morbid phenomena disappear. In other diseases, on the other hand, the same impressions are much less successful, and sometimes, instead of palliating, of the symptoms. The agents which are capable, under certain circumstances, of making these curative impressions, are apparently similar in their nature and physiological action, that we call their methodus medendi scarcely anything in common, since making a powerful impression on the nervous system. Of the periodic agents cinchona and arsenious acid stand pre-eminent their greater frequency of success, and, therefore, are those resorted to. I have already (see p. 644) made some remarks relative therapeutic value. They differ in two particular characteristic. Cinchona may be given, as an antiperiodic, in any quantity the stomach can bear; whereas arsenious acid must be given in cautiously-regulated doses; secondly, there are two methods tempting the cure of an intermittent by cinchona; one is, an immediate stop to the disease by the use of very large dose remedy given a few hours prior to the recurrence of the paroxysm, the other is to gradually extinguish the disease by exhibiting moderate doses at short intervals during the whole period of intermission, so that the violence of every succeeding paroxysm is what less than that of the preceding one;—but in the case of acid the latter method is alone safe, and, therefore, to be adopted.

It has been asserted that cinchona is admissible in the only of an intermittent fever; and that if it be exhibited a paroxysm it has a tendency to prevent the subsidence of. But this statement is much overcharged. Morton* and others have given it in almost every stage without injury. Dr. Hebermatt observes, "the only harm which I believe would follow from

* See some remarks on periodic movements in Müller's Elem. of Phys. by Baly, &c.

* Pneumologia.

* Comment. art. Feb. Intern.
in the middle of the fit is, that it might occasion a sick persons might harass the patient by being vomited up, and might against it. It is, however, more efficacious during the time of accession, the more certainly I will it be. I have already stated (p. 644) that arsenious yt be given with good effect during the whole period (path and intermission) of the disease.

The necessary condition to its perfect success is that it sit well on the stomach; for if it occasion vomiting or purging it is much better to act beneficially. Hence an emetic and a purgative are tended to precede its employment. The use of these is more necessary if there be symptoms of inflammation of the digestive organs. A semen, with a calomel pill, forms a good purgative. To enable it to act well on the stomach, cinchona (or the sulphate of quina) is given in conjunction with aromatics. The infusion or decoction of cinchona, though much less effective, is, however, less likely to disturb the stomach than the powder of cinchona or the

of quina. Opium is sometimes a necessary adjunct to cinchona to prevent its running off by the bowels. In some cases of intractable stomach, cinchona or sulphate of quina by the mouth, these agents have otherwise introduced into the system. Thus clysters of cinchona were used by Helvetius, Torti, and Bagliivi. Van Swieten has often seen this method successful in young children; but takes three times as much bark as would suffice if the remedy was given. Cataplasmas of cinchona have also been employed. They applied them to the abdomen; Torti to the wrist. Alexakou tried an ague by a pediltuvium of decoction of cinchona; Berden tried it without success. Bark jackets were employed in the cases of children by Dr. Pye. They consisted of soft coats between whose layers powdered cinchona was quilted. A powder of cinchona has been applied to the skin; thus Dr.ONDstrewn it in the patient's bed. Chrestien successfully used a mixture and alcoholic extract by the intraleptic method (see 49). More recently sulphate of quina has been employed in the treatment of agues. The last mentioned operation has also been applied by the neric method: but this mode of using it is sometimes at-

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1 Mat. Med. ii. 90.
2 Murray, App. Med. i. 871.
3 Comment. Medic. vii. 377.
4 Murray, op. cit. 872.
5 Exp. Rass. 38.
6 Comment.
7 Med. Obs. and Inq. ii. 345.
8 De la Méthode Intralept. 372 and 376.
9 Archiv. Gén. de Méd. 1825; Revue Méd. 1827.
tended with intense pain and an eschar. To infants at the
Rosenstein advises its indirect exhibition by the nurse, in
with milk its active principle is administered to the child. Mor-
cently sulphate of quina mixed with tobacco (in the propor-
tion of 15 grs. of the former to an ounce of the latter) has been em-
ployed as a snuff in intermittent headache.
Cinchona and its preparations prove most successful in the
or uncomplicated form of intermittents; that is, where the dis-
 ease appears to be purely nervous. But when agues are accom-
panied with inflammatory excitement or with visceral diseases, cin-
chona generally proves either useless or injurious. In remittents it
is much less successful than in regularly-formed intermittents.
In these cases we endeavour to promote the efficiency of the cinchon-
a by reducing the disease to the form of a pure or simple intern-
ment. The means to effect this must of course depend on a variety of
circumstances; but blood-letting, both general and local, purga-
tives and diaphoretics, are those which for the most part will be
available. Under some circumstances mercury given in alterna-
ting doses, or even as a very slight sialogogue, proves beneficial.
Intermittent fevers are not the only periodical diseases in
which cinchona has been found beneficial. It is a remedy which
proved serviceable in several other cases in which a paroxysm
of pain, spasm, inflammation, hemorrhage, or fever) returns at
irregular periods. Thus intermittent neuralgia, rheumatism, headache, a
rosis, catarrh, ophthalmia, stricture, &c., have been greatly ben-
eyed by its use. Some of these affections have been regarded as agues. When periodical diseases recur at uncertain periods,
the case of epilepsy, no particular advantage can be expected
from the use of cinchona.

2. In Continued Fever.—In the latter stage of continued
fevers, when the vital powers are beginning to sink, and when there
are no marked and decided symptoms of inflammatory disease of the
or digestive organs, cinchona or sulphate of quina sometimes pro-
duced highly beneficial. If the tongue be dry, as well as furred, and the
skin hot and dry, no advantage, but the reverse, can be antici-
pated from its employment. It is most applicable to the low forms of
fever occurring in debilitated constitutions. When exacerbations
or remissions, however indistinct, occur at regular periods, the admin-
istration of cinchona is the more likely to be followed by good
Under the preceding circumstances there can scarcely be
opinions as to the admissibility of bark. But on the general
principle of administering this remedy in continued fever, consid-
merit. Dr. Heberden cautious,

* Trouseau and Pidoux, Traité de Thérap., ii. 219.
* Ibid., 231.
* Clutterbuck, On the Seat and Nature of Fever, 399, 2nd. edit. 1825.
* Comment.
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Advisable to begin with the infusion, for which, afterwards, first the
sucection, then the sulphate of quina, may be substituted. In the
age of convalescence, the use of cinchona or sulphate of quina may
can be advantageously preceded by infusion of calumba: without
precaution, irritation of stomach or febrile symptoms are readily
set up.

3. In inflammatory diseases.—As a general rule, stimulants and
poisons, as cinchona, are improper in inflammatory diseases. Yet to
this statement, which applies principally to the first stage, to acute
and active cases, and to the disease when it occurs in strong and
rigorous habits, many exceptions exist. Thus when it takes place
in old and debilitated constitutions; when it is of a mild or atonic
character, and has existed for some time without giving rise to any
obvious organic changes; when it assumes an intermittent or even
mattent form; or when it is of a certain quality, which experience
has shown to be less benefited by ordinary antiphlogistic measures,
chinchona is sometimes admisible and advantageous after evacuations
have been made proportioned to the activity of the disease and the
severity of the system. In scrophulous inflammation (as of the eye) its
use is fully appreciated. In rheumatomia, in which disease Morton,
Catherill, Saunders, and Haygarth, have so strongly recommended
its use, is now obsolete, except under circumstances similar to
those which regulate its employment in ordinary inflammation. The
above remarks apply to its employment in erysipelatous inflammation,
which it was of no time much esteemed.

4. In maladies characterised by atony and debility.—Cinchona is
useful in a great variety of diseases dependent on, or attended by, a
deficiency of tone or strength, as indicated by a soft and lax contain-
ment of the solids, weak pulse, incapability of great exertion, im-
paired appetite, and dyspeptic symptoms. Thus, in chronic atonic
fection of the alimentary canal, it proves very serviceable, especially
in some forms of dyspepsia and anorexia. In these it should be
given half an hour, or an hour, before meal-times. In some chronic
maladies of the nervous system, as chorea, when it occurs in delicate
girls; also in the neuralgia of weakly subjects. Disulphate of quina
has been used by Dr. Bright* in tetanus. In mortification, it is
useful in those cases in which tonics and astringents are obviously
indicated; but it has no specific power of checking the disease, as was
formerly supposed. In passive hemorrhages, from relaxation of
vessels, as in some cases of profuse menstruation, or uterine hemor-
rhage consequent on miscarriage. In profuse mucous discharges with
reat debility, as in leucorrhoea, excessive bronchial secretion, old diar-
rhoeas, &c. In cachectic diseases, as enlargements and indurations of
in absorbent glands, of a scrophulous nature, strumous ophthalmia,
estimate ulcers, &c.* Also in venereal diseases, when the secondary
mptoms occur in shattered and broken-down constitutions, and

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* Guy's Hospital Reports, vol. 1.
* See Dr. J. Foulcy, Med. Obs. and Ing. i. 184.
after the full use of mercury. Likewise in some of the chronic diseases, which are seen in cachectic habits.

5. In the convalescence of either acute or chronic lingering diseases such as fever, inflammation, hemorrhage, profuse suppuration, &c.; after important surgical operations, when the strength is greatly reduced. In no class of cases is the efficacy of cinchona or its alkaloids more manifest than in these.

6. As a topical astringent and antiseptic.—The efficacy of cinchona as an astringent and antiseptic depends on tannic acid. Many vegetable substances exceed cinchona in the quantity of acid which they contain, so they surpass it in astringency. The topical uses of bark are comparatively unimportant; and, most part, are nearly obsolete. Powdered cinchona is frequently employed as a tooth powder. Formerly it was used as an application to mortified parts, foul ulcers, caries, &c. The decoction, without hydrochloric acid, is applied as a gargle in putrid sore throats.

7. As a chemical antidote.—The value of cinchona bark as a chemical antidote, depends on its tannic acid. I have offered some observations on its employment in poisoning by tartar (see p. 679). I believe, in all cases it might be advantageously replaced by other and more powerful astringents; as nutgalls, an emergency, green tea.

Administration.—In the form of powder, cinchona is rarely administered. The bulk of a full dose, its disagreeable taste, its tendency to cause nausea and vomiting, and the quantity of woody fibre which it contains, form great objection to its element. Yet of its great efficacy, as a febrifuge or antiperiodic in remittents, and of its superiority in these cases, to the decoction, the infusion, no doubt can exist; but sulphate of quina has entirely superseded it. Its dose is from a scruple to a drachm; even more than this, when the stomach can bear it.

1. Infusum Cinchonæ, L. E. D.; Infusion of Pale [Laxa] B (Lance-leaved Cinchona [any species of Cinchona, according to prescription, E.], bruised [in powder, E., in fine powder, D]. Boiling [Distilled, L. Cold, D.] Water, Oj. [1/3xj. D.]:—Mix for six (four, E.) hours in a vessel lightly covered, and strain [into linen or calico, E.]—The directions of the Dublin College follows: Triturate the bark with a little of the water, and during the next 24 hours, pour on the rest; macerate for 24 hours, shaking it time to time, then pour off the clear liquor).—Water extracts more of the cinchona bark the kinates of quina, cinchonia, and lime, gum, tanin (red cinchonic) and yellow colouring matter. The quantity of the cinchona alkaloids remains in the marc, as a very small quantity of the compound of red cinchonic and the cinchona alkaloids is extracted.—The infusion of cinchona is stomachic, but is scarcely energetic enough to be febrifuge. It is a preparation, applicable as a tonic where the stomach is very debilitated, and cannot support the more active preparations of this medicine. The dose is 1/3j. to 1/2j. thrice a day.
2. DECOCTUM CINCHONÆ, E.; Decoction of Bark.—(Crown, Gray, yellow, or Red Cinchona, 3j. bruised; Water, f3xxiv. Mix them for ten minutes, let the decoction cool, then filter it, and evaporate sixteen fluidounces.)

3. DECOCTUM CINCHONÆ CORDIFOLÆ, L.; Decoction of Yellow Calisaya Bark.—(Heart-leaved Cinchona, bruised, 3x.; Distilled Water, Oij. Boil for ten minutes in a lightly-covered vessel, and strain the liquor while hot.)

4. DECOCTUM CINCHONÆ LANCIFOLÆ, L.; Decoction of Pale [Loxa] Bark.—Lance-leaved Cinchona, bruised 5x[3j. D.]; Distilled Water Oj. [a sufficient quantity to afford pint wine measure after straining, D.]

5. DECOCTUM CINCHONÆ OBLONGIFOLÆ, L.; Decoction of Red Bark.—(As the Decoction Cinchonæ cordifolæ, but using Oblong-leaved Cinchona).

By boiling, water extracts from cinchona the kinates of quina, cinbunga, and lime, gum, soluble red cinchonic (tannin, yellow colouring matter, starch, and a portion of the compound of the red cinchonic tannate of cinchona alkaloids. While hot, the liquor is transparent; as it cools, it becomes turbid, owing partly to the deposition of tannate of starch when the temperature falls below 88° F.; and partly because the red cinchonic compound being more soluble in hot than in cold water, is deposited on cooling. Of 146 parts of the pessis, from decoction of yellow (Calisaya) bark, Soubiran found 1 parts (principally tannate of starch) were insoluble in alcohol, and of the remaining 86 parts were readily soluble in alcohol, and yielded cinchona alkaloids. The same author also found that by decoction of yellow (Calisaya) bark lost two-thirds of its weight; whereas, in infusion, it merely lost one-third of its weight. If the water employed in preparing the decoction or infusion be acidulated (with sulphuric or hydrochloric acid) the medicinal value of the preparation greatly increased; for the acid decomposes the insoluble red cinchonic salt, and forms, with the cinchona alkaloids, a soluble combination. Alkaline solutions, on the other hand, yield less powerful, though highly coloured, preparations; they readily dissolve the red cinchonic and the acids, but they render the alkaloids insoluble. Decoction of cinchona is stomachic, tonic, and febrifuge.—The dose 3ij. to 5ij.

3. TINCTURA CINCHONÆ, L.E.D.; Tincture of Bark.—(Heart-leaved Yellow, or any other species, according to prescription, E., Lance-aved, D.] Cinchona, bruised [in fine powder, E., coarsely powdered, 3ij., 3ivj. [3iv. E. D.]; Proof Spirit, Oij. [wine measure D ; Oj. E.] Incard for fourteen [seven, D.] days, and strain. The directions of Edinburgh College are as follows:—"Percolate the bark with the the bark being previously moistened with a very little spirit, as for ten or twelve hours, and then firmly packed in the cylinder. This tincture may also be prepared, though much less expedi-
5. **Extractum Cinchona**, E.; Extract of Bark.—(Take varieties of Cinchona, but especially the Yellow or Red C. fine powder, 5iv.; Proof Spirit, f3xxiv. Percolate the cinchona in the spirit; distil off the greater part of the spirit; and what remains in an open vessel over the vapour-bath. 2. 

a. **Extractum Cinchona cordifolia**, L.; Extract of [Calisaya] Bark.—(Heart-leaved Cinchona, bruised, 3x; Water, Cong. iv. Boil down in a gallon of the water 1 and strain the liquor while hot. In the same manner boil the bark in an equal measure of water four times, and strain the liquors being mixed, evaporate to a proper consistence. 

b. **Extractum Cinchona lancifolia**, L.; Extract of Pale D.; Extract of Pale [Loxa] Bark.—(Prepared as the
The watery extract of cinchona (extractum cinchonea, L. D.) contains the same constituents already mentioned (p. 1415) as being in decoction of bark. Mr. Brande,\(^1\) says, lance-leaved [i. e. de] bark yields 80 per cent. of watery extract. The active principles of this preparation are the kinates of the cinchona alkaloids.

The spirituous extract (extractum cinchonea, E.) is a more efficacious preparation, as it contains, besides the alkaline kinates, the comedy of the red cinchonie with the cinchona alkaloids. When prepared with rectified spirit, 24 per cent. of extract is obtained from lance-leaved [i. e. pale] bark. But as the Edinburgh College direct of spirit to be employed, the produce is larger.—Well-prepared (not decomposed by evaporation) extract is a very useful preparation, which, however, has been nearly superseded by sulphate of it. It is given in the form of pill, in doses of from gr. v. to gr. vi.

Or the watery extract may be dissolved in water, or in infusion roses, or, for administration to children, in syrup of mulberries or orange-peel.

Quinque Disulphas, L. E.; Sulphate of Quinine, offic.; Subsulphate Quina.—The directions of the London College for the preparation this salt are as follows:—

Take of Heart-leaved Cinchona, bruised, lb. viij.; Sulphuric Acid, zix.; Purified Animal Charcoal, ij.; Hydrated Oxide of Lead; Solution of Ammonia; distilled Water, each as much as may be sufficient. Mix four ounces and two drams of the Sulphuric Acid with six gallons of distilled Water, and add the cinchona to them; boil for an hour, and strain. In the same manner again boil the remains in Acid and Water, mixed in the same proportions, for an hour, again strain. Finally, boil the Cinchona in eight gallons of distilled water strain. Wash what remains frequently with boiling distilled water. To the clear liquors add Oxide of Lead, while moist, nearly to saturation. Pour off supernatant liquor, and wash what is thrown down with distilled water. Let the liquors for a quarter of an hour, and strain; then gradually addition of Ammonia to precipitate the Quina. Wash this until nothing alkaline perceptible. Let what remains be saturated with the rest of the Sulphuric acid, diluted. Afterwards digest with two ounces of Animal Charcoal, and strain. The Charcoal being thoroughly washed, evaporate the liquor cautiously; crystals may be produced.

Mr. Phillips\(^1\) gives the following explanation of this process.

The quina exists in combination with a peculiar acid, called Kinic id, forming with it Kinate of Quina, which is soluble to a certain extent in water, and is rendered more so by the sulphuric acid employed in the process, and perhaps by decomposing it. Whatever may be the state of combination, the solution contains sulphuric acid, the acid, and quina, mixed with extractive and colouring matter, the latter being got rid of by the animal charcoal. On adding oxide of lead the sulphuric acid combines with it, and the resulting sulphate begins insoluble is precipitated, while the kinic acid and quina remain; when ammonia is added, after the separation of the sulphate of lead, the kinic acid unites with it, and the kinate of ammonium.

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\(^1\) *Diet. de Pharm.* 170.
\(^2\) *Transl. of the Pharm.*
nia formed is soluble, while the quina is precipitated, and this afterwards combined with sulphuric acid, forms disulphate of which crystallizes.

The directions of the Edinburgh College for the preparation of disulphate of quina are as follows:

Take of Yellow Bark, in coarse powder, one pound; Carbonate of eight ounces; sulphuric acid, half a fluidounce; Purified Animal coal, two drachms. Boil the bark for an hour in four pints of which half the carbonate of soda has been dissolved; strain and express again, and repeat this twice. Boil the residuum for an hour with four pints of water and half the sulphuric acid; strain strongly, moisten with water, and express again. Boil the residuum of three pints of water and a fourth part of the acid; strain and squeeze as before, and again the residuum with the same quantity of water and acid; strain as formerly. Concentrate the whole acid liquors to about a pint; let them cool; filter it, and dispose of the remaining of the carbonate of soda and impure quina on a cloth, wash it slightly, and squeeze out the liquid hand. Break down the moist precipitate in a pint of distilled water; one fluidscruple of sulphuric acid, heat it to 212°, and stir occasionally any precipitate retain its grey colour, and the liquid be neutral, add acid, drop by drop, stirring constantly, till the grey colour disappears, let the liquid redden litmus, neutralize it with a little carbonate of soda, let the crystals form on the surface, add boiling distilled water to dissolve them through paper, preserving the funnel hot; set the liquid aside to cool, and collect and squeeze the crystals; digest them in a pint of distilled water to 212°; digest the solution for fifteen minutes with the animal charcoal and crystallize as before. Dry the crystals with a heat not exceeding 100°. The mother-liquors of each crystallization will yield a little more solution and cooling.

The object of this process is to extract, by means of the carbonate of soda, the acids, the colouring and extractive gum, &c. from the bark, but leaving the cinchona a Stoltze used for this purpose lime; Badollier and Scharlau potash (see p. 1402). The alkaline decoction has a very deep red by boiling the residuum in water acidulated with sulphuric acid, the alkaloids are dissolved. On the addition of carbonate double decomposition takes place, and the impure quina is dissolved. This is afterwards dissolved in water acidulated with sulphuric acid, and is filtered liquid is set aside to crystallize. The disulphate of quina thus obtained is re-dissolved in boiling and the solution, after being decolorized by digestion with charcoal, is filtered, and put aside to crystallize.

I have repeated this process, which has the great merit of the use of alcohol, and I believe it to be an excellent one, can be both simplicity and economy. In one experiment I employed picked uncoated yellow (Calisaya) bark, and found that the precipitated impure quina required two fluidscruples and five minims sulphuric acid to saturate it, instead of one fluidscruple, directly the Edinburgh College. In another experiment I could not impure sulphate of quina to crystallize until it had been digested with animal charcoal.

The method of manufacturing disulphate of quina, which is usually followed by manufacturers in this country, is as follows:
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Cinchona bark is boiled with water acidulated with acetic or hydrochloric acid. The residuum boiled a second or a third time acidulated water. Some repeat the process a fourth time. Finely-powdered lime is added to the filtered decoction (when cold), until the liquor is strongly alkaline, and acquires a dark colour. The precipitate is collected, washed on a cloth, and then submitted to graduated pressure (usually in a hydraulic press). The cake so obtained is, when dry, reduced to powder, and distilled with rectified spirit. The filtered tincture is distilled until the residue becomes quina) in the retort has a brown, viscid appearance. This residuum is to be carefully saturated with very dilute sulphuric acid, the solution filter and set aside to crystallize. The disulphate of quina thus obtained is yellow-brown. It is drained in a cloth, compressed, dissolved in water, decolourized with animal charcoal, re-crystallized, and dried. This last part of the process is very carefully conducted, to avoid efflorescence.

Some persons think it preferable to convert the quina of this alcoholic solution to a sulphonate before distillation, in order to separate the fatty matter. I formed, by a maker of this salt, that the use of spirit in the process does not greatly affect the large scale, add much more than a penny an ounce to the cost of the quina, as the greater part is recovered.

In the large scale the decoction of the bark is usually prepared in a vat, the boiling being effected by steam. The acidulated decoction contains the quina, the cinchona, the yellow colouring matter, red cinchonic, the kinine, and the sulphuric (or hydrochloric) acid.

The lime saturates all the acids, and forms soluble salts (if sulphuric acid have been employed, sulphonate of lime is formed, a part of which precipitates), which remain in the liquid portion of red colouring matter. The precipitate is composed of cinchona, a combination of lime and red cinchonic, fatty, and, excess of lime, and, when sulphuric acid has been employed, of lime: the whole is contaminated with colouring matter. Of extracts from this precipitate the quina and cinchona, the matter, and the colouring matter; leaving undissolved the excess of lime, the compound of lime with the red cinchonic, and, sulphuric acid has been used, sulphonate of lime. The sulphuric acid being then added to the impure quina, converts it into a naphthalene.

Account of the expense of spirit of wine, various substitutes have been proposed. Pyroxylic spirit has been tried, but I believe it not answered. Pelletier has taken out a patent for the employment of a volatile oil (oil of turpentine). The dried cake of quina obtained in the usual manner, is to be digested in oil of turpentine, which dissolves the quina. The oleaginous solution is to be agitated with water acidulated with sulphuric acid, by a sulphonate of quina is obtained. By repose, the oil rises to the top, and after removal may be employed again, while the solution is to be evaporated as usual. Hitherto, however, process has not succeeded, partly because the turpentine does not distil more than nineteen-twentieths of the quina present. If any other oils, however, should be found to procure the disulphate in this way, it is possible that some modification of this process would best.

Sulphonate of quina occurs in small, fibrous, odourless, very bitter parts, which have a pearly aspect, and a flexibility like amiantus.
Exposed to the air, they effloresce slightly. When heated they become luminous; friction promotes this phosphorescence. At 100° they melt like wax; at a more elevated temperature the salt takes a fine red colour; and when ignited in the air burns, leaving carbonaceous residuum, but which is subsequently dissipated. A part of this salt requires 80 parts of cold alcohol (sp. gr. 0.740) parts of cold, or 30 parts of boiling, water to dissolve it. A saturated solution cools, part of the salt separates. A rest property of this salt is to give a blue tinge to water. The composition of this salt is:

<table>
<thead>
<tr>
<th></th>
<th>Atoms</th>
<th>Eq. Wt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulphuric Acid</td>
<td>1</td>
<td>40</td>
</tr>
<tr>
<td>Quina</td>
<td>2</td>
<td>324</td>
</tr>
<tr>
<td>Water</td>
<td>8</td>
<td>72</td>
</tr>
<tr>
<td>Crystallized Disulphate of Quina</td>
<td>1</td>
<td>436</td>
</tr>
</tbody>
</table>

By exposure to the air the crystals lose four (Soubirian equivalents of water, equal to about eight per cent. When fused they evolve two more equivalents. One hundred grains of the crystals dissolved in water, acidulated with hydrochloric acid, yield by evaporation of chloride of barium a quantity of sulphate of baryta, weighing 26.6 grs. If chlorine gas or a solution of chlorine be added to an aqueous solution of the salt, and a solution of ammonia, an emerald-green colour is produced.

Adulteration.—Various foreign bodies (as earthy and alkaline gum, sugar, starch, fatty matters, sulphate of cinchonia, and so on,) are, it is said, occasionally intermixed with disulphate of quina. The following are the tests by which the presence of these bodies is detected:—By digesting disulphate of quina in alcohol this salt is dissolved, leaving any alkaline or earthy sulphates, gum, or starch may be present. Gum is soluble in cold water; starch is soluble in water and blue by a solution of iodine. When heated in the open disulphate of quina is burned and dissipated; the earthy salt is left. The disulphate is soluble in water and with sulphuric acid, whereas fatty matters are insoluble. If sugar be added, a solution of the disulphate carbonate of potash precipitates, while sulphate of potash and sugar are left in the latter may be detected by its sweet taste, or by evaporating the liquid to dryness, and digesting the residue with spirit, which leaves the sulphate. Ammoniacal salts are by the ammoniacal odour emitted on the addition of caustic amyl. Salicylic may be recognized by oil of vitriol, which turns it red (1074). Sulphate of cinchonia may be made to crystallize in a more or less ramulent form, by stirring the solution, and in this state it may be intermixed with disulphate of quina. This fraud, I suspect, I recently carried on to no very slight extent. To detect it, prepare a solution of the suspected salt in water by potash; collect

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IPECACUANHA.

Extract, and boil it in alcohol. The cinchona crystallizes as the liquor cools, while the quina remains in the mother-liquor.

The characteristic marks of the purity of disulphate of quina are, according to the London College, as follows:—

"Totally dissolved in water, especially when mixed with an acid. Quina is thrown down by ammonia, the liquor being evaporated; what remains ought not to contain any malsiguas. One hundred parts of disulphate of quina lose eight or ten parts of water with a gentle heat. It is totally consumed by fire. Chlorine first added to it, and afterwards ammonia, it becomes green."

The characters given by the Edinburgh College are as follows:—

"A solution of ten grains in a fluidounce of distilled water, and two or three drops of sulphuric acid, if decomposed by a solution of half an ounce of carbonate of soda, in two waters, and heated till the precipitate shrinks and fuses, or, on cooling, a solid mass, which, when dry, weighs 7-4 grains, and in water dissolves entirely in solution of oxalic acid."

The quantity of carbonate of soda required to decompose 10 grs. of disulphate of quina, to which a few drops (say six grains) of sulphuric acid have been added, is less than twenty-five grains.

Disulphate of quina is given in doses of from gr. i. to grs. v. Occasionally it is exhibited in much larger doses as a febrifuge; but it is very apt to disagree, causing disturbance of stomach, febrile disorders, and headache. I have known fourteen grains taken, and have heard of a scruple or half a drachm being exhibited at a dose. It may be given either in the form of pill, made with conserve of roses, or dissolved in some aqueous liquid by the aid of an acid. Infusion of roses is a favourite vehicle for it. An ointment (composed of 5j. of disulphate of quina and 3j. of lard) rubbed into the axilla has been used with success to cure ague in children.

2. CEPHAELIS IPECACUANHA, Richard, L. E. D.—THE IPECA-

Cuanha Cephaelis.

Callitoea Ipecacuanha, Bratero.

Sex. Syst. Pentandria, Monogynia.

(Radix, L. D.—Root, E.)

History.—Ipecacuanha is first mentioned by Michael Tristram, who calls it Ipecaya or Pigaya. In 1684 it was described and designated by Piso. In 1686 it was celebrated in Paris as a remedy for dysentery. It appears that Jean-Adrian Helvetius (then a young

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man) attended with Afforty, a member of the faculty, a merchant, named Grenier, or Garnier, who, when he recovered from his illness, gave to his physician, as a testimony of his gratitude, some of this root, as a valuable remedy for dysentery. Afforty attached very little importance to it, but gave it to his pupil, Helvetius, who tried it, and thought he had found in it a specific against dysentery. Numerous placards were placed about the streets of Paris, announcing to the public the virtues of the new medicine, which Helvetius sold without discovering its nature. Luckily for him, some of the gentlemen of the court, and even the Dauphin, the son of the king (Louis XIV) were at this time afflicted with dysentery. Being informed by his minister Colbert of the secret possessed by Helvetius, the king deputed his physician Aquin and his confessor Le P. de Chaise to arrange with Helvetius for the publication of the remedy. 1000 Louis-d’or was the price which was paid, after some trials had been made with it at the Hôtel-Dieu, and which were crowned with the most brilliant success. Garnier now put in his claim for a part of the reward, saying that he, properly speaking, was the discoverer of the medicine; but the claim was not allowed. Subsequently Helvetius obtained the first medical honours of France. He wrote a treatise describing the use of ipecacuanha in diarrheea and dysentery.

Great confusion existed for a long time respecting the plant yielding Ipecacuanha. In 1800 Dr. Gomes returned from the Brazil and brought with him the plant, on which he published a dissertation. In 1802 Brotero described it under the name of Calliococcus Ipecacuanha, which Richard afterwards changed to Cephaëlis Ipecacuanha.

**BOTANY. Gen. Char.**—Tube of the calyx obviated; limb very short, five-toothed. Corolla somewhat funnel-shaped; its lobes five, small, rather stouter. Anthers inclosed. Stigma bis, usually exerted. Berry obovate-oblong, crowned with the remains of the calyx, two-celled, two-seeded (De Cand.)

**Sp. Char.**—Stem ascending, at length erect, somewhat pubescent at the apex. Leaves oblong-ovate, rough above, finely pubescent beneath. Stipules cleft into setaceous segments. Heads terminal, erect, at length pendulous. Bracts somewhat cordate (De Cand.)

Root perennial, annulated, simple, dividing into a few diverging branches, flexuous, from four to six inches long; when fresh, pale brown externally. Stem somewhat shrubby, two or three feet long, emitting runners. Leaves rarely mat.

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* Bull. de la Soc. de la Fac. de Méd. 1818.*
IPECACUANHA.

Can four or six leaves, placed at the end of the stem and branches; petioles abscissed, which are connected to each by the erect stipules. Stipels membranous at their base. Peduncles solitary, erect when in water, reflexed when in fruit. Head semiglobose, eight- to ten-

centred. Involucre one-leaved, spreading, deeply four- to six-parted; segments obovate. Bracts acute, pubescent; a single one to each flower. Calyx minute. Corolla white. Stamens five. Ovary obo-

me; style filiform, white; stigmas linear, spreading. Berry soft, sticky, violet-black. Seeds (nucules) pale, plane-convex: albumen amy.

Hab.—Brazil; in moist shady situations from 8° to 20° south latitude. Abundant in the valleys of the granitic mountains, which run more or less distant from the sea) through the provinces of Rio de la Plata, Espirito Santo, and Bahia; also met with in Pernambuco. Humboldt and Bonpland found it on the St. Lucar mountains of nw Granada.

Collection of the Roots.—The roots are gathered at all seasons the year, though more frequently from January to March inclusive; if no care is taken in the cultivation of the plant, it has become arce around the principal towns. Those Brazilian farmers who live in the neighbourhood of the plant, carry on considerable commerce with it. The native Indians also are very assiduous in the collection of it. Those called by the Portuguese the Coroados, who live near the river Xipó, in the province of Minas, as well as their neighbours, the Puri, are the greatest collectors of it. They sometimes leave their villages for two months at a time, fixing their habitations in those places in which this plant abounds. They cut the roots from the stems, dry them in the sun, and pack them in bundles of various sizes and forms.

Commerce.—Ipecacuanha is imported into this country from Rio de la Plata, in bales, barrels, bags, and serons. The duty is 1s. per lb. the quantities on which this was paid, for the last six years, are as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Weight (lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1834</td>
<td>9,035</td>
</tr>
<tr>
<td>1835</td>
<td>7,427</td>
</tr>
<tr>
<td>1836</td>
<td>11,437</td>
</tr>
<tr>
<td>1837</td>
<td>11,435</td>
</tr>
<tr>
<td>1838</td>
<td>12,426</td>
</tr>
<tr>
<td>1839</td>
<td>7,423</td>
</tr>
<tr>
<td>1840</td>
<td>6,423</td>
</tr>
<tr>
<td>1841</td>
<td>9,035</td>
</tr>
</tbody>
</table>

Description.—The root of this plant is the ipecacuanha (radix ipecacuanha) of the shops. No other root is known in English commerce by this name. By continental writers it is denominated annulatus ipecacuanha (radix ipecacuanha annulata) to distinguish it from the roots of Psychotria emetica and Richardia scabra; the first of which is termed striated ipecacuanha—the second, undulated ipecacuanha: both will be described hereafter.

The root of Cephaelis Ipecacuanha occurs in pieces of three or four inches long, and about the size of a small writing-quill: va-
Brown Ipecacuanha Root.

a. Ringed portion.
b. Portion of a root without rings.

It has a knotty appearance, consequence of a number of deep fissures about a line in depth, and extend inwardly to a central ligneous so as to give the idea of a number of rings upon a thread (hence the name annulated). These rings are unequal, both with respect to each other and different parts of the same ring. This a resinous fracture. Its substance of two parts: one called the cortical which is brittle and resinous, of appearance, with a grayish or brown colour—sometimes whitish; and another called meditullium, and which consists in yellowish-white, woody, vascular running through the centre of each. In 100 parts of good ipecacuanha, there about 80 of cortex and 20 of medulla. Ipecacuanha root has an acid, somewhat bitter taste, and a slight seco, but peculiar odour. The colour of the root varies somewhat, being reddish-brown, grayish-brown, or grey.

Richard, Merat, and Guibourt add varieties of annulated ipecacuanha, whose distinction is the colour of the epidermis of the root, the nature of the soil, and the drying, are among the different circumstances producing these varieties. Sometimes they are met with in the same bale.

Var. a. Brown Annulated Ipecacuanha, Richard; Brown Ipecacuanha, Lemer.- (Radix ipecacuanha annulata fusa.) This is the best kind. The greater part of the ipecacuanha of commerce consists of this variety. It is the grey or brown of the powder is grey. The cortical portion has a horn-like appearance. The root which I have received from Professor Guibourt, as black ipecacuanha, is somewhat less brown. It is the grey or annulated ipecacuanha of Merat.

I have occasionally found in commerce a brown non-annulated variety of ipecacuanha (fig. 268 b) imported in distinct bales. It consists of slender, often branched pieces, frequently several inches long, smooth, or warty, but not annulated or moniliform, with a very thin cortex, and meditullium of the usual size, or thicker. These pieces appear to be the bases of the stems or runners, and the ends of the roots. Occasionally, pieces of the brown annulated ipecacuanha are found attached.

Var. b. Red Annulated Ipecacuanha, Richard.—This differs from the latter by the lighter and reddish colour of its epidermis, by its less odour, and by its want of aromatic taste. Sometimes it has, when be...
horny and semi-transparent quality of the brown ipecacuanha, but more
ently it is opaque, dull, and farinaceous; in which case it is generally less
These differences probably depend on the nature of the soil in which
at grew. The root which I have received from Professor Guibourt under
of reddish-gray annulated ipecacuanha, is scarcely so red as the pieces
I have met with in English commerce. It is the red-gray ipecacuanha of
ry and Merat.

4. Gray Annulated Ipecacuanha, Richard; White Gray Ipecacuanha,
Greater Annulated Ipecacuanha, Guibourt.—The colour of this variety is
b-white. Professor Guibourt has met with it of a reddish-gray colour.
Ipecacuanha occurs in pieces of greater diameter than either of the foregoing
with fewer, more irregular, and less prominent rings. It is merely a por-
the root of Cephaelis, which has become more developed, either from
with excess of nourishment, or from some other circumstance.
ive found, in English commerce, a gray ipecacuanha, whose roots were
ager than the brown variety, but whose rings were imperfectly developed.

Ipecacuanha

Pelletier’s Analyses.
Brown Annulated Ipecacuanha.

<table>
<thead>
<tr>
<th>Component</th>
<th>Cortex</th>
<th>Medullarium</th>
<th>Cortex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cortex</td>
<td>16</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>Fatty matter</td>
<td>2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Resin</td>
<td>6</td>
<td>5</td>
<td>16</td>
</tr>
<tr>
<td>Balsam</td>
<td>10</td>
<td>5</td>
<td>16</td>
</tr>
<tr>
<td>Gum</td>
<td>42</td>
<td>100</td>
<td>18</td>
</tr>
<tr>
<td>Saponaceous matter</td>
<td>20</td>
<td>65</td>
<td>48</td>
</tr>
<tr>
<td>Emetine extractive</td>
<td>0</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Fats</td>
<td>4</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

| Ipecacuanha     | 100    | 100%        | 100    |

Bucholz’s Analysis.

<table>
<thead>
<tr>
<th>Component</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emetine extractive</td>
<td>4.13</td>
</tr>
<tr>
<td>Soft resin</td>
<td>2.45</td>
</tr>
<tr>
<td>Wax</td>
<td>8.9</td>
</tr>
<tr>
<td>Gum</td>
<td>28.12</td>
</tr>
<tr>
<td>Starch</td>
<td>9.00</td>
</tr>
<tr>
<td>Woody fibre</td>
<td>10.80</td>
</tr>
<tr>
<td>Bitter extractive</td>
<td>10.12</td>
</tr>
<tr>
<td>Sugar</td>
<td>2.00</td>
</tr>
<tr>
<td>Extracted, gum, and starch, extracted by potash</td>
<td>35.80</td>
</tr>
<tr>
<td>Loss</td>
<td>6.80</td>
</tr>
</tbody>
</table>

Ipecacuanha     100%  

insoluble fatty matter.—It is extracted from ipecacuanha by ether. It
brownish-yellow colour, soluble in alcohol and ether, to both of which it
micate a yellow colour. Its odour is very strong, and similar to that of
ential oil of the horseradish; it becomes insupportable when heat is
ce is acid; the specific gravity is greater than that of alcohol.

fatty matter consists of two substances; 1st, a very fugacious volatile sub-
which is the odorous principle of ipecacuanha root; 2dly, a fixed fatty
(which some chemists have mistaken, when mixed with emetine, for
having little or no odour.

withstanding its strong taste and odour, the fatty matter of this root does
em to have any effect on the stomach. Given in large doses to animals,
no sensible operation. Caventou took six grains at one time, but expe-
no marked effects therefore. Pelletier and Magendie swallowed some of
of it, and experienced a disagreeable impression on the throat, but it was
very only.

emetina.—When first discovered by Pelletier and Magendie, in 1817, it
med in materia comitiva, or emetine (from εἰμί, I comit.)
emetina is white (when not absolutely pure it has a grayish-yellow
 pulverulent, inodorous, with a slightly bitter taste; fusible at 122° F.;
soluble in cold, but much more so in hot, water; very soluble in
, but scarcely soluble in ether and oils. It dissolves in acids, the acidity
which it does not entirely destroy. The salts of emetine are slightly acid, and
stabilizable. They form gummy masses, in some only of which are traces

* Journ. de Pharm. lii. 118.
* Ibid. vi. 254.
of crystallization occasionally found. Emetina restores the blue colour of ipecacuanha, which has been reddened by an acid. I find that the yellowish-white emetina, sold in the shops under the name of pure emetina, is coloured red by urine and the red colour being much deepened on the addition of ammonia. An alcoholic solution of iodine, added to an alcoholic solution of emetina, produces a light precipitate (hydriodate of emetina?). Tincture of galls copiously precipitates solutions of emetina (tannate of emetina). The effect of these resins on emetina is similar to their effect on morphia; but from this last substance emetina is distinguished by the salts of iron, which produce no change of color in it.

The following is the composition of emetina:

<table>
<thead>
<tr>
<th>Atoms</th>
<th>Eq. Wt.</th>
<th>Per Cent.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon</td>
<td>35</td>
<td>210</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>Oxygen</td>
<td>9</td>
<td>72</td>
</tr>
<tr>
<td>Emetina</td>
<td>1</td>
<td>321</td>
</tr>
</tbody>
</table>

The following are stated by Magendie as the effects of impure emetina — From half a grain to two grains given to cats and dogs caused at first vomiting and then sleep. In doses of from six to ten grains, vomiting, sleep, and death took place. Dissection showed inflammation of the pulmonary tissue and of the mucous membrane of the alimentary canal, from the cat to the anus. The same effects (namely, vomiting, sleep, and death) were observed when impure emetina was dissolved in water, and injected into the jugular vein, into the pleura, into the anus, or into the muscular tissue. A man a quarter of a grain excited nausea and vomiting; a grain and a half or two grains, taken fasting, caused continued vomiting, and decided disposition to sleep.

The effects of pure emetina are similar, but more energetic. In one at 1-16th of a grain caused vomiting in a man eighty-five years of age: two grains are sufficient to kill a dog.

Emetina has been proposed as a remedial agent, — as a substitute for ipecacuanha, all the advantages of which it is said to possess in a much smaller dose and without the unpleasant taste and odour which the root is known to have.

Confess, however, I think very little advantage is likely to be gained by the substitution. When we wish to give emetina in a liquid form, it may be readily dissolved in water by the aid of acetic or dilute sulphuric acid.

**Chemical Characteristics.**—A decoction of the root, filtered and allowed to cool, becomes, on the addition of a solution of iodine, blue (iodide of starch). Tincture of nutgalls forms, in the decoction as well as in the tincture diluted with water, a greyish white precipitate (tannate of emetina). Sesquichloride of iron communicates a greenish tint (tannate [gallate, Pelletier] of iron) to the decoction as well as to the diluted tincture. A solution of isinglass forms in the infusion, after twelve hours, a precipitate (tannate of gelatine). Alcohol renders the decoction turbid (gum). Diacetate of lead forms with the tincture, and especially with the decoction, a precipitate (colouring matter, gum, and oxide of lead).

**Physiological Effects.**—If the powder or dust of ipecacuanha be applied to the eyes or face, it acts as an irritant, and causes redness and swelling of these parts. Inhaled, it irritates the respiratory
ssages, and, in some persons, brings on difficulty of breathing, similar to an attack of spasmodic asthma. Mr. Roberts, surgeon, Dudley, is affected in this way; and I have received from him the following account of his case:—"If I remain in a room where the expiration of ipecacuanha is going on—for instance, making the dr. ipecac. comp.—I am sure to have a regular attack of asthma. A few seconds dyspnœa comes on in a violent degree, attended with wheezing and great weight and anxiety about the precordia. The attack generally remains about an hour, but I obtain no relief till a copious expectoration takes place, which is invariably the case. After the attack is over I suffer no further inconvenience. I have always considered that the attack proceeds from the minute articles of the ipecacuanha floating in the atmosphere, acting as an irritant on the mucous membrane of the trachea and bronchial tubes." Some cases the mere odour of the root seems sufficient to excite difficulty of breathing, with a feeling of suffocation.

There is one case recorded of poisoning by the incalculable inhalation of the dust of ipecacuanha, in the process of powdering it, by a perist's assistant. It is mentioned by Dr. Priestley. The patient, who was suffering with catarrh and cough, inhaled, during three hours, the dust from the root; in consequence of which vomiting ensued, followed by a tightness of the chest. An hour after this he complained of a sense of suffocation, and constriction of the trachea and throat: his appearance was pale and deathly. The physician was called in, bled him, and gave asafetida and belladonna, with temporary relief; but in five hours a fresh attack came on, with the most imminent danger of suffocation. A strong decoction of urasi, with the extract of rhathany, was administered with almost immediate relief, and in an hour his breathing was much freer. He was able to leave the house in two days, but suffered several days with difficulty of breathing.

When taken in small and repeated doses, ipecacuanha principally acts its influence to the secreting organs, especially those of the nose, whose activity it promotes. It specifically affects the bronchial membrane, in some morbid conditions of which it promotes expectoration, while in others, attended with a profuse secretion of phlegm, it exerts a beneficial influence, and often contributes to the abatement of the part to its normal condition. In somewhat larger doses it creates nausea, with its concomitant phenomena, depression, increased secretion of saliva and buccal mucus, &c. If a diaphoretic tincture be adopted, it exerts a powerfully relaxing influence over the system. In full medicinal doses it occasions vomiting, followed by a tendency to sleep. Its operation as an emetic is exceedingly safe, the inflammation is not produced by it, even when an overdose has been swallowed.

— Scott, Phil. Trans. for 1776, p. 166.
+ Root's Mag. B. xxxii. H. 1, 8, 182.
The vomiting produced by ipecacuanha is not so violent as induced by emetic tartar, neither is it so long continued, nor at with such nausea. Furthermore, ipecacuanha is less disposed on the bowels. The tonic and astringent qualities of the compounds, as well as their want of diaphoretic power, distinguish these emetic substances from ipecacuanha. Squill (with which ipecacuanha agrees in its expectorant and emetic qualities) is distinguished by its greater acridity, and by its influence not concentrated on the pulmonary organs, as is the case with ipecacuanha, which does not, therefore, possess that power of stimulating the urinary organs possessed by squill (see pp. 981-2).

The most remarkable of the effects of ipecacuanha seem produced by the agency of the eighth pair of nerves. "How it is," says Dr. M. Hall, "that ipecacuanha taken into the body should excite asthma, and taken into the stomach should excite another affection of the respiratory system, vomiting." Subscribes the red condition of the bronchial membrane, and the congestion of the lungs of animals killed by emetine, not to the stimulus exerted by this substance over the pulmonary mucous membrane, but to an exhausting stimulus over the eighth pair of nerves which is brought on; for he has observed the same appearances in persons who have died of this disease, where there was no inflammatory condition of the bronchial membrane, but a lytic condition of its small blood-vessels.

Uses.—Ipecacuanha is employed in full doses as an emetic, smaller doses as an expectorant and nauseant.

1. In full doses, as an emetic.—The mildness of its operation on ipecacuanha for the use of delicate and debilitated persons is well fitted for the disorders of children requiring the emetics (as when the stomach is overloaded with food, in hoarseness, croup, &c.) on account of the mildness and certainty of action. It is also exceedingly useful for adults (especially females); thus, in gastric disorders, to evacuate undigested matters from the stomach,—to promote the passage of calculi,—as a counter-irritant at the commencement of fever, many inflammatory diseases (as acute mucous catarrh, cysorrhoea, hernia humoralis, and ophthalmia),—in asthma,—and as an ant in cases of narcotic poisoning. When the indication is to gentle vomiting in very weak and debilitated frames, Dr. Pyne has shown that it may be effected frequently with the utmost care and safety by ipecacuanha in doses of from two to four grains.

Cullen has expressed some doubt with respect to the correctness of this statement; but it is well known that ten grains of Ipecacuanha are usually given in an ipecacuanha draught. 

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48 Lectures in the Lancet, for April 21, 1838.
5 Handb. d. ap. Heilmittel. II. 5.
7 Mat. Med. 21, 74.
IPECACUANHA.

The mildness of its operation is not the only ground for preferring ipecacuanha to other emetic substances. Its specific power over the pulmonary organs and the stomach leads us to prefer it in maladies these parts, in which vomiting is likely to be beneficial; especially those affections in which the nerves appear to be more than ordinarily involved, as spasmodic asthma and hooping-cough. In the rest of the complaints, Dr. Akenside has shown that it proves equally serviceable even when it fails to occasion vomiting, and merely produces nausea. He gave a scruple, in the paroxysm, to induce vomiting, and, in the interval, five grains every morning, ten grains every morning. Dr. Wright recommends gentle doses of ipecacuanha at the commencement of the treatment of dysentery.

2. In small doses as a nauseant, antispasmodic, diaphoretic, and expectorant.—When given in doses insufficient to occasion vomiting, ipecacuanha is serviceable in several classes of complaints, especially use of the chest and alimentary canal.

a. In Affections of the Respiratory Organs.—Nauseating doses of ipecacuanha are used with considerable advantage in acute cases of voous catarrh. They favour expectoration, and relaxation of the mucous vessels. In milder and more chronic forms, smaller doses, which do not occasion nausea, will be sufficient. In children, who vomit vomiting much better than adults, full nauseating or even emetic doses are to be preferred.

"When a child becomes hoarse, and begins to cough," says Dr. Heyne, "let every kind of stimulating food be withdrawn; let him be confined to an apartment of agreeable warmth; have a tepid bath; take a drachm of the following mixture every hour, or every two hours, if it produces sickness:—R. Vini Ipecacuanhæ, 5iij.; grapi Tolut. 5v.; Mucil. Acacie, 5j. Mix.: and all danger will probably be averted. Whereas, if no change be made in the quality of the food, and if he be sent into the open air, he will probably undergo an attack of bronchitis or croup."

In hooping-cough, in which disease considerable benefit is obtained by the use of emetic substances, ipecacuanha is frequently administered with advantage. After giving it to create vomiting, it should be administered in nauseating doses. In asthma, benefit is obtained by it, not only when given so as to occasion nausea and vomiting, as has been noticed, but also in small and repeated doses. In both this and the preceding disease, the benefit procured by the use of ipecacuanha arises, not from the mere expectorating and nauseating operation alone of this remedy, but from its influence otherwise over the eighth pair of nerves. In bronchial hemorrhage (haemoptysis) the efficacy of ipecacuanha has been greatly commended. A. N.

* Med. Trans. i. 33.
† Memoir of, pp. 379 and 397.
Aasheim, a Danish physician, gave it in doses of one-fourth grain every three hours during the day, and every four hours during night. In this way it excites nausea, and sometimes even vomiting. It checks the hemorrhage, alleviates the cough, and relieves vomiting.

β. In Affections of the Alimentary Canal.—In indigestion, benton gave it in doses just sufficient to excite a slight sense of nausea. Eberle tried it, in his own case, with evident advantage. An anti-emetic quality has been assigned to it by Schön.

In dysentery, ipecacuanha has gained no trifling celebrity under the name of radix antidysenterica. In severe forms of this disease, no one, I suspect, now would think of relying on it as his only remedy; but as an auxiliary, its efficacy is not to be denied. Advocates for its use, however, are not agreed as to the best mode of using it. Sir George Baker, and Dr. Cullen, consider it of most benefit where it acts as a purgative, but this can scarcely be called the methodus medendi. From my own observations of its use in milder forms of dysentery met with in this country, I am inclined to ascribe its efficacy in part to its diaphoretic powers, since I have always seen it promoted by conjoining a diaphoretic regimen with it; its tendency to produce an antiperistaltic movement of the bowels doubtless contributes to its antidysenteric property. It is best, I think, in conjunction with opium, (of course depletion preparatory to the violence of the disease and the strength of the preceding its use). Its determination to the skin should be facilitated by warm clothing, and the free use of mild, tepid aliments. Twining gave ipecacuanha in large doses (grs. vj.), with occasionallygentian, without causing vomiting. Mr. Playfair recommends half a drachm to a drachm of ipecacuanha, with from thirty-six drops of laudanum, to be given at the commencement of the disease.

γ. In various other maladies.—As a sudorific, ipecacuanha is in combination with opium, (see Pulv. Ipecacuanhae comp.) of much service in various diseases. On the continent it is esteemed as an antispasmodic. In uterine hemorrhage also it has been employed. In visceral enlargements it has been administered as a resolvent.

Administration.—The usual dose of ipecacuanha, in the form of an emetic, is grs. xv. But a much smaller quantity (for five, six, or four, or even two grains) will frequently suffice, as before mentioned. But a scruple, or half a drachm, may be given, with perfect safety. A commonly-used emetic consists of half of an emetic tablet, and ten or fifteen grains of ipecacuanha.

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1 Mémo. sur les Indigest. 1789.
1 Treat. of the Mal. Med. i. 44, 2d ed.
2 De Dysenteria, 1751.
Ipecacuanha.

Half a grain or a grain of this root is usually sufficient to occasion vomiting. In all cases, the operation of the remedy should be assisted by diluents. As a nauseant the dose is from one to three grains. As an expectorant and sudorific, the dose should not exceed the grain: for infants, one-quarter or one-eighth of a grain. Ipecacuanha lozenges contain usually from a quarter to half a grain of the powder, and may be used in catarrhal affections to promote expectation. 

Infusion of Ipecacuanha (prepared by digesting $\frac{1}{2}$ j. of the coarsely-powdered root in $\frac{1}{3}$ y. of boiling water) may be used as an emetic, in cases of narcotic poisoning, in doses of $\frac{1}{3}$ j. to $\frac{1}{3}$ j.

1. Vinum Ipecacuanile, L. E. D.; Wine of Ipecacuanha.—(Ipecacuanha, bruised, $\frac{3}{4}$ j.; Sherry Wine, Oj. [wine measure, $\frac{3}{4}$ ] Macerate for fourteen [seven, E.] days, and strain).—According Dr. A. T. Thomson, a pint (i.e. $\frac{3}{4}$ y.) of wine takes up 100 grains the soluble matter of ipecacuanha. This preparation is diaphoretic, expectorant, and emetic.—Dose, for an adult, as a diaphoretic $\frac{1}{4}$ j.; as an expectorant, $\frac{1}{6}$ j. to $\frac{1}{6}$ j. On account of the mildness of its operation, it is given, as an emetic, to children: the dose is from $\frac{1}{4}$ j. to $\frac{1}{3}$ j.; according to the age of the child. It also exceedingly useful as an expectorant in the diseases of infants: the dose from $\frac{1}{8}$ j. to $\frac{1}{8}$ j.

2. Syrupus Ipecacuanile, E.; Syrup of Ipecacuanha.—(Ipecacuanha, in coarse powder, $\frac{1}{8}$ j.; Rectified Spirit, Oj.; Proof Spirit, or Water, of each $\frac{1}{4}$ j.; Syrup, Ovij. Digest the ipecacuanha in $\frac{1}{2}$ fluidounces of the rectified spirit, at a gentle heat, for twenty-four hours; strain and squeeze the liquor, and filter. Repeat this process until the residuum and proof spirit; and again with the water. Unite the fluids, and distil off the spirit till the residuum amount to twelve ounces; add to the residuum five fluidounces of rectified spirit, and strain the syrup).—A syrup of ipecacuanha is a very useful preparation for children; but some difficulties attend its preparation. A aqueous decoction of this root contains so much starch that it is scarcely be filtered. Even the infusion filters slowly, is always thick, and yields a syrup which does not keep well. Hence MM. was and Henry* introduced a process, of which that of the Pharmacopoeia is a modification (improvement?). They prepared an alcoholic extract, which is dissolved in water and mixed in concentrated syrup. About two fluidscupules of the Edinburgh preparation contain the strength of one grain of ipecacuanha; hence a dose of it, as an emetic, for infants, will be half a tea-spoonful; for adults, $\frac{1}{3}$ j. or $\frac{1}{3}$ j. As an expectorant, the dose is $\frac{1}{3}$ j. to $\frac{1}{3}$ j.

3. Pulvis Ipecacuanile Compositus, L. E. D.; Compound Powder of Ipecacuanha; Dover's Powder; Pulvis Doveri, offic.—(Ipecacuanha, powdered; Hard Opium, powdered, of each $\frac{1}{3}$ j.; Sulphate of tash, powdered, $\frac{1}{3}$ j. Mix them. The proportions used by all the Fish Colleges are the same. The Dublin College directs the Sul-
phate of Potash to be rubbed with the Opium, and the Ipecacuanha to be then intermixed).—This preparation is an imitation (not a very exact one) of a formula given by Dover's; which is commonly known in the shops as Dover's Powder. The following is Dr. Dover's recipe:

"Take opium, 3 grains; saltpetre; tartar vitriolated, of each 6 grains; ipecacuanha liquorice, 3 grains. Put the saltpetre and tartar into a red hot mortar, and with a spoon until they have done flaming. Then powder them very fine, that slice in your opium; grind these to a powder, and then mix the powders with them. Dose, from 40 to 60 or 70 grains, in a glass of white wine, going to bed. Covering up warm, and drinking a quart or three of posset drink while sweating."

The compound powder of ipecacuanha is one of our most powerful, and valuable sudorifics. The sulphate of potash is intended to serve the double purpose of promoting the sudorific action of the other ingredients, and of minutely dividing, by the process of its particles, the opium and ipecacuanha. The nitrate of silver, also employed by Dr. Dover probably contributed still further to the sudorific effect of the powder. The opium and ipecacuanha, when combined, enjoy great sudorific properties not possessed by either of the substances individually. I am inclined, however, to assign a greater part of the activity of the compound to the opium, which is well known to strongly determine the cutaneous surface (sweating) and often produces pricking or itching of the skin; and which, when used by the copious use of warm aqueous diluents, operates as a sudorific. This effect, however, is greatly promoted by the ipecacuanha, which has a relaxing influence over the cutaneous vessels. The opium is posset, enjoined by Dr. Dover, is an important part of the plan. The contra-indications for the use of compound powder of ipecacuanha are an irritable condition of the stomach (when the patient is apt to occasion sickness), and cerebral disorder. In fevers, a dry furrowed tongue, and a dry skin, with much disorder of the cerebro-spinal functions, it, like other opiates, is calculated but most injurious. In such cases, the antimonial sudorifics are resorted to (see pp. 198 and 678). But when the tongue is moist, if not damp, at least soft, and the functions of the brain not disturbed, it will probably operate beneficially. In slight colds, and rheumatic pains, it often proves most effectual. In inflammatory affections, when the febrile excitement does not increase, and when the brain is undisturbed, it may be used to a beneficial effect. In acute rheumatism, it is occasionally highly serviceable. In diarrhoea and dysentery also. In hemorrhages from the uterine veins, as the uterus, it is useful on the principle of reaction-counter-irritation (see p. 145), by its power of determining to a point. The dose of this preparation is usually from gr. v. to gr. xvi., in currant jelly or gruel, or made into a pill (see Pila Ipecacuani et Opiae), or administered in a common saline draught.\footnote{The ancient Physician's Legacy to the Country, Vol. II.}
GAMBIR.

Birnach is irritable, I have frequently seen five grains cause sickness. On the other hand, in some cases where a powerful sudorific is required, and the head quite free, grs. xv. or even $\frac{1}{2}$j. of this powder are not unfrequently given.

A PILULÆ IPECACUANII COMPOSITAE. I. ; Pilula Ipecacuanhae et Scyllæ. E. ; Compound Pills of Ipecacuanha ; Pills of Ipecacuanha and Squill.—(Compound Powder of Ipecacuanha, sijj.; Squill, fresh-ground; Ammoniacum, of each, s. j.; Mixture of Acacia, as much as may be sufficient. Beat them together until incorporated, L.—Powder Ipecacuanha and Opium, three parts; Conserve of Red Roses, one part; beat them into a proper mass, which is to be divided into four pills, E.)—Narcotic, and sudorific. Employed in chronic diarrhea.—Dose, gr. v. to gr. x.

5. TROCHISCH MORPHÆ ET IPECACUANII. (See Morphia).

3. UNCA'RIA GAMBIER, Roxburgh, E.—THE GAMBIR.

Nau clea Gam'bir, Hunter.

See Syst. Pentandria, Monogynia.

(The extract obtained from the leaves, E.; Gambir, or Gambir-Catechu.)

Theory.—Gambier, or Gambir, is the Malay name of an extract obtained from the leaves of this shrub. Rumphius* has described a plant under the name of Funis uncatus or Daun Gatta Gambir.

Botany.—Gen. Char.—Limb of calyx short, urceolate, five-cleft. Corolla funnel-shaped; tube slender; throat naked; lobes five, red, oval-oblong. Anthers enclosed or protruded. Style filiform, protruded; stigma tumid, undivided. Capsules pedicellate, acute, tapering to the base. Seeds numerous, imbricated, winged. Climbing shrubs. Peduncles when old bearing axillary compressed hooked spines. Flowers in loose heads (Lindley; De Cand.).

Sp. Char.—Branches terete. Leaves ovate-lanceolate, acute, with petioles, smooth on both sides. Stipules ovate. Peduncles axillary, solitary, opposite, bracteolated about the middle; the lowest sterile, converted into hooked spines (De Cand.)

A stout, scandent shrub. Florets green and pink. Capsules bilobed, clavate, two-celled, two-valved.

Islands.—Islands of East Indian Archipelago. Extensively cultivated. The Island of Bintang there are 60,000 Gambir plantations*.

Extraction of Gambir.—Two methods of obtaining Gambir are described: one consists in boiling the leaves in water, and inspissating the decoction; the other, which yields the best Gambir, consists of infusing the leaves in warm water, by which a fæcula is obtained, which is inspissated by the heat of the sun, and formed into cakes. Dr. Campbell^{1} has described the method of making the circular or rical variety of Gambir, as followed in the colony established

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* Herb. Ambain. vol. v. tab. 34.
* Bennett's Wandering, ii.
* Asiatic Researches, xi. 198.
* Roxburgh, Fl. Ind. i. 218.
by the Sultan of Moco, where the manufacture is carried on to a considerable extent. It consists in shredding and bruising the shoots and leaves “in water for some hours, until a ferment is produced; this, insipissated in the sun to the consistence of a paste, is thrown into moulds of a circular form, and in this state it is brought to market.” Dr. Roxburgh describes the manufacture of the cubical variety as practised eastward to the Bay of Benga: the process consists in “boiling the leaves and young shoots; evaporation of the decoction by fire and the heat of the sun. When sufficiently insipissated, it is spread out thin, and cut into little square cakes, and dried.” Mr. Bennett has given a very full account of the manufacture making the cubical variety as practised at Singapore. The leaves are plucked from the prunings, and boiled in a qualie, or brine (made of bark, with an iron bottom); after being boiled and rinsed, they are used as a manure for the pepper vine. The juice is evaporated to the consistence of a very thick extract, of a yellowish, brown colour, like clay, which is placed in oblong pieces. The pieces thus obtained are divided into squares, and dried in the sun on a raised platform. Hunter says, Sago is often imported with the extract, but Bennett denies that this is done at Singapore. The best Gambier is made at Rio, in the isle of Bintang; but the best is that of Lingin.

Commerce.—Gambir (the cubical variety) is imported from Java principally. Its principal use here is for tanning; at the dealers it is distinguished from catechu, cutch, &c. by the terra japonica. The following are the quantities imported of late four years:

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantity</th>
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</thead>
<tbody>
<tr>
<td>1836</td>
<td>970 tons</td>
</tr>
<tr>
<td>1837</td>
<td>2738</td>
</tr>
<tr>
<td>1838</td>
<td>1600</td>
</tr>
<tr>
<td>1839</td>
<td>3213</td>
</tr>
</tbody>
</table>

During the last three years, its price has varied from 1s. per cwt. The duty on it is 1s. per cwt. It is brought over in baskets, lined with palm leaves. Mr. Bennett says they are a kind of rattan found in the jungle at Singapore.

Description and Varieties.—Gambir (Terra Japonica, or Catechu in square cakes, of druggists; Cubical Resinous Catechu, Guibourt; Gambier of Second Quality, Bennett*) occurs in cubes, whose faces are about one inch square. When thrown into water, it floats. These cubes are externally of a deep reddish orange brown colour; their fracture is dull and porous, and internal colour is paler than that of their surface, being yellowish or pale brown; the fractured surface not unfrequently presenting some feebly shining stripes, extending from without inwards. It has no odour; its taste is powerfully astringent and bitter, consequently becoming sweetish. It melts entirely in the mouth.

* Ibid.
* Wandering, ii. 183.
* Linn. Trans. ix.
Gambir. 1485

Gambir in parallelepipeds: Gambir of the second quality, Bennett.—This occurs in two forms: cubes (forming the Gambir of English commerce, cited in the text), and square prisms or oblong pieces. The latter I received from Dr. Maclagan, of Edinburgh, under the name of Yellow Gambir in parallelepipeds. The length of the prisms is two inches; the size of the terminal faces of an inch square. In other respects the oblong variety agrees with the other kind.

Cylindrical Gambir: Gambir of the third quality, Bennett.—This occurs in thin discs, or short cylindrical pieces, the length of the cylinder being only one-third of an inch, while its diameter is one inch and a quarter. One of the round surfaces is marked with the fibres of a cloth, on which the cakes have been dried. The colour internally is pale, dull, pinkish yellow, externally a shade darker. Its fracture is dull and porous. It is easily scraped with the nail, and in this state has a chalky feel. Its taste is astringent, less so than the other kinds; it is gritty under the teeth. It sinks in water. Samples in the Medico-Botanical Society are somewhat smaller than those in my own collection. This kind contains many impurities.

Cubical Amylaceous Gambir.—It is in cubes, which swim in water, and the faces are about half an inch square. Externally these cubes are dark brown, being darker coloured than the kind just described. Its fracture is dull porous, its colour internally being pale cinnamon brown. It is readily disordered from all other kinds of Gambir, by the black colour produced when

the tincture of iodine is applied to the fractured surface. When held in water it is resolved into two parts—

<table>
<thead>
<tr>
<th>Matter soluble in water</th>
<th>43</th>
</tr>
</thead>
<tbody>
<tr>
<td>Matter insoluble in water, principally amylaceous</td>
<td>35</td>
</tr>
</tbody>
</table>

The amylaceous matter is probably sago.

**COMPOSITION.—**Gambir (the cubical variety) was analyzed by v. Essenbeck, who found Tannin 36 to 40 per cent., Peculiar Gum or Gummy Extractive, Tannic Deposit (similar to red clays) and 2 1/4 per cent. of Woody Fibre.

1. **TANNIC ACID.**—The properties of this acid have been before described. That extracted from Gambir is soluble in water, alcohol, and gives a green colour to the salts of iron.

2. **CATECHEINE; Catechuic Acid; Tanninsäure.** Buchner; Resinous Nees.—When gambir is treated with cold water, an insoluble residuum is impure catechine, and was termed by Nees, Resinous Tannin. When quite pure, it is a white, light powder, composed of silky needles, having a sweet taste. It is very slightly soluble only in cold water, or boiling water. Ether, and especially alcohol, are better solvents for it. It produces a green colour with salts of iron, but does not produce a precipitate in gelatinous solution. Its composition is C_{13}H_{10}O_{6}. If it be digested with potash, and the solution exposed to the air, oxygen is absorbed, and the acid is converted into Japonic Acid, composed of C_{13}H_{10}O_{3}. But if it be boiled in carbonate of potash, and exposed to the air without heat, it is converted into Rubinic Acid, composed of C_{13}H_{10}O_{3}.

**PHYSIOLOGICAL EFFECTS.—**Gambir is one of the most powerful pure astringents, whose effects have been before described (see Acacia). Its sweet taste depends, in part at least, on catechuic acid.

**Uses.—**It is employed by druggists as catechu (see Acacia).

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4. **RU'BIA TINCTO'RUM, Linn. D.—DYER'S MADDER**

**Sex. Syst.** Tetrandria, Monogynia.

**(Radix, D.)**

**HISTORY.**—Madder (ρυθροφόρος) was employed in medicine by Hippocrates⁴. Theophrastus⁵, Dioscorides⁶, and Pliny⁷, also used this substance. In the middle ages it was called varanitia⁸.

**BOTANY.** Gen. Char. — Tube of the calyx ovate-globose and scarcely any. Corolla five-partite, rotate. Stamens short. Petals two, short. Fruit didymous, somewhat globose, bacca (De Cand.)

Sp. Char.—Herbaceous. Leaves four to six in a whorl, subpetiolate, lanceolate, smooth above; their margin and keel, as the angles of the stem, aculate, rough. Pedicels axillary, cuneiform. Lobes of the corolla gradually callos-acuminatus and cuspitate (De Cand.)

Root perennial, horizontal, long, crouching, reddish brown. Several, herbaceous, tetragonal, with hooked prickles. Leaves what membranous. Flowers small, yellow.

**Hab.**—Levant and south of Europe.

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⁴ Ed. Ptolemai 407 and 634.
⁵ Hist. Plant. IX. 14.
⁶ Lib. XII. cap. 126.
⁷ Hist. Nat. IV. xxv. cap. 64 and 83. ed. Valpy.
DESCRIPTION AND VARIETIES.—Madder roots (radix rubiae tinctorum) are long, cylindrical, about the thickness of a writing quill, branched, externally deep reddish brown. They consist of an easily separable cortex, whose epidermis is thin, and of a ligneous medullary, which in the fresh state is yellow, but by drying becomes reddish. The odour of the root is feeble; the taste is bitter and astringent.

Levant, Turkey, or Smyrna Madder, is imported whole, and constitutes the roots usually found in the shops. Dutch or Zealand Madder is imported ground. Four kinds of the powder are distinguished: crop (the best), ombró, gamene, and mull (the worst). French Madder is imported both ground and whole; it is produced in the environs of Avignon and Alsace. Small quantities of Spanish Madder are imported. The substance termed East Madder, or Munjeet, is the root of Rubia Munjista, Roxb.

POSITION.—Several analyses of madder have been made, viz. Bohlz, John, and Kuhlmann.

<table>
<thead>
<tr>
<th>Bucholz.</th>
<th>Kuhlmann.</th>
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<tbody>
<tr>
<td></td>
<td>Red colouring matter</td>
</tr>
<tr>
<td></td>
<td>Yellow dito (Xanthin)</td>
</tr>
<tr>
<td>mucilage</td>
<td>Nitrogenous matter</td>
</tr>
<tr>
<td>tractive</td>
<td>Bitter substance</td>
</tr>
<tr>
<td>gum</td>
<td>Gum</td>
</tr>
<tr>
<td>sugar</td>
<td>Woody fibre</td>
</tr>
<tr>
<td>fibre</td>
<td>Vegetable acid</td>
</tr>
<tr>
<td>resin</td>
<td>Porous resin</td>
</tr>
<tr>
<td>ashes</td>
<td>Salts in the ashes.</td>
</tr>
</tbody>
</table>

Nature of the colouring matters of madder has been further studied by Robiquet and Colin, by Gaultier de Clauvry and Cachard by Runge. According to the last mentioned chemist, no less than five colouring matters in madder. The same mentions two colourless acids of madder; viz. Madderic Acids. The colouring matters are as follows:—

PURPLE (Purpurin, Robiquet and Colin).—An orange-yellow powder. It is slightly soluble in cold water, very readily so in ether. A strong solution of alum dissolves it. Alkalis dissolve it, forming red solutions. The colours which it imparts to mordanted less permanent than those produced by madder-red.

RED (Alizarin, Robiquet and Colin).—Is red, insipid, odourless, and sublimable in a strong solution of alum, almost in cold water, but is soluble in alcohol and ether. Alkalis dissolve it, forming a violet-coloured solution. It dyes cloths, which have been mordanted, composition is C≡H₂H₂O₁₀.

ORANGE.—Is very soluble in ether, sparingly so in cold alcohol. When added to a hot solution in spirit, crystals are deposited.
4. Madder Yellow (Xanthin, Kuhlmann)—It is very soluble in warm alcohol. It has no affinity for cotton impregnated with the alum mordant.

5. Madder Brown.—Not being valuable as a dye-stuff, it has not been fully examined.

It appears from Decaisne’s observations that the colouring of Rubia tinctorum does not reside in peculiar vessels or secretory apparatus, but in the interior of the elementary organs. Not confined to the root, for in the stem of full-grown plants in smaller spots are here and there found, where the cells and vessels are filled with it. Moreover, it appears that in madder only yellow colouring matter is observed, which is the more in as the plant is older. When the yellow sap of the root comes in contact with the atmosphere, it acquires, by the influence of oxygen and moisture, a red colour, and a granular substance forms in it.

Physiological Effects.—The influence of madder on the system is exceedingly slight. Its topical effect is scarcely one of Home, ascribed to it emmenagogue qualities. Others have designated it to be diuretic. Neither of these effects, however, were observed by Cullen. It may, perhaps, possess mild astringent and tonic properties.

But the most remarkable physiological effect of madder is in colouring the bones of animals fed with it, red. This fact was observed by Belcher; though Beckmann has adduced evidence to prove some hints of it are to be found in the works of the ancients, effect on the bones is produced more effectively, and in a shorter time, in young than in old animals. In birds, the beaks and claws become coloured. As the nerves, cartilages, aponeuroses, tendons, and periosteum are not tinged, the effect is ascribed to the chemical affinity of the phosphate of lime for this colouring matter. Mr. Gibson accounts for it as follows:—The blood charged with red particles imparts its superabundance of them to the phosphate, it circulates through the bones. But as soon as the blood is from the madder by excretion, the serum then attracts the colouring matter, and in a little time entirely abstracts it.

This hypothesis has, however, been combated by Mr. Paget, who asserts that the madder colours only those particles of phosphate of lime which are deposited during its use; and that it has no influence on the phosphate already existing in the bones before its administration, nor has the serum any chemical power to remove the phosphate from the phosphates once tinged. The coloured phosphate indeed regains its whiteness after a time, when the madder is not exhibited; but this he ascribes to the “gradual decomposition of the madder, as reddened skeletons gradually lose their colour exposed to air and light.” As, however, living bones are not subject to the same influence of air and light (powerful decolorizers), the skeletons referred to are, the analogy does not hold good. This part of Mr. Paget’s hypothesis is, therefore, unsatisfactory.

* Phil. Trans. vol. 227.
* Hist. of Insect. and Disease, 111, 379.
* Manchester Memoirs, 1, 146, 2d Ser.
York and Gmelin could not detect the colouring matter of
the chyle; and the red tint of the serum prevented them
seeing its existence in the blood, though of this scarcely a doubt.

It was formerly a favourite remedy in jaundice, in which
Ydendenham used it. On account of its capability of ting-
ing as red, it has been recommended in rickets and mollities
in the supposition of its promoting the deposition of bone
but this notion appears to be groundless. Home employed
emmenagogue in uterine complaints.—The dose of it is 3ss.
three or four times a day.

OTHER MEDICINAL AND DIETETICAL RUBIACEÆ.

**Psychotria emetica** is a native of Colombia, Peru, and probably of other
South America. Its roots constitute the **striated ippecuanha** of Richard,
Guibourt, and Merat; the **black or Peruvian ippecuanha** of some other
authors. They are neither annulated nor undulated, but longitudinally
striated. They have deep circular intersections at various distances,
giving them the appearance of being articulated; and when slight force is
used, they fracture at these parts.

As met with in commerce, they have externally a blackish-gray colour, with
a brownish tinge; but when fresh, they are said to be dirty reddish-gray.
Their fracture is resinous; the medullary, or central ligneous cord, is
yellowish, and perforated by numerous holes, which are very visible by a
magnifier: the cortical portion is softish, easily separable, and of a
grayish-black colour, becoming much deeper when moistened. Its powder
is deep gray. According to the

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**Richardsonia Scabra** (R. braziliensis, Gomez) is a native of the
Brazils, New Granada, Peru, &c. Its
root is the **undulated ippecuanha** of Guibourt; the amylaceous or white
ippecuanha of Merat. It has a jointed
appearance, from constrictions which
are remote from each other. It is
about the same size as that of the
annulated species; is tortuous, atten-
tuated at the extremities; extema-
ally of a grayish-white colour,
becoming brownish by age. It
presents no rings, properly so called,
but is marked by semicircular grooves. It consists, like the annulated
of a thin yellowish meditullium, and a cortical portion. The fracture
is not at all resinous, but farinaceous, and of a dull-white colour: the
surface presenting, when examined by a magnifier, numerous shining
probably amyloaceous, spots. The odour is musty. The composite
according to Pelleiter, is *emetina 6, fatty matter 2, starch and lignous nitric
little of the latter*) 92.

3. **Coffea Arabica.**—The important dietetical uses of *coffee* (semia
the albumen of the seed of *Coffea arabica*, a short notice. The coffee plant is a native of
Felix and Ethiopia, but is extensively cultivated in Asia and America. It is an ever-green shrub
to 20 feet high, with oblong-ovate, acuminate leaves, a five-toothed calyx, a white tubular
petals with a five-parted spreading limb, five stamens with a bifid style, and an oval, blackish-red or purplish two-seeded berry.
are enclosed in a membranous endocarp (ment-like putamen of some botanists), and a
hairy, yellow, bluish or greenish albumen is on one side flat with a longitudinal furrow;
the seed is the other convex. At one end of the seed is the cotyledon. The dried
were imported from Demerara in 1839. On the other hand, the seeds contained in their endocarp (eg.
husk) are met with in commerce.

The varieties of *coffee* are distinguished in commerce according to their
of growth; but considered with reference to their physical properties
characterized by colour (yellow, bluish, or greenish) and size (the small
are about three lines long and two broad, the largest five lines long and
and a half broad). *Arabian* or *Mocha Coffee* is small, and dark yellow.
East India (Malabar) kinds are larger, and paler yellow. The *Ceylon*
are analogous to the *West India* kinds (Jamaica, Berbice, Demerara, Dominica,
broad, &c.), which, as well as the *Brazilian*, have a bluish or greenish
roasted coffee (semen caffeine tosta) is, when ground, extensively adulterated
chicory. To detect the adulteration, shake the suspected coffee with cold
in a wine-glass; if it be pure coffee it will swim, and scarcely comm!n
colour to the fluid. Chicory, on the other hand, sinks, and comes to
a deep red tint to the water. The presence of roasted corn may be detected
blue colour produced on the addition of a solution of iodine to the
of coffee, in the raw and roasted states, has been the subject of
chemical investigations; but the results hitherto obtained can scarcely
satisfactory. The distilled water of coffee offers traces of a
Pfaff declares that the aroma of roasted coffee depends on the volatile
rather decomposition, of a peculiar acid contained in raw coffee, and we
been denominated *caffeic acid*. The same author gives for the comp!
this acid—Carbon 29·1, Hydrogen 6·9, and Oxygen 64. Zenneck,
asserts, that the aromatic principle of roasted coffee is neither acid nor
It is, probably, a volatile oil generated during torrefaction, though
known what constituent of the raw coffee produces it. *Coffein* is a
crystalline, neutral constituent of coffee. Its composition is C8H10 N3
a decoction of coffee is coloured green by the persalts of iron, probably the
of the presence of *catechine*. By the action of alkalis on the volatile
principle of coffee, a green substance is produced, called *coffee green*. The
constituents of coffee are—*gum, resin, fixed oil, extractive, albumen, and a
Common Elder.

The following is a comparative analysis of raw and roasted Martinico coffee, from Dr. Braude:

<table>
<thead>
<tr>
<th>Raw Coffee.</th>
<th>Roasted Coffee.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coffee principle</td>
<td>17.58</td>
</tr>
<tr>
<td>Ad mucilaginous extract</td>
<td>3.64</td>
</tr>
<tr>
<td>Gum and mucilage</td>
<td>0.41</td>
</tr>
<tr>
<td>Tene</td>
<td>66.65</td>
</tr>
<tr>
<td>Total</td>
<td>100.00</td>
</tr>
<tr>
<td>Coffee principle</td>
<td>12.50</td>
</tr>
<tr>
<td>Extractive</td>
<td>4.80</td>
</tr>
<tr>
<td>Gum and mucilage</td>
<td>10.42</td>
</tr>
<tr>
<td>Oil and resin</td>
<td>9.08</td>
</tr>
<tr>
<td>Solid residue</td>
<td>68.75</td>
</tr>
<tr>
<td>Loss</td>
<td>1.43</td>
</tr>
<tr>
<td>Total</td>
<td>100.00</td>
</tr>
</tbody>
</table>

The coffee must be slightly nutritious, on account of the gum and other nutraceutical elements it contains. Rasori employed it, like powdered bark, in fever; and Grindel used it, in other cases, also as a substitute for opium. By roasting, its nutritive principles are (for the most part) destroyed, and only the empyreumatic matters developed, which communicate a stimulant influence to the nervous system.

Coffee possesses powerfully anti-soporific properties; hence its use as a stimulant and tonic to the body. It is a powerful restorative in cases of fermentations; as a stomachic, for dyspepsia; as an astringent, in diarrhoea; and as a stimulant to the spinal system, in some nervous disorders. Floyer, Dr. Percival, and others used it in spasmodic asthma; and Laennec says, "I have myself used it in cases in which coffee was really useful."

LIII.—Caprifoliaceæ, Jussieu.—The Honey-Suckle Tribe.

Character.—Calyx superior, four- or five-cleft, usually with two or three petals at its base. Corolla superior, monopetalous or polypetalous, tubular, regular or irregular. Stamens epipetalous, equal in number to the corolla, and alternate with them. Ovary with from one to four cells, one of which is often monospermous, the others polyospermous, the former the ovule is pendulous; style one; stigmas one, or three. Fruit indehiscent, one- or more-celled, either dry, fleshy, or succulent by the persistent lobes of the calyx. Seeds either solitary and dry, or numerous and attached to the axis; testa often long; embryo in fleshy albumen; radicle next the hilum.—Shrubs or herbaceous with opposite leaves, destitute of stipules. Flowers usually corymbose, with sweet-scented (Landley).

Ambucus nigra, Linn. L. E. D.—Common Elder.

Sect. Syst. Pentandra, Trigyna.

(Flores, L.—Flowers, E.—Flores. Baccæ. Cortex interior, D.)

History.—Hippocrates employed the elder (αχιρί) in medicine.


* Tertullian on Diseases of the Chest, by Forbes. 2d ed. p. 418.
pulpy, one-celled (Gærtn.), three- to five-seeded; funiculi bearing the oblong seeds in the axis of the fruit (De Cand.)

**Sp. Char.**—Stem shrubby, somewhat arborescent. Leaves pinnate, smooth; segments ovate-lanceolate, serrate. Coriaceus five-partite (De Cand.)

**Stem** much and irregularly (though always oppositely) branched, of quick growth; branches (after a year's growth) clothed with smooth gray bark, and filled with a light spongy pith. Leaflets deep green, smooth, usually two pair, with an odd one. Cymes (corymbs) large, smooth, of numerous cream-coloured flowers, with a sweet but faint smell; some in each cyme sessile. Berries globular, purplish-black, their stalks reddish (Smith).

**Hab.**—Indigenous; in hedges, coppices, and woods; common.

**Description.**—The *liber* or inner bark (cortex interior sambuci); collected from the branches: its colour is greenish-white; its taste sweetish astrigent; its odour feeble. Its infusion is rendered slightly green by the sesquichloride of iron. Elder flowers (for sambuci) are white when fresh, but by drying become yellow, and retain an agreeable odour. Elder berries (baccae sambuci) yield, on expression, a purple juice, called elder rob.

**Composition.**—I am unacquainted with any analysis of elder but the flowers were analyzed by Eliason, who obtained from the volatile oil, acrid resin, tannin, oxidized extractive, nitrogenous extractive, gum, woody fibre, glutinous matter, albumen, malates of potash and lime, mineral salts, and a trace of sulphur. Elder juice contains malic acid, a little citric acid, sugar, pectin, and colouring matter which is reddened by acids, and made green by alkalis.

**Physiological Effects.**—The flowers, owing to their volatile nature, are mildly stimulant, and, perhaps, sudorific. The berries are cooling, aperient, and diuretic. The inner bark (liber) is hydragogue, catartic, and emetic. The leaves, probably, possess similar, though less energetic, properties.

**Uses.**—The flowers are seldom employed, except in the preparation of elder-flower water and elder ointment. The use of the inner bark is now almost solely confined to the manufacture of elder wine. The inspissated juice of the berries is, however, an officinal preparation. The inner bark has been used as a hydragogue cathartic in doses, but smaller doses may be given in decoction (prepared by boiling 3 j. of the bark in 1 Oij. of water to Oj.), in doses of 1/3-1/2 j. Smaller doses have been used as an aperient and resolvent in various chronic disorders.

### 4. Oleum Sambuci, L. Oil of Elder.—(Directed to be obtained from the flowers by submitting them to distillation with water.)—By distillation the flowers yield a small quantity of a butyricaceous, aromatic oil, but totally unfit for any useful purpose. Its introduction into the Pharmacopoeia must, therefore, have been an oversight. The liquid sold in the shops as Green Oil (Oleum viride) or Oil of Elder...

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pared by boiling leaves (usually those of the elder) in rape oil, employed as a liniment.

**Aqua Sambuci**, L. E.; *Elder Flower Water* (Elder flowers, *E.*), lb. x. [or Oil of Elder, 3 iij. *L.*]; Water, Cong. iij.; Proof, 3viij. [Rectified Spirit, 3viij. *E.*] Mix them, and let a gallon.—Elder-flower water is frequently made from the *pickled flowers of sambuci saliti* which are prepared with alternate layers of the leaves and common salt compressed and preserved in a well-closed barrel [usually a cask]: the water which exudes being rejected. It can be made from the oil, as ordered by the London College. It is pally used as a perfume.

**Unguentum Sambuci**, L. D.; *Elder Ointment* (Elder Flowers, 1 lb. iij.; Boil the Elder flowers in the Lard until they are crisp; then press through a linen cloth.—The *Dublin College* leaves instead of the flowers. The formula is as follows: sh leaves of Elder, lb. iij.; Prepared Hog’s Lard, lb. iv.; Pre-Mutton Suet, lb. ij. Make an ointment in the same manner as an olive Ointment.

The *Unguentum Sambuci*, Ph. L. is the white elder ointment of the shops. Except in its agreeable odour it has no advantage over spernite ointment. The *Unguentum Sambuci*, Ph. D. is the green elder ointment of the shops: it is inodorous. It is popularly used as a healing ointment.

**Succus Spissatus Sambuci**, D.; *Inspissated Juice of Elder; Rob.* (Prepared as the succus spissatus aconiti).—Refrigerant, debrine, and diuretic. Diluted with water it forms a cooling beverage and inflammatory disorders.—Dose, 3 iij. to 3 iij.

† 4 LIV.—ARALIACEÆ, Richard.—THE ARALIA TRIBE.

**Aralia**, Jussieu.

1. **Aralia quinquefolium**, Linn. is a native of North America, growing in the Northern, Middle, and Western States of the Union. Its root is the *American Ginseng* (radix ginseng). It is exported to China, where it is highly valued. Pieces of it are said to be occasionally found intermixed with *senega root*.

2. **Pañax Schin’seng**, Nees v. Esenbeck, is a native of Asia, and has been usually confounded with the preceding species. Nees admits three varieties:—P. Schin-seng, var. coraiensis; P. Schin-seng, var. japonica, and P. Schin-seng, var. nepalensis (P. Pseudo-ginseng, Wallach). The root of this species is the *Asiatic Ginseng* (radix siniti). The Chinese physicians ascribe the most improbable and extravagant virtues to ginseng. They regard it as an invigorating and aphrodisiac agent. At Pekin it is said to have been sometimes worth its weight in gold! To the taste it is mucilaginous, sweetish, somewhat bitter, and slightly aromatic. In Europe it is believed to possess very little power.
Order LV.—UMBELLIFERÆ, Jussieu.—THE UMBELLIFEROUS TRIBE.

APIACES, Lindley.

Essential Character.—Tube of the calyx adherent to the ovary [superior calyx of Lindley] entire, or five-toothed, or obsolete. Inserted into the upper part of the calyx [inserted on the outside epignous disc, Lindley], usually indexed at the point; ovation rarely valvate. Stamens five, alternate with the petals, incurved in the Ovary [inferior Lindley] adherent to the calyx, two- (rarely one-) solitary pendulous ovules: styles two, distinct, incrassated at the stigmatum, covering the whole of the ovarium; stigmas simple. Fruits diarchica, polyarchica, or cremocarpum consisting of two mericarps carpella, with half of the calyx attached, so that they can be called carpella nor achenia), separable from a common axis (carpophorus), they adhere by their face (commisurum); the dorsal surface of each traversed by ridges, of which the primary (costa seu juga prima) four secondary (juga secunda), latter are sometimes absent; between the ridges are called (caliculae). In the channel the pericarp, are, sometimes receptacles, called vitta. Seed usually adhering inseparably micropylar, rarely loose: embryo pendulous from the apex of the carpophorus; radicle point hilum; albumen abundant, (Orthosperma), or rolled inwards (Camphoraceae), or radicle inwards from the base to the hilum; (C baldander).—Herbaceous perennials, fistular furrowed stems. Leaves divided, sometimes simple, shining; the base. Flowers in umbels, white, pink, yellow, or blue, generally an involucre (Condensed from De Candolle).

Properties.—Extremely variable.

1. CA'RUN CA'RUI, Linn. L. E. D.—COMMON CARAWAY

Sex. Sin. Pentandria, Digynia.

(Prunus, L.—Fruit, E.—Semen, D.)

History.—Caraway is not mentioned in the writings of Hippocrates. Pliny and Dioscorides, however, speak of former calls it Careum (from Caria, its native country),—themselves it καροκ.

COMMON CARAWAY.

Commissure flat, bivittate. Channels one. Corophorus free, forked at the apex. Seeds terete-convex. Root tuberous, edible. Matisept; the segments many-cleft. Involucrè variable. White (De Cand.)

—Root fusiform. Leaves bipinnatisect; the lower segments of the branches decussate, all many-cleft. Involucrè none (De Cand.)

Biennial. Stem branched, about 2 feet high. Umbels numerous, dense. Flowers white or pale flesh-coloured; appear in June.

Hab.—In meadows and pastures all over Europe; naturalized in England. Largely cultivated in Essex.

Description.—The mericarps, commonly called caraway seeds (fructus seu semina carui) are from 1/4 to 2 lines long, usually separated, slightly curved inwards, of a brownish colour, with five lighter coloured primary ridges; there are no secondary ones. In each channel is one vitta, and on the commissure are two. The smell is strong and peculiar, the taste warm and spicy. The caraway seeds are in part the produce of this country, but is partly supplied by Germany. In 1839, duty (30s. per cwt.) was paid on which were imported.

Preparation.—No analysis of the fruit has been made. The aromatics depend on a volatile oil.

CARUI (see below).

LOGICAL EFFECTS.—Caraway is an aromatic stimulant and carminative (see p. 181). Its effects are similar to those of dill and fennel. Caraway is principally consumed by the confectioner and is also used by the distiller for flavouring liqueurs. Its employment is not extensive. It is given to relieve the colic of children, and enters, as an adjuvant or corrective, into officinal compounds. It is less seldom employed in the form of oil, spirit, or water.

CARUI, L. E. D.; Oil of Caraway.—(Obtained by sub-boiling fruit [bruised, E.] to distillation with water).—The quantity of oil from a given weight of fruit is variable. Reclus says 5 per cent.; but I am informed, by a manufacturing chemist, that he obtained 2 1/4 lbs. of oil from 30 cwt. of the fruit; which is 43 per cent. When fresh prepared it is colourless; but it is yellow and subsequently brown by keeping. It is limpid, the aromatic odour of the fruit and an acrid taste. As
2. SPIRITUS CARUI, L. E. D.; Spirit of Caraway bruised, 3xxij. [lb. ss. E., lb. j. D.]; Proof Spirit, 1 Cong. j. wine measure, D.]; Water, Oij. [Oij. E., prevent empyreuma, D.] Mix [macerate for two or vessel, E., for twenty-four hours, D.] and distill off [E., by a gentle heat].—This is frequently imitated by oil of caraway in spirit. It is aromatic and carminative to f3iv. Sweetened with sugar, this spirit is drunk a dram (Kümelliqueur; Kummelbrandwijn).

3. AQUA CARUI, L. D.; Caraway Water.—(Caraway D.); Water, Cong. ij. [enough to prevent empyreuma Spirit, f3vij. L.] Distil a gallon).—This is usually resolved or diffusing the oil through water by the carbonate of magnesia. It is employed as a carminative, purgatives (as saline purgatives, magnesia, &c.) and colic of children.

2. PIMPINEL'LA AN'ISUM, Linn. L. E. D.—The

Sex. Syet. Pentandria, Digynia.

(Fructus, L.—Fruit, E.—Semina, D.)

History.—Anise was used by Hippocrates. It is by Pliny and Dioscorides. The latter terms it ìn introduced into this country in 1551. In our translation of the Testament, the word anise occurs instead of dill.

ndivided, those of the stem more finely cut. Umbels of many involucres none. Petals white, rarely pink or yellow (De Cand.)

Stem smooth. Radical leaves cordate, somewhat rounded, incised, serrate; middle ones pinnate lobed, the lobes or lanceolate; the upper ones trifid, undivided, linear. Fruit a few scattered hairs (De Cand.) tapering. Stem erect, branched, about a foot high. Flowers white.

Island of Scio and Egypt. Largely cultivated for its Malta, Spain, and various parts of Germany. It also grows

Ripition.—The fruit, called aniseed (fructus seu semina anisi), slightly compressed at the sides. The separated mericarps are of a grayish-green colour, with five paler, thin, filiform, primary (there are no secondary ones), and covered with downy hairs. In the channel are three villae. The odour is aromatic, and similar of the fruit of Illicium anisatum, or star anise, a plant belonging to the family Winteraceae. The taste is sweetish and aromatic. Less observers, aniseed may be confounded with the fruit of

AARSE.—Aniseed is principally imported from Alicant and Geneva (the first is preferred); but some is also brought from the dies. In 1839, duty (5s. per cwt.) was paid on 192 cwt.

Position.—A very elaborate analysis of the fruit has been made by Braudes and Reimann in 1826. The following are their results:

-Volatile oil 3-00, stearin combined with chlorophyll 0-12, 58, fatty oil soluble in alcohol 3-38, phytocel 7-85, incrystal-sugar 0-65, gum 0-50, extractive 0-50, substance analogous to Anis-ulmin) 8-60, gumoin 2-90, lignin 32-85, salts (acetate, phosphate, and sulphate) of lime and potash 8-17, inorganic with silicic acid and oxide of iron 3-55, water 23-00 (excess

Anise (see p. 1448).

Physiological Effects.—Anise is an aromatic stimulant (see above). Its effects are similar to those of dill. The odour of anise is to be recognised in the milk of those who have taken it; or, the urine, we are told, acquires an unpleasant smell from it. It would appear that the oil of anise becomes absorbed and is supposed to promote the secretion of milk, urine, bronchitis, and of the menses, though without sufficient evidence. He says, that he accidentally discovered that pigeons are readily infected by a few drops of the oleum anisi. Hillefield also notices its use on pigeons.

x.—Anise is used to flavour liqueurs, sweetmeats, confectionary of various kinds, ragouts, &c.
In medicine it is employed to relieve flatulence and colic, especially of children, and to prevent the griping effects of cathartics. Nurses sometimes take it to promote the secretion of milk. It has also been employed in pulmonary affections and used as a horse medicine.

1. **OLEUM ANISI, L. E. D. Oil of Anise.**—(Obtained by submerging the fruit with water to distillation).—Mr. Brande says, that from five bushels of fruit about two pounds of oil are obtained. The greater part of the oil consumed in this country is foreign. The oil of anise of the present day is imported into this country from Germany and the East In 1839 duty (1s. 4d. per lb.) was paid on 1544 lbs. It is procured by distillation, from the fruit, in whose pericarp it resides. When fully prepared it is transparent and nearly colourless, having a yellow tinge. It has the odour and taste of the fruit from which it is obtained. Its specific gravity increases with its age; thus Marmontel says that when the oil is fresh distilled, the specific gravity is only 0·76, but after keeping it for a year and a half, the specific gravity increased to 0·9853. It congeals at 50° F., and does not liquefy under 62° F. It is soluble in all proportions in alcohol; but whose specific gravity is 0·84, dissolves only 0·42 of its weight of alcohol by exposure to the air it forms resin, and becomes less dispensible. It is composed of two volatile oils,—one solid at low temperatures (stearoptène); the other liquid (eleoptène)—in the following proportions:—eleoptene 75, stearoptene 25. According to Cabour the stearoptene consists of C_{20}H_{12}O_{2}.

The **oleum badiani**, or the oil of star-anise (*Illicium anisatum*), has the odour and taste of the oil of anise; but it preserves its fluidity at 35·6° F. It is said to be sometimes substituted for the *oleum anisii*.

Spermaceti, which is said to be sometimes added to oil of anise to promote its solidification, may be distinguished by its insolubility in cold alcohol. Camphor, said to be added for the same purpose, is recognized by its odour.—Dose, five to fifteen drops on being rubbed up with sugar, in camphor mixture.

2. **SPIRITUS ANISI, L. Spiritus Anisi compositus, D.**; *Spirited Anise.*—(Anise, bruised, 3x. [Anise and Angelica seeds of equal parts, D.]; Proof Spirit, Cong. j. [wine-measure, D.]; Water, Of sufficient to prevent empyreuma, D.) Mix [macerate for two hours, D.] and let a gallon distil.—Stimulant, stomachic, an abortifacient. Dr. Montgomery says that the preparation of the Dublin pharmacon of anise is nearly the composition of the Irish *Usquebaugh*. It is coloured yellow by saffron, or green by sap-green. A similar compound is prepared in France, under the name of *crème d'anise*. The pharmacopoeial preparation is usually made by dissolving the oil in spirit.—Dose, ½j. to 1j.
ANISI. *Anisé Water.*—(Extemporaneously made by diffusing oil through water by the aid of sugar or spirit).—Eminently flatulent colic of infants, and as a vehicle for other

RÉCULUM VULGARE, Gärner, L.—COMMON FENNEL.

Foeniculum officinale, E.—Anethum Foeniculum, D.

* Sex. Sex. Pentandria, Monogynia.*

Fennel (μαρακοφ) was used by Hippocrates. Some e. g. Matthiolus) have been of opinion that μαρακοφ of is *sweet fennel* (Foeniculum dulce, De Cand.), and that the of the same authority is *common fennel* (Foeniculum vulgare); but the latter part of the opinion does not, from an of Bauhin, appear probable.

**Gen. Char.**—Margin of the calyx swollen, obsolete, toothed roundish, entire, involute, with a squarish, blunt lobe. transverse section nearly taper. *Mericarps* [half fruits] prominent, bluntly-keeled ridges, of which the lateral ones and rather broader. *Channels* univittate. *Commissaure Seed* nearly semi-terete.—Biennial or perennial herbs. s. somewhat striated, branched. *Leaves* pinnatisect, dec- the segments linear, setaceous. *Involucre* scarcely any. flow (De Cand.).

—*Stem* somewhat terete at the base. Lobes of the leaves olate, elongated. Umbels of 13 to 20 rays. *Involucre* and.

al, three or four feet high. *Flowers* golden yellow. *Fruit* lines long, oval, of a dark or blackish aspect; the channel owing to the vitta, the ridges are pale yellowish

and chalky ground all over Europe.

**SECTION.**—The fruit, called *wild fennel seed* (semina seu fructus vulgaris) has a strong aromatic, acrid taste, and an aromatic is other qualities have been described.

**SECTION.**—The peculiar properties of the fruit depend on a

COMMON, WILD, OR BITTER FENNEL. (*Oleum Foeniculi vulgaris.*)—A pale yellow oil, having the peculiar odour of the fruit. Its sp. gr. is 0.907, by cold, though with much more difficulty than oil of anise. It consists of which has the same composition as that of oil of anise; oil which is isomeric with oil of turpentine.

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* P. 531, &c. ed. Fors.
* Lib. iii. cap. 81.
* Ibid. cap. 82.
* Prinimum p. 76.
PHYSIOLOGICAL EFFECTS.—Aromatic stimulant (see p. similar to those of sweet fennel.

USES.—This species is not employed in medicine.

4. Fœnic'ulum Dul'ce, C. Bouchin; De Cand.—SWEET FEN
   Sec. Syst. Pentandria, Monogynia.
   (Fructua.)

HISTORY.—This plant is regarded by some botanists as a cul
variety of the former plant. De Candolle¹ is the principal syst
writer who regards them as distinct species. The London C
in quoting his F. vulgare as the officinal plant, has committed
ious error, seeing that it is his F. dulce which is always empl
medicine in this country.

BOTANY. Gen. Char.—See F. vulgare.

Sp. Char.—Stem somewhat compressed at the base. Radica
somewhat distichous; lobes capillary, elongated. Umbels of
eight rays (De Cand.)

This plant differs from F. vulgare in several other particula
is an annual, and much smaller plant. It flowers earlier. Its t
are sweeter, less aromatic, and, therefore, edible. The fruit i
longer; some of the specimens being nearly five lines in leng
compressed, somewhat curved and paler, with a greenish ting

Hab.—Italy, Portugal, &c. Cultivated as a pot-herb, a
garnishing.

DESCRIPTION.—The fruit, termed sweet fennel seeds (fruc
semina fennici dulcis vel fennici cretici), has a more ag
odour and flavour than common or wild fennel. Two k
known in trade, shorts and longs: the latter is most esteemed.

COMPOSITION.—The peculiar properties of the fruit depe
volatile oil.

PHYSIOLOGICAL EFFECTS.—Sweet fennel is an aromatic sti
(see p. 181); its effects are similar to those of anise or dill.

USES.—Seldom employed. May be given in the flatulen
cchildren, or as a carminative vehicle for remedies which s

to gripes.

1. Oleum Fœniculi, E. D.; Oil of Sweet Fennel; Oleum F
dulcis.—(Obtained by submitting the fruit [bruised, E.] with
to distillation).—Nineteen cuts. of the fruit (shorts) yield 78
oil " This oil is distinguished from the oil of wild fennel by its
agreeable odour and taste. Stimulant and carminative. §
used.—Dose, two to twenty drops.

2. Aqua Fœniculi, E. D.; Fennel Water.—(Obtained as
Anethi). Carminative. Employed to relieve flatulent colic

¹ Prodr. iv. 142.
² Private information.
GARDEN ANGELICA.

5. ARCHANGELICA OFFICINALIS, Hoffm. and Koch.—GARDEN ANGELICA.

_Angelica Archangelica_ Linn, B. D.

_Sec. Eryt. Pentandra, Digyna._

(Root, _E._—Semina, _D._)

_History._—It is doubtful whether the ancient Greeks and Romans were acquainted with this plant, as no certain notice of it appears in their writings. C. Bauhin * calls it _Angelica sativa._

_Botany._ _Gen. Char._—Margin of the _calyx_ with five short teeth. _Petals_ elliptical, entire, acuminate, with the point curved inwards. _Fruit_ somewhat compressed at the back, with a somewhat central _pili_, two-winged on each side. _Mercurialis_ [half-fruits] with thick, sealed ridges; the three dorsal ones elevated, the two lateral ones luted into a twice as broad wing. _Seed_ not adhering to the _involucre_; the nucleus free, covered all over with numerous _vittae_. _Sepalophorus_ two-partite.—_Perennial herb._ _Leaves_ pinnatisect; _segments_ broadly ovate, acute, coarsely dentate, terminal, lobed. _Sessiles_ large, sheathing, _saccate._ _Involucre_ scarcely any; _partial_ _involucres_ halved, many leafed. _Flowers_ white, or greenish (De Cand.)

_Sp. Char._—_Stem_ smooth, terete, striated. _Leaves_ bipinnatisect; _segments_ subcordate, lobed, sharply serrated, the odd one three-bobed; _sheaths_ loose, _saccate._ _Leaflets_ of the _partial involucres_ forming the partial _umbel_ (De Cand.)

_Root_ biennial, large, fleshy, branched, resinous, pungently aromatic. _Stem_ four or five feet high, a little glaucous. _Foliage, stalks, and even the flowers_ bright green. _It flowers_ from _June_ to _September._

_Hab._—Indigenous; northern parts of Europe. _Cultivated_ in moist situations, and on the banks of ditches.

_Description._—The dried _angelica_ root (_radix angelicae_) of the shops is imported from Hamburg in casks. In 1839 duty (4s. per cwt.) was paid on 386 cwt. Formerly _Spanish Angelica_ was sometimes employed for medicinal purposes. The dried root of the shops consists of a short cylindrical head, from which numerous branches rise. The size of these branches varies: the larger ones are as thick as the little finger, and six or eight inches long. Externally the root is corrugated, and grayish brown. Internally it is dirty white, and presents, when cut transversely, numerous dark points, which are the cut extremities of vessels or intercellular spaces filled with a liquid, strongly odorous, oil or oleo-resin. To the taste the root is at first sweet, then hot, aromatic, and bitter. The odor is peculiar, and not very disagreeable. The fruit, called _angelica seeds_ *

* _Fisher, 155._
(fructus seu semina angelicae), have the odour and taste, but in a diminished degree, of the root.

Composition.—Angelica root has been analyzed by John, * by Bucholz and Brandes. The latter chemists obtained volatile about 0·70, acrid soft resin 0·02, bitter extractive 28·40, gums in some common salt 31·75, starch (not inulin) 5·40, woody fibre 8· peculiar matter (oxidized extractive?) 0·66, albumen 0·97, wax 17·50, [loss 2·0]. The aromatic qualities of the root and seeds depend on the volatile oil and resin.

Physiological Effects.—Both root and seeds are pungent stimulants and mild tonics.

Uses.—Angelica (either root or seeds) is scarcely employed in modern practice, though it was formerly much esteemed. The tendons, stems, stalks, and midribs of the leaves, are made, with sugar, into sweetmeat or candy (candied angelica; caules seu rami angel conditi), which, taken as a dessert, is a very agreeable stomachic. The seeds are used in the preparation of the spiritus anisi composition D. The principal consumption of angelica root and seeds is by tasters and compounders in the preparation of gin and the liquid termed bitters.

6. OPO'ONAX CHIRO'NIUM, Koch. L.—THE OPOONAX.

Pastina'ca, Opopanax, Linn. D.

Sec. Syst. Pentandria, Monogynia.

(Gummi-resina, L. D.)

History.—Hippocrates x employed opopanax (παπάξις). Theophrastus y mentions four, and Dioscorides z three kinds of resins. The latter of these writers has given a good account of opopanax (ὀποπάναξ), which he says is procured from παπάξις ἥρακλειον.


Sp. Char.—The only species.—A plant six or seven feet high, resembling the parsnip.

Hab.—Sunny parts of the South of France, Italy, Sicily, Crete and Greece.

x Gmelin, Handb. d. Chem. ii. 1277.
* Opera, p. 402, ed. Foss.
+ Hist. Plant. lib. ix. c. 12.
* Lib. iii. cap. 55-5-7.
Extraction.—According to Dioscorides, whose account is probably correct, this gum-resin is obtained by incisions into the root: milky juice exudes, which, by drying, becomes yellow, and forms opoponax.

Description.—Opoponax (gummi opoponax) occurs in irregular bright-red lumps (opoponax in massis), or in reddish tears (opoponax lacrymis). It has an acrid bitter taste, and an unpleasant odor. Rubbed with water it forms an emulsion. Its general properties as a gum resin have been before (p. 183) noticed.

Composition.—Opoponax has been analysed by Pelletier. He found the constituents to be—

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resin</td>
<td>42.0</td>
</tr>
<tr>
<td>Gum</td>
<td>33.4</td>
</tr>
<tr>
<td>Starch</td>
<td>4.2</td>
</tr>
<tr>
<td>Extractive</td>
<td>1.6</td>
</tr>
<tr>
<td>Wax</td>
<td>2.3</td>
</tr>
<tr>
<td>Moic acid</td>
<td>2.8</td>
</tr>
<tr>
<td>Lignin</td>
<td>9.8</td>
</tr>
<tr>
<td>Volatile oil, traces of caoutchouc, and loss</td>
<td>5.9</td>
</tr>
<tr>
<td><strong>Opoponax</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Description.—Reddish yellow; fusible at 122° F. Soluble in alkalis, alcohol, and water. The alkaline solution is reddish; the resin is precipitated from it, by chloric acid, in the form of yellow flocks. Nitric acid acts freely on the resin. Its composition, according to Johnston, is C_{20}H_{35}O_{14}.

Physiological Effects.—Similar to the other fetid, antispasmodic gum-resins (see p. 181). It is, perhaps, more allied to ammonium than to any other of these substances.

Uses.—Opoponax is rarely employed. It is adapted to the same uses as the other gum-resins of this class (see p. 181).

FERULA ASAFOETIDA, Linn. L. E. D.—THE ASAFOETIDA FERULA.

Sex. Syst. Pentandria, Digynia.

(Gummi-resina, L. D.—Gummi-resinous exudation, E.)

History.—It is uncertain at what period asafoetida was first used or described. The difficulty in determining its history arises from the confusion which has existed with respect to the Succus Cyrenaeus and asafoetida. By many writers the two substances were regarded to be identical; but this opinion seems now to have been generally disproved by the discovery of the plant, called by the Greeks σιλπτηρ, by the Romans lasermittium (Thapsia Silphion, Viviani), which yields the Cyrenaeic juice, and which agrees tolerably well with the rude figures struck on the Cyrenean coins. It would appear, however, that the Cyrenaeic juice becoming scarce, the ancients employed some other substance of similar, though inferior, properties, as a substitute, and to both of these they applied the term

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* Bull. de Pharm. iv. 49.
* See Geoffroy, Traité de Mat. Med. ii. 609.
to have been introduced by the Monks into the school. But it appears to have been of oriental origin, and we have suspected, derived from the word *laser*. 2. syriacus, almost the last of the Greek physicians, according to Sprengel, about 1227, A.D. spoke of a plant, “There are two kinds of Assa [i.e. *laser*, Lat. Traccena, "one fetid, the other odoriferous.”

**BOTANY. Gen. Char.**—Margin of the calyx short.

**Petals** ovan, entire, acuminate, with an ascending or reflexed margin. The **Fruit** flattened at the back, with a dilated flat base, and the end of the **Spokes** half-fruits] with three, dorsal, filiform ridges, the teeth and lobes or teeth and lost in the dilated margin. **Vitae** in the surface, three or more; in the commissure four or many. **Pophorus** bipartite.—*Herbs. Root* thick. **Stem** tall, compound; the segments usually divided into linear 

bels of many rays, lateral, often opposite or verticillate, various. **Flowers** yellow (De Cand.)

**Sp. Char.**—**Stem** terete, simple, clothed with hairs.

**Leaves** radical, pinnatisect; the segment one- or three- or sinuate; lobes oblong, obtuse. **Involucres** none (De Cand.)

**Root** perennial, tapering, ponderous, increasing as a man’s arm or leg, covered with a blackish-coloured skin, or below the top with many strong, rigid fibres; its internal pith is fleshy, abounding with a thick, milky juice, which has a strong, fetid, alliaceous smell. **Stem** two or three, six or seven inches in circumference at the base. **Radical leaves** near two feet long. Kämpfer (De Cand.) compares the leaves of *Paeonia officinalis*; but in colour, and in his species, he says they resemble *Ligusticum Levisticum*, or *Ligusticum vulgare*. (De Cand.)
on the Hindoo Koosh, is described as being an annual. If the description be correct, the plant can scarcely be F. Asafetida.

There is reason to suspect that *Ferula Asafoetida* is not the only plant from which a gum-resin, called asafoetida, is obtained; but that one, if not more, or species yield it. *Ferula persica* has been described by Dr. Pope as the asafoetida plant; and the Edinburgh College has admitted it as being, properly, one source of asafoetida. Michaux sent its fruit from Persia as asafoetida. That it does really yield asafoetida seems furthermore probable, from the strong smell of that drug, which pervades the whole plant. It is, I think, not likely that the tear and lump asafoetida of the shops are procured from different species. Dr. Royle suggests, that *Prangos pabularia* was one of the is of *Silphion* of the ancients, and may be an asafoetida plant.

**Extraction.**—Asafoetida is obtained by making incisions into the outer part of the root; the footstalks of the leaves and the fibres at top of the root being previously removed. Kämpfer divides the inness of collecting into four parts: the first begins about the middle of April, and consists in digging the earth about the root, coveting the leaves and fibres, which are afterwards laid over the plant to defend it from the sun. The second commences on the 25th of May. Each collector is provided with a sharp knife to cut the root, a broad iron spatula to scrape off the juice, a cup fixed to his arm to receive it, and two baskets hung over his shoulders upon a pole. The top of the root is then cut off transversely, and, on the third day (i.e. the 27th of May), the juice is scraped off and put in cups. A fresh incision is then made, and the juice removed the same day (i.e. the 29th of May), when they again cut the roots. The cups are from time to time emptied into large vessels. The juice is exposed to the sun to become harder, and is conveyed in the baskets (see fig. 276, p. 1456). The third and fourth acts are mere repetitions of the second. The third commences about 10th of June, the fourth about the 3rd of July. Except after the last operation, the roots are carefully defended from the sun, after the incision, by covering them with leaves.

**Commerce.**—Asafoetida is exported from the Persian gulf to Bombay, from whence it is sent to Europe. It comes over usually in cases and cases. In 1825 the quantity imported was 106,770 lbs.; in 1830 only 8,722 lbs. The quantity retained for home consumption is, however, very small. In 1838, duty (6s. per cwt.) was paid, and 60 cwt.; in 1839, on 24 cwt.

**Description and Varieties.**—Asafoetida (*Asafoetida; Gummi Asafoetida, offic.*) occurs in irregular pieces of variable size. Externally they are yellowish- or pinkish-brown. The fracture is a conchoidal dish, or milk-white, translucent, pearly, with a waxy lustre. By exposure to light and air the recently-fractured surface acquires, in a
few hours, a violet-red or peach-blossom red colour, which, after days or weeks, diminishes in intensity, and gradually passes.

Fig. 276.

Extraction of Asafetida.

yellowish or pinkish-brown. Asafetida is fusible and infusible in the air with a white flame and the evolution of smoke. Its taste is acrid and bitter, and its odour strong, and peculiar; to most persons being remarkably disagreeable. The Germans have denominated asafetida Teufelsdreck, or Diaboli's dung; in plain English, Devil's dung. However, this it is not universal; some of the Asiatics being fond of it, taking it with their food as a condiment, or to flavour their sauces, or even eating it alone. Hence, and of the older writers, we find it denominated Cibus Deorum, the Gods. Captain M. Kinnier tells us, that in Persia the plant are eaten like common greens, as is the root when
Lieut. Burnes', speaking of asafetida, says, "in the fresh state it is the same abominable smell; yet our fellow-travellers greedily greedy meals.

I am acquainted with three varieties only of asaefetida:—

**Asaefetida in the tear** (*Asaefetida in granis seu lachrymis*). *Asaefetida of the Ferula persica.*—This kind occurs in distinct, dish, flattened or oval tears, and also in irregular pieces, varying in the size of a pea to that of a walnut, of a yellow or brownish-yellow colour externally, but white internally. This kind is comparatively rare. I think it not at all improbable that this variety is obtained from a different plant to that which furnishes the lump variety; its colour, externally, is more yellow, its odour is much stronger, its fresh-fractured surface becomes more slowly and less intensely by exposure to the air. As it has considerable resemblance to *froniacum in the tear* (with which, indeed, except by its odour, it is readily confused), may it not be the substance which Thier* calls ammoniacum, and which he says is produced by *ferula persica*?

**Lump Asaefetida** (*Asaefetida in massis*). *Asaefetida of the Ferula ceptida.*—This variety is the kind usually met with in the shops. It is in variable sized masses, of irregular forms, and having a red-brownish-yellow colour. Frequently these masses are broken up to tears, agglutinated by a reddish-brown sub-ele: these form that kind of asaefetida sometimes denominated *pyraloid* (*asaefetida amygdaloideae*).

**Stony Asaefetida** (*Asaefetida petrea*).—I have never met with this in English commerce. My samples were received from Dr. Tiny. It occurs in irregular, more or less angular pieces, which externally of asaefetida, and a yellowish brown colour, and numerous small shining points or plates. It slightly effervesces hydrochloric acid. By incineration it yields a white ash, which quickly effervesces on the addition of acids. Angelini found in stony asaefetida, 51·9 per cent. of gypsum.

**Composition.**—Asaefetida has been analyzed by Pelletier*1, Lamsdorff, Brandes, and Angelini*2:

<table>
<thead>
<tr>
<th>Pelletier's Analysis</th>
<th>Brandes's Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resin .................. 65·00</td>
<td>Resin .................. 48·85</td>
</tr>
<tr>
<td>Gum, with traces of saline matters 19·44</td>
<td>Gum, with traces of saline matters 19·44</td>
</tr>
<tr>
<td>Bassorin ................ 11·66</td>
<td>Bassorin ................ 6·40</td>
</tr>
<tr>
<td>Volatile oil ................ 3·60</td>
<td>Volatile oil ................ 4·60</td>
</tr>
<tr>
<td>Supernate of lime, and loss .............. 6·30</td>
<td>Extractive, with saline matters .............. 4·40</td>
</tr>
<tr>
<td><strong>Asaefetida</strong> ............ 100·00</td>
<td>Sulphate and carbonate of lime .............. 9·70</td>
</tr>
<tr>
<td>Oxide of iron and alumina .............. 6·40</td>
<td>Oxide of iron and alumina .............. 6·40</td>
</tr>
<tr>
<td>Sand and lignin .............. 4·60</td>
<td>Sand and lignin .............. 4·60</td>
</tr>
<tr>
<td>Water .................. 6·00</td>
<td>Water .................. 6·00</td>
</tr>
</tbody>
</table>

*1 *Travaux*, ii, 243.
*3 *Bull. de Pharm.,* iii, 356.
1. **Volatile Oil of Asafoetida.**—This is obtained by distilling asafoetida with either water or alcohol. It is on this principle that the odour of this gum-resin depends. It is lighter than water, and is at first colourless, but by exposure to the air acquires a yellow tinge. It dissolves in all proportions in water and ether, but requires more than 2000 times its weight of water to dissolve it. Its taste is at first mild, then bitter and acrid; its odour is very strong. It evaporates very quickly, and soon fills a large room with its odour. Sulphur, or probably phosphorus, are among its elementary constituents. The presence of sulphur in asafoetida is shown in various ways: thus if chloride of barium is added to water distilled from asafoetida, and likewise a little chlorine, then it becomes gradually acidified, and after some time a precipitate of sulphate of baryta is formed. If the oil be rubbed with mercury, it forms sulphate of mercury. Moreover, if pills made of asafoetida be rolled in silver leaf, the leaf, after a few days, is blackened by the formation of a sulphuret of silver.

2. **Resin of Asafoetida.**—The resinous matter of asafoetida is soluble in alcohol. When the alcoholic solution is mixed with water, a milky liquid is formed owing to the deposition of the hydrated resin. Oil of turpentine and the oil of almonds also dissolve the resin, but less readily than alcohol. The resin obtained by evaporating the alcoholic solution, consists, according to Johnson, C_{48}H_{26}O_{10}. By exposure to the sun’s rays it becomes violet red. Brandes has shown that the resin of asafoetida is of two kinds: one insoluble in ether; the other soluble. The proportion of the first to the second is as 1:6 to 4:7:2.

a. **Resin insoluble in ether.**—Is brownish-yellow, brittle, tasteless, has a sulphuraceous odour, is fusible, and soluble in warm caustic potash.

b. **Resin soluble in ether.**—Is greenish-brown, brittle, has an aromatic odour and a faint, but permanent, alliaceous bitter taste. Chlorine decolorizes it. Oil of vitriol renders it dark red: if heat be applied, sulphurous acid is evolved and the mixture becomes black; if the liquid be diluted with water, and saturated with an alkali, the surface assumes a sky-blue colour. Nitric acid makes it first orange, then yellow, and makes it almost insoluble in ether. Hydrochloric acid dissolves it, and colours it pale-red. It dissolves in boiling concentrated acetic acid, but is deposited when the solution cools.

**Characteristics.**—Asafoetida possesses the usual characteristics of a gum-resin (p. 183). From other gum-resins it is distinguished by its peculiar odour, which is especially obvious when a small portion of this substance is heated on the point of a knife, and by fresh-fractured surface becoming red on exposure to air. Heat with sulphuric acid it blackens, yields a dark, blood-red liquid, develops sulphurous acid gas: if the liquid be diluted with water and saturated with caustic potash, it becomes blue, especially on the surface, by reflected light, similar to that observed when sulphate of quina is dissolved in water.

**Physiological Effects.**—Asafoetida is usually placed, by pharmacological writers, among those remedies denominated antispasmodics or stimulants. It is the most powerful of the fetid gum-resins already noticed (p. 183). Its local effects are moderate: it is devoid of those acrid and irritating properties possessed by gas-boge, euphorbium, scammony, and many other resinous and gummy resinous substances. In the mouth, as already mentioned, it causes a sensation of heat, and the same effect, accompanied by emotions, is experienced in the stomach, when it is swallowed. 1. Professor Jörg* and his pupils (males and females), who endeavours to elucidate the effects of this medicine by experiments made on

---

ves, doses of asafetida, not exceeding a scruple, caused un-
satiation and pain of the stomach, increased secretion of the gastro-
jejunal membrane, and alvine evacuations. The pulse was in-
increased frequency, the animal heat augmented, the respiration
accelerated, and the secretions from the bronchial membrane and skin
increased. A very constant effect was headache and giddiness. The
pelvic apparatus appeared to be specifically affected, for in
some cases there was an increase of the venereal feelings, with irrita-
tion of the glans penis, while in the females the catamenial dis-
tem appeared before its usual period, and uterine pain was
increased.

The stimulant effects of asafetida were observed in a greater or
degree in all the nine persons experimented on; and it should be
in mind, that the dose did not, in any one case, exceed a

Very opposite to these results, and to the observations of
others generally, is the statement of MM. Trousson and Pi-
who tell us that they have taken half an ounce of good asa-
foetida, with no other effect than that of altering the odour
secretions, by which they were kept for two days in an in-
termittent state of fever, possessing a more horrible degree of fever than
asafoetida itself! These apparently contradictory results seem
to show, that different individuals are most unequally susceptible of
influence of asafetida in convulsive and spasmotic diseases.

As in these cases the functions of the excito-
system are the functions principally or essentially involved, it
assuming too much to suppose, that the influence of asafetida
is essentially directed to the excito-motor nerves. To paraphrase
the words of Dr. M. Hall, asafetida acts through the excitor nerves;
its effects are manifested through the motor nerves. The varying
effect or susceptibility (natural and morbid) of these

in different subjects, will, perhaps, in some measure account
for the unequal effects produced by this agent on different healthy
nimals, as well as for the therapeutical influence in certain sub-
ing disease or disproportionate to the observed physiological effects.

etida, or its odorous principle, becomes absorbed by the veins,
slowly. Flandrin gave half a pound of this gum-resin to a
the animal was fed as usual, and killed sixteen hours after

The odour of asafetida was distinguished in the veins of the
of the small intestine, and the caecum: it was not noticed in
right blood, nor in the lymph. Tiedemann and Gmelin were
cessful in their search for it; they gave two drachms of asa-
fetida to a dog, and at the end of three hours were unable to recognize
of it either in the chyle of the thoracic duct, or in the blood
plenic and portal veins; but they detected it in the stomach

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1 Traitè de Thèrapie, p. 12-13.
2 Lectures in the Lancet, April 14, 1838.
3 Magendie. Physiol., by Milligen, 288. 1823.
4 Versuch, S. 9.
and small intestines. In farther proof of the opinion that asafetida becomes absorbed, may be mentioned the detection of the odor of this substance in the secretions. The experience of MM. Trousseau and Pidoux, already related, may be adduced as corroborative of the statement. We are told that the transpiration of Asiatics who take asafetida daily, is extremely fetid; a circumstance to which Apollonides of Phanes sometimes alludes. Vogt says, that the secretions from carious teeth sometimes smell of asafetida, when this substance has been taken some time.

The stimulant influence of asafetida over the organs of respiration and of secretion (as the bronchial membrane and skin), depends apparently on the topical action of the oily and resinous particles in the vessels in their passage through the latter.

Uses.—From the foregoing remarks it will be readily gathered that asafetida is contra-indicated in febrile and inflammatory diseases on account of its stimulant properties; as also in vascular irritations or inflammation of the stomach, on account of its topical influence on this viscus. On the other hand, it is found highly useful in spastic or convulsive diseases not dependent on disease of the motor centres, but of the kind called by Dr. Hall eccentric.

1. In spasmatic and convulsive Diseases.—Few remedies have acquired such celebrity in hysteria, as asafetida. Dr. Cullen's in the highest terms of it, and I believe the experience of most physicians corroborates his opinion of its virtues. "I have found it," says he, "to be the most powerful in all hysterical cases; and the presence of an hysterical paroxism prevented medicines given by the mouth, I have found it given in elixiers to be very useful." When the circulation is very languid, ammonia may advantage be conjoined. Schönheyder recommends asafetida in the form of opium. In infantile convulsions, asafetida is often used with good effect. Even in the epilepsy of adults they are not always without value. In purely spastic asthma, I have never seen relief from the use of asafetida. This observation, which accords with Dr. Cullen's experience, does not agree with the statements of others. Trousseau and Pidoux do not agree that they have seen it produce good and undoubted effects. But in chronic catarrhs, with occasional spasmatic difficulty of breath and spasmatic cough, I have procured the most marked relief by combined use of asafetida and ammonia. I have no experience of the use of this gum-resin in the disease called laryngismus stridor in which Millar, and others, have found it beneficial. In cough, both Millar and Kopp have found it beneficial. It promotes expectoration, and diminishes both the violence and frequency of

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* Pharmakogn. ii. 125, 2nd Aufl.
* On the Asthma and Hooping Cough. 1769.
* Lond. Med. Gaz. i. 368.
The repugnance which children manifest to its use is, however, a great drawback to its employment. In flatulent colic of hysterical and dyspeptic individuals, or of infants, few remedies are more efficacious, when the disease is unaccompanied by any marks of inflammatory action, and is attended with constipation. Of its efficacy in the flatulent colic of infants, I can speak from repeated observation; it is given with great advantage in the form of clyster. In most cases, its laxative operation is an advantage; but should this be an objection, it may be counteracted by the addition of laudanum.

2. As a stimulating expectorant and antispasmodic in chronic cough, it is often of considerable use. It is adapted for old persons, and where the disease is of long standing. I have found it of great benefit in those cases where the cough and difficulty of breathing assume at intervals a spasmodic form, and where the expectoration is considerable. In such cases, I have found full doses of asafetida with ammonia give great relief. In delicate females, subject to repeated attacks of catarh, attended with wasting, sweating, I have found constitutional symptoms of phthisis, I have found asafetida a frequent benefit. In these cases it does not act merely by its expectorant effects, for oftentimes one good consequence of its use is diminution of excessive bronchial secretion.

3. In affections of the alimentary canal.—The use of asafetida in flatulent colic has been above noticed. It is often of considerable use in relieving flatulence in old persons, especially in hypochondriacal and hysterical subjects, and when accompanied with constipation, as it has a laxative effect. It provokes the expulsion of the flatus matter, and appears to aid in preventing its re-production. It is beneficially used in the form of clyster, to relieve a tympanitic condition of the abdomen and flatulent distension of the bowels in all fevers. In constipation, with flatulence, it is an useful addition to purgative mixtures or enemata. It has often been used as an astringent, but is of less frequent efficacy.

4. As an emmenagogue in uterine obstructions (amenorrhoea and irregularity) asafetida has been employed from a notion that it specifically affected the womb,—an opinion which is supported by the reports of Jörg’s female pupils, that it brought on the catamenial discharge earlier than usual. Experience, however, has not been in favour of the emmenagogue operation of asafetida when as a remedy has been employed in diseases. “Whether it be owing,” says Dr. Cullen, “to the imperfect state in which we too frequently leave this medicine, or to somewhat in the nature of the amenorrhoea, we would not positively determine; but this is certain, that I have very seldom succeeded in employing the asafetida as an emmenagogue.”

5. As a condiment.—I have already referred to the condimentary uses made of asafetida, especially by oriental nations. At the Pass of Dundan Shikun,” says Lieutenant Burns, “we found the

b, Travels, i. 143.
asafetida plant in exuberance, and which our fellow-travellers eat with great relish." It is much used by the Brahmins against flatulence, and to correct their cold vegetable food.

**Administration.**—The dose of asafetida is from grs. v. to 185 or 3ss. It may be given in substance, in the form of pill, or mixed into an emulsion. In hysteria and flatulent colic, where we want an immediate effect, it is best administered in a liquid form. Used as an enema, it may be administered to the extent of two drachms rubbed up with warm water. The following are the official preparations of asafetida:

1. **Mistura Asafetidae**, L. D.; *Lac Asafetidae; Mixture of Asafetida.*—(Asafetida, 5v. [3j. D.]; water Oj. [Pennyroyal water, f3vij. D.].) Triturate the asafetida with the water, gradually pouring in, until they are perfectly mixed. Stimulant and antispasmodic. Used in hysteria, in doses of 5ss. to 3jss. Frequently employed in an enema in the flatulent colic and convulsions of children, as well as in worms. The tincture of asafetida, mixed with pennyroyal water, is often used as a substitute for the official mixture.

2. **Enema Fœtidum**, D. E.; *Asafetida or Fetid Clysmer.*—(Made by adding to the cathartic enema two [fluid] drachms of tincture asafetida.)—The fetid clysmer is a valuable stimulant, antispasmodic, and carminative purgative, which may be used with most beneficial results in hysteria, flatulent colic, infantile convulsions, and wounds in the rectum.


—Dose, 3ss. to 3ss. Pennyroyal is a good vehicle for it. When mixed with aqueous liquids, it becomes milky, owing to the depo- sition of the hydrated resin.

4. **Pilulae Asafetidæ**, E.; *Pilulae Galbani Composite, L. D.*—*Asafetida or Compound Galbanum Pills.*—(Asafetida, Galbanum, and Myrrh, three parts of each; Conserve of Red Roses, four parts or a sufficiency; mix them, and beat them into a proper pill mass E.—Galbanum, 3j.; Myrrh; Sagapenum; of each 3ss.; Asafetida 3ss.; Syrup [Treacle, D.] as much as may be sufficient. Beat them together until incorporated, L. D.)—As the most powerful ingredient of this combination is asafetida, the more appropriate name for the pills would be *pilulae asafetidæ compositæ.* This compound is stimulant and antispasmodic. It is used in hysteria, chlorosis, &c—Dose, grs. x. to 2j.

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*Anand, Materia Indica, vol. 1, 21.*
...
1. Oil of Sagapenum.—Pale yellow, lighter than water, soluble in alcohol and ether. Has a strong alliaceous odour, and a mild (afterwards hot) alliaceous taste. Sulphuric acid renders it dark red.

2. Resin of Sagapenum.—Obtained by evaporating an alcoholic solution is pale yellow, having a strong garlic odour, and becoming fluid at 212° composition according to Johnston is C_{60}H_{29}O_{9}. By the action of ether resolved into two resins.

a. Resin insoluble in ether.—Brownish-yellow, tasteless, odourless, soluble in warm liquor potassae and in spirit, but insoluble in the oils of mint and almonds.

b. Resin soluble in ether.—Reddish-yellow, with a feeble odour of saffron and a mild (afterwards bitter) taste. It is soluble in spirit, and slight the oils of turpentine and almonds. It dissolves in sulphuric acid, in blood-red solution, from which water separates a violet substance.

Physiological Effects and Uses.—Its effects and uses are the same as those of asafoetida. It is usually considered to hold an intermediate rank between asafoetida and galbanum; but it is not so employed.

Administration.—It is given in substance, in the form of doses of from grains v. to 2 grains.

Pilule Sagapeni Composite, L.; Compound Pills of Sagapenum (Sagapenum, 2 grains; Aloes, 5 grains; Syrup of Ginger, as much as may be sufficient. Beat them together until incorporated.)—This preparation corresponds to the Pilula Aloe et Asafoetidae, E. (p. 97). The latter, however, is more active. It is used as a warm stimulant and purgative in dyspepsia, with flatulence and costiveness.

S. Dorema Ammoniacum, Don. L. E.—The Ammoniacal Dorema.

Sex. Syst. Pentandria, Digynia.
(Gummi-resina, L.—Gummy-resinous exudation, E.)

History.—The term ammoniacum has been applied to two distinct gum-resins; one, the produce of Ferula tingitana; the other Dorema Ammoniacum. The first is the ammoniacum of Hippocrates; Dioscorides (i) and Pliny (ii); the latter is the commercial ammoniacum of the present day.

Dioscorides says ἄμμονιακὸς is obtained from a species of which he calls ἀγασυλLEN (or Ammon), growing near Cyrene, in Africa, in the Metopion, and says it grows in that part of Ethiopia, near the temple of Jupiter Ammon, which, as well as the gum-resin, received its name. ἄμμος, sand, from the sandy soil of the country. Both Dioscorides and Pliny mention two kinds of ammoniacum; the one called Θραύστων (Thrauston) resembled olibanum, and had a castoreum-like castoreum, and a bitter taste; and the commonest, Phyrama (Phyrama) had a resinous appearance, and was adulterated with earth and stones. African ammoniacum (in Arabic, Fa
AMMONIACUM DOREMA.

I have not been able to ascertain when Persian ammoniac (the produce of Dorema Ammoniacum) first came into use. As the Greeks and Romans make no mention of it, they were, probably, unainted with it. Avicenna* does not mention the origin of his ammoniac (assach, Arab.) The ammoniac (eschak, Arab.) of Abu Musur Mowajik†, an ancient Persian physician, who wrote about 55, A. D., was doubtless of the Persian kind; as was also the ammoniac (derukht ushuk) of Beva Ben Khuas Khan, A. d. 1512‡. The Arabic terms (assach, eschak, and ushuk), by which the three last named authors designate ammoniac, closely resemble that (oshac) which the ammoniacum plant is now known in Persia; hence we may refer them all to the same object.

Botany. Gen. Char.—Epigynous disk, cup-shaped. Fruit slightly impressed from the back, edged; with three distinct, filiform, pinnate ridges near the middle, and, alternating with them, four obtuse undulate ridges; the whole enveloped in wool. Vitae, one to each undulate ridge, one to each primary marginal ridge, and four to the umbraneous, of which two are very small (Lindley).

p. Char.—The only species.

Glaucescent green plant, about seven feet high, looking like the Ephionax. Root perennial. Stem about four inches in circumference at the base. Leaves large, petiolate, somewhat bipinnate, two feet long; pinnae in three pairs; petioles downy, sheathing at the base. Bels proliferous, racemose; partial ones globose, on short stalks, arranged in a spiked manner. Involucres, general or partial, of several. Petals white. Stamens and styles white. Ovaries buried in wool. Fruit naked. (Condensed from Don.)

Fab.—Persia, in the province of Irak, near Jezud Khast, and on the plains between Yerdekanst and Kumisha.

Extraction.—The whole plant is abundantly pervaded with a pungent juice, which oozes forth upon the slightest puncture being given, even at the ends of the leaves. This juice when hardened constitutes ammoniacum. Through the kindness of my friend Dr. Doley, I have in my museum the upper part of the (apparently bending) stem, about ten inches long, with lumps of ammoniacum king to it at the origin of every branch. It was gathered by Sir d'Niell, in Persia (I believe between Ghorian and Khaff). It does not appear that artificial incisions are ever made in the stem. Lieut.-Col. Kennet7 says, "When the plant has attained perfection, immovable beetles, armed with an anterior and posterior probe of half an inch in length, pierce it in all directions; it [ammoniacum] soon dries, and is then picked off, and sent via Bushire to India, to various parts of the world."

* Lib. ii. cap. 8.
† Lib. Fund. Pharm. i. 35. Ind. R. Seligmann. 1829.
‡ Ainslie, Med. Ind. i. 160.
§ Linna. Trans. vol. xvi. 605.
* Linna. Trans. vol. xvi. 605.
COMMERCCE.—Ammoniac is usually imported from Bombay, occasionally it comes from the Levant. It is brought over in cases, and boxes. The quantity imported is but small.

DESCRIPTION.—Common or Persian ammoniacum, usually in gum ammoniacum or ammoniac (gummi ammoniacum), occurs in various forms; in the tear and in the lump.

a. Ammoniacum in the Tear (ammoniacum in lachrymis seu gypso), occurs in distinct dry tears, usually more or less spheroidal, frequently of irregular forms, varying in size from that of the coriander (or even smaller) to that of a walnut. Externally they are of a yellow (pale reddish or brownish) colour, with a waxy luster; internally they are white or opalescent, opaque, or only feebly translucent at the edge of thin films. At ordinary temperatures, it is rarely hard and brittle, but softens like wax in the hand.

β. Lump Ammoniacum (ammoniacum in placentis seu massis). Occurs in masses usually composed of agglutinated tears, whose properties it possesses. It is sometimes met with in soft plastic masses of a darker colour, and mixed with various impurities. To separate these, it is melted and strained (Strained Ammoniacum; Ammoniacum colatum).

Both kinds have a faint, unpleasant, peculiar odour, by which gum-resin may be readily distinguished from all others. This is best detected by heating the ammoniacum on the point of a knife. The taste is bitter, nauseous, and acrid. Umbelliferous are not unfrequently found intermixed with both sorts. In its other properties ammoniacum agrees with other gum-resins (p. 183).

I am indebted to Dr. Lindley for a fine sample of African Ammoniacum (άμμονιακώ, Dioscor.). It was sent by W. D. Hays, Esq., the British Consul at Tangier, to the Hon. W. T. Fox Strangways, and is marked, "Gum Ammoniacum Fushgh, Tangier, 17 June, 1839, J. W. D. H." It is an oblong piece, about 2 inches long, and one and a half inches thick, and broad. Its weight is 830 grains. Externally it is irregular and uneven, and has a dirty appearance, similar to what ammoniacum would acquire from repeated handling and exposure to the air in a dusty situation. It is partially covered with a few pieces of reddish chalky earth (which effervesces with acids) adhering to it, thus confirming the account given of it by Jackson; the quantity of this on my specimen is not sufficient to affect in any way the quality of it. It appears to be made up of agglutinated tears, like the Persian ammoniacum. Internally it has very much the appearance of lump ammoniacum, but is not so white, but has a brownish, reddish, and in some parts a faint bluish tint. Its odour is very faint, and not at all like Persian ammoniacum. Heated on the point of a knife, its distinction from Persian ammoniacum is obvious. Its taste is also much lighter than that of the commercial ammone. Rubbed with water, it forms an emulsion like the latter. It is the product of Ferula tingitana (Lindley).

COMPOSITION.—Ammoniacum has been analyzed by Calvus, Bucholz a, Braconnet b, and by Hagen c.

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1 Account of the Empire of Morocco, 3d ed. p. 155.
3 Ann. de Chem. xlvii. 60.
4 Schwarze, Pharm. Tabol. 280, 2ª Ausg.
AMMONIACUM DOREMA.

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<td>Sand</td>
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VOLATILE OIL OF AMMONIACUM.—Transparent, lighter than water.

Resin of Ammoniacum.—Reddish-yellow, tasteless, has the odour of the resin. Soluble in alkalis and alcohol; partially soluble in ether and the fixed and volatile. Its preparation according to Johnston is C40 H35 O9.

PHYSIOLOGICAL EFFECTS.—The effects of ammoniacum are similar though less powerful than, those of asafoetida (p. 183) and of the fetid gum-resins already (p. 183) mentioned. MM. Troussseau Pidoux in their cases did not say these authors, “two drachms of this substance at once, but experiencing any of those accidents complaisantly indicated authors.”

I would remark, however, that the local irritation produced by the plaster of ammoniacum is known to most practitioners, papular eruption being a frequent result of the application of this plaster. Ammoniacum contains much less volatile oil than either asafoetida or galbanum; its stimulating influence is less than either of these.

Full doses of it readily disturb the stomach.

Uses.—Though applicable to all the same cases as asafoetida (p. 180) and the other fetid gum-resins (p. 183), its internal use is chiefly or almost solely confined to chronic pulmonary affections. It is not fitted for irritation or inflammation of the bronchial membrane. But in chronic coughs, with deficient expectoration, or in chronic catarrhs and asthmatic cases of old persons with profuse catarrh, it sometimes gives slight relief. Thoroughly employed, in a few cases only have I observed it beneficial.

As a topical, discutient, or resolvent application, in the form of rub, to glandular enlargements, indolent affections of the joints, it occasionally proves useful.

ADDITION TO THE TEXT.—The dose of ammoniacum is from grs. x. to 5ss. of the compound pills of squills (see p. 183), a very useful expectorant in old catarrhs.

MIXTURE AMMONIACI, L. D. Lac Ammoniaci; Ammoniacum mixture; (Ammoniacum, 5v. [3j. D.]; Water Oj. [Pennyroyal Oj. f. 5viij. D.]) Rub the ammoniacum with the water gradually up on, until they are perfectly mixed. [It should be strained through linen, D.].—The resinous constituent of ammoniacum is effectually suspended in water by the aid of the yolk of an egg. This mixture operates as a stimulant to the bronchial membrane.

* Traité de Thérapie, p. 19.
and is used as an expectorant in chronic coughs, humoral &c. It is a convenient and useful vehicle for squills or ipecac. Dose 3ss. to 1f.

2. EMPLASTRUM AMMONIACI, L. E. D. Plaster of Ammoniacum (Ammoniacum, 3v.; Distilled Vinegar, f3vij.; [f3x. E.; of Squills, Oss. wine measure, D.] Dissolve the ammoniacum vinegar, then evaporate the liquor [in an iron vessel, E.] slow fire, [over the vapour bath, E.] constantly stirring, to a consistence.)—A very adhesive, stimulant, and discutent vent plaster. It sometimes causes an eruption. It is applied to indolent swellings, as of the glands and joints. A very useful application to the housemaid’s swollen knee.

3. EMPLASTRUM AMMONIACI CUM HYDRARGYRO, L. E. D. 729.)

9. ANETHUM GRAVEOLENS, Linn. L. E.—COMMON GARDEN ANIS

Sex. Syst. Pentandria, Digynia.

(Fructus, L.—Fruit, E.)

History.—This plant is mentioned by Hippocrates*; Dioscorides†, and by Pliny ‡. It is also noticed in the New Testament§.

Botany. Gen. Char.—Margin of the calyx obsolete. Roundish, entire, involute, with a squarish retuse lobe. Fructiclar, flattened from the back, surrounded by a flattened Mericarps [half-fruits] with equidistant, filiform ridges; the intermediate [dorsal] acutely keeled, the two lateral more or less losing themselves in the border. Vitae broad, solitary in the nels, the whole of which they fill, two on the commissure; slightly convex, flat in front.—Smooth erect annuals. Leaves compound, with setaceous linear lobes. Involucre and involucre none. Flowers yellow (De Cand.)

Sp. Char.—Fruit elliptical, surrounded with flat dilated (De Cand.)

Root tapering long. Stem one and a half to two feet high striated, simply branched. Leaves tripinnat; segments flat; leaf-stalks broad and sheathing at the base. The plant resembles common fennel, though its odour is less agreeable.


Description.—The fruit, commonly called dill seed (frutina anethi) is oval, flat, dorsally compressed, about a half long, and from a half to one line broad, brown and surr by a lighter-coloured membranous margin (ala). Each
OFFICINAL GALBANUM.

half-fruit) has five primary ridges, but no secondary ones. In
channel is one vitta, and on the commissure are two vittae.
ese vittae contain the aromatic oil. The odour of the fruit is
ugly aromatic; the taste warm and pungent.
Composition.—Dill owes its peculiar properties to a volatile oil.
see below.)

Physiological Effects.—Aromatic stimulant, carminative and
medicament, analogous to other aromatic umbelliferous fruits (see
181.)

Uses.—Employed as a condiment by the Cossacks. Loudon
ys the leaves "are used to heighten the relish of some vegetable
bles, particularly cucumbers; and also occasionally in soups and
bles."

In medicine it is principally employed in the diseases of children.
is a common domestic remedy among nurses, to relieve flatulence
1 gripping of infants. Occasionally it is taken under the idea of
promoting the secretion of milk. Practitioners generally use dill a
vehicle for the exhibition of purgative and other medicines to
ren, the gripping of which it assists in preventing. The whole
its may be given to adults in doses of ten grains to a drachm.

1. OLEUM ANETII, E. Oil of Dill. (Obtained by submitting the
seed of dill, with water, to distillation). Two cuvs. of the
yield 8lbs. 5ozs. of oil. This oil is pale yellow. Its sp. gr. is
81. Its odour is peculiar and penetrating, analogous to that of
fruit. Its taste is hot, but sweetish. Alcohol and ether readily
solve it. According to Tietzmann 1440 parts of water dissolve
part of this oil. Principally used to prepare dill water. May
taken in the dose of a few drops on sugar, or dissolved in spirit.

2. AQUA ANETII, L. E. Dill Water. (Dill, bruised, lb. jss.
viij. E.); Proof Spirit, f5viij. (Rectified Spirit, 3ij. E.); Water,
vg. ij. Mix. Let a gallon distil.—This compound is usually
pared by diffusing the oil through water by the aid of sugar or
unt. Carminative. Dose, for adults, f3j. to f5ij.; for infants,
. to f5ij. It is generally given to infants with their food.

3. GALBANUM OFFICINALE, Don., L.—OFFICINAL GALBANUM.

Sex. Spat. Pentandra, Digynia.

Gummi-resina, L. D.—Concrete gummy-resinous exudation of an imperfectly ascertained
umbelliferous plant, probably a species of Opopoia, E.)

History.—Galbanum is mentioned by Moses who ranks it among
sweet spices. It was used in medicine by Hippocrates. Dios-
ides says it (χαλβαν) is the μετώπων, growing in Syria.

1 Encyclopedia of Gardening.
2 Private information.
3 Exodus xxx. 34.
= Pusey’s, &c. ed., Forn.
4 Ib. iii. 27.
Fruit compressed at the back, elliptical; ridges seven, elevately bluntly keeled, not winged; the lateral distinct, marginal, obovate, concave, without vitre. Commisurture flat, dilated, bivittate, somewhat curved. (Don.)

But though it is not at all improbable that these fruits are produced of the galbanum plant, yet no proof of this has as yet been adduced, and Dr. Lindley, therefore, very properly a fruit found by Mr. Don upon the gum really belong to it.

More recently Sir John McNeill sent home specimen gum called a second sort of ammoniacum, gathered near Doura Europos, 1838, to the branches of which are sticking lumps of waxy gum-resin, which Dr. Lindley took for galbanum, the plant which yields it being essentially different from the one named by him Opóidia galbanifera 9. Dr. Lindley was not able to send me a small fragment of this gum-resin for examination, but I was unable to identify it with any other known gum, except a gum from the order Umbelliferae. It certainly was neither an ammoniacum; nor did it appear to me to be either a double or true galbanum.

The precise country where galbanum is produced is not hitherto ascertained. Dioscorides says it is obtained from the plant which is perhaps correct, though hitherto no substitute has been obtained. It is not improbable that it is produced in Persia, or even in Arabia, as suggested by Dr. Böhm. Galbanifera grows in the province of Khorasan, near Qum.

Extraction.—Geoffroy 7 says, though I know of no authority, that galbanum is generally obtained by making a hole into the stalks about three fingers' breadth above the gum, from which it issues in drops, and in a few hours becomes dry, a sufficient quantity to gather.
OFFICINAL GALBANUM.

none of which, in my collection, exceed the size of a pea. fracture is feebly resinous and yellow.

Lump Galbanum (galbanum in massis) is the ordinary galbanum in commerce. It consists of large irregular masses of a brownish or brownish-yellow colour, and composed of agglutinated tears, few of which, when broken, are observed to be translucent and clear, or pearl-white. The mericarp, pieces of the stem, &c. are intermixed with the tears. To separate these, galbanum is ground and strained (strained galbanum; galbanum colafijm).

The odour of both kinds is the same; viz. balsamic, and peculiar. The taste is hot, acrid, and bitter. When exposed to cold, galbanum becomes brittle, and may be reduced to powder. In many of its other properties, it agrees with the other gum-resins. It is imported from Persia and from India, in cases and chests.

Recently another gum-resin from India has been introduced as gum; but it is said to resemble the latter in colour only, and is unsaleable.

Composition.—Galbanum has been analyzed by Neumann, Fiddechow, and Meissner.

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Volatile Oil of Galbanum.—Obtained by submitting the gum-resin, with to distillation. It is colourless and limpid. Its sp. gr. is 0:912; its smell is like that of galbanum and camphor; its taste is hot, afterwards cooling and bitterish. It is soluble in spirit, ether, and the fixed oils.

Resin.—Is the residue obtained by boiling the alcoholic extract of galbanum with water. It is dark yellowish-brown, transparent, brittle, and tasteless; it dissolves in ether and alcohol, scarcely so in spirit containing 50 per cent. of water, but not in oil of turpentine, even when heated to 245° F., or 260° F. The composition of galbanum, according to Johnston, C₃₀ H₄₇ O₇.

Pharmacological Effects.—The general effects of galbanum are of the fetid antispasmodic gum-resins already described (p. 183). It is usually ranked between asafoetida and ammoniacum, being inferior than the former, but stronger than the latter. As it yields, by distillation, more volatile oil than asafoetida does, it has been supposed that it must exceed the latter in its stimulant influence over the vascular system; but as an antispasmodic, it is decidedly inferior.


S. de M. E. ibid. 204.

de Pharm. 1841, p. 97.

B. Heiser, "Pharm. Tabel. 284, 2nd Aug."
Administration.—It may be given in substance, pill, in doses of from grs. x. to 3ss., or in the form of

1. Tinctura Galbani, D. Tincture of Galbanum. cut very small, 3ij.; Proof Spirit, Oij. [wine measure seven days, and filter].—Stimulant and antispasmodic, the same purposes as the tincture of asafetida, than nauseous and less powerful."—Dose, 15j. to 15ij.

2. Pilulae Galbani Composite, L. D. (See p. 1465)

3. Emplastrum Galbani, L. D. Emplastrum gummosum of Galbanum. (Galbanum, 3vij.; Plaster of Common Turpentine, 3x.; Resin of the Spruce Fir, Add first the Resin of the Spruce Fir, then the Plaster, with a slow fire, to the Galbanum and Turpentine mixed, and mix them all, L.—"Litharge plaster, 3iv.; ammoniaca and bees' wax, of each 3ss. Melt the gum-resins together; then: melt also together the plaster and wax, add the latter mixture, and mix the whole thoroughly." E.—Lb. 1ij.; Galbanum, lb. ss.; Scrapings of Yellow Wax, galbanum, and add the litharge plaster and wax; together with a medium heat, and strain, D.)—This, upon leather, is applied to indolent tumours, to promote resolution, and to disperse them. Its operation appears to be a mild stimulant. It is also applied to the chest in chronic complaints. In weakly, rickety children, with weakness of extremities, it is applied to the lumbar region.

11. Cu‘minum Cy‘minum, Linn. L. E.—The Office
OFFICINAL CUMIN.

Botany. Gen. Char.—Teeth of the calyx five, lanceolate, setaceous, unequal, persistent. Petals oblong, emarginate, erect, spreading, with an inflexed lobe. Fruit contracted at the side. Mericarps small fruits] with wingless ridges; the primary ones five, filiform, distinctly muricate, the laterals forming a border; the secondary ones four, more prominent, and aculeate. Channels under the secondary ridges one-vittate. Carpophorus bipartite. Seed somewhat euneo anteriorly, on the back convex.—Herbs. Leaves many-cleft: bases linear, setaceous. Leaflets of the involucre two to four, simple divided. Involutellum halved, two- to four-leaved, becoming re-ened. Flowers white or pink (De Cand.)

Sp. Char.—Lobes of the leaves linear, setaceous, acute. Umbel roco- to five-cleft. Partial involucre equalling the pubescent fruit (De Cand.)

Root annual. Stem slender, branched, about a foot high. Leaves with pinnate involucre. Flowers white or reddish.

Hab.—Upper Egypt, Ethiopia. Extensively cultivated in Sicily and Malta.

Description.—The fruit, commonly termed cumin seeds (fructus semina cuminum), is larger than anise, and of a light-brown or grayish-yellow colour. It has some resemblance to, though it is larger than, caraway. Each mericarp has five primary ridges, which are filiform, and furnished with very fine prickles. The four secondary ridges are prominent and prickly. Under each of these is one lobe. The odour of the fruit is strong and aromatic. Both odour and taste are somewhat analogous to, but less agreeable than, caraway. Cumin is imported from Sicily and Malta. In 1839, duty of £1 per cwt. was paid on 53 cwt.

Composition.—The peculiar properties of cumin reside in a volatile oil.

Oil of Cumin: Oleum Cumin. Obtained by submitting the fruit to distillation with water. Sixteen cwt. of the fruit yield about 44 lbs. of oil. This oil, usually met with, is pale yellow and limpid. Its smell is disagreeable; its taste very acrid. It consists of two oils, one a carbo-hydrogen called Cumene or cumene C₁₀H₁₄; the other an oxygogenous oil called Hydromel of Cumene C₁₀H₁₄O². Cumyl is a hypothetical base composed of C₁₀H₁₄O². When treated with caustic potash, oil of cumin yields hydrated cuminic acid C₁₀H₁₄O²+aq., which is a crystallizable solid.

Physiological Effects.—Cumin agrees with the other aromatic Umbelliferous fruits (see p. 183) in its mildly stimulant and carminative qualities.

Uses.—Internally, cumin is rarely used; caraway being an equally efficient, and much more agreeable medicine. As a discutient and solvent, it was formerly employed, externally, in the form of plaster austrum cuminum, Ph. L. 1824) and cataplasm (cataplasma e cy- muni, Quincy). As there is now no preparation of cumin in the British Pharmacopoeia, I am surprised at the retention of this substance in the Materia Medica. The dose of cumin is grs. xv. to 5ss. It is principally used in veterinary surgery.
12. Dau'cus Caro'ta, Linn. L. D.—Common or Wild

Sec. Syt. Pentandra, Dicyanin.

(Fructus; Radix recens, L.—Radix, D.)

D. Carota, var. sativa, De Candolle, E. (Root).
D. Carota, var. sylvatica, D. (Semina).

History.—According to Dr. Sibthorp, this plant is the true Dioscorides. Hippocrates employed it in medicine under the same name. The σαφέλλες ἄγρος of Dioscorides is, according to Dr. Sibthorp, the Daucus guttatus.

Botany. Gen. Char.—Margin of the calyx five-toothed, obovate, emarginate, with an inflexed point; the outer radiating, and deeply bifid. Fruit somewhat compressed, back, ovate or oblong. Mericarps [half fruits] with the four ridges filiform and bristly; the three middle ones at the back and two laterals on the plane of the commissure; the four ridges equal, more prominent, winged, split into a simple spine. Channels beneath the secondary ridges one-vittate, anteriorly flattish. Usually biennial herbs. Leaves bipinnate, involucre of many, tri-, or pinnatifid leaflets; partial in many, entire, or trifid leaflets. Flowers white or yellow; the generally fleshy, blackish purple, sterile (De Cand.)

Sp. Char.—Stem hispid. Leaves two- or three-pinnate, segments pinnatifid; the lobes lanceolate, cuspidate, almost entire, the umbel. Prickles equal to the diameter of the oblong; (De Cand.)

Root slender, yellowish, aromatic, and sweetish. Stem three feet high, branched, erect, leafy, hairy or bristly. Umbels broad, concave, ribbed footstalks, distinctly hairy. Umbel white, except the one central neutral flower, which is bracteate. Fruit small, protected by the incurvation of the flowers, from which the umbels are rendered hollow, like a bird's nest.—(Cited from Smith).

Hab.—Indigenous; in pastures and the borders of fields, gravelly soil, common. Europe, Crimea, and the Caucasus thence, probably, carried to China, Cochin-China, and America.

Dau'cus Caro'ta, var. sativa, D.C.; E. Cultivated or Garden Carrot, a thick succulent root, whose colour varies. Loudon mentions varieties.

Description.—The officinal root is that of the cultivated (radix dauci sativi). It is tap-shaped, now and then branched, or pale straw-coloured, succulent, of a peculiar, not unpleasant odour, and a sweet, mucilaginous, agreeable taste. Carrot, (dauci) is reddish, turbid, with the odour and taste of the r
COMMON OR WILD CARROT. 1475

g, a feculent matter (amylum dauci), which has been recently ed in medicine, deposits. It coagulates at a temperature under The coagulum is yellow, and when dried amounts to 0.629 of ce. The root of the wild, or uncultivated, carrot is small, acrid, and bitter, with a strong aromatic odour. The official usually called carrot seeds (fructus seu semina dauci sylvestris) se of the wild carrot: they are brownish, from one to one and lines long, with a peculiar and aromatic odour, and a bitter arm taste. Their other characters have been described (p. 1474). Seeds of the cultivated carrot are much milder.

POSITION.—The fruit (commonly termed seeds) has not been ed: the seeds owe their peculiar properties to volatile oil (oleum in dauci sylvestris). The root has been analyzed by Vauxer Wackenroder, and by C. Sprengel. The constituents of pressed juice, evaporated to dryness, are, according to Wacken- fixed oil with some volatile oil 1:0, carotin 0:34, uncrystalliz- ar with some starch and malic acid 93:71, albumen 4:35, composed of alumina, lime, and iron 0:60.

VOLATILE OIL OF CARROT-ROOT.—Colourless, has a smell of carrots, a permanent, unpleasant taste, and a sp. gr. of 0.8865 at 54° F. It is little in water, but very soluble in alcohol and ether. From 34 lbs. of the ot only half a drachm of oil was obtained. It is probable that the vola- carot-fruits possesses analogous properties.

CUMIN.—A crystalline, ruby-red, tasteless, odourless, neutral substance, ible and combustible, but not volatile, soluble in the mixed and volatile ly in alcohol, not in ether unless fat oil be present. Its solutions lorized by solar light.

ACETIC ACID.—By the action of alkalis on the ligneous tissue of carrots, ot procured pectic acid. I have repeated his experiments, and can con- statements, but the quantity obtained is small. Pectic acid consists, n to Freny, of C\(_{24}\) H\(_{31}\) O\(_{22}\).

PHYSIOLOGICAL EFFECTS AND USES.—The fruit (seed of the shops) carrot is an aromatic stimulant and carminative, like the other ic umbelliferous fruits (see p. 183). Arean says it possesses perties, a statement confirmed by Eberle. It has been ed in suppressions of urine and painful micturition, and also es. The expressed juice has been used as an anthelmintic. boiled root is a well-known article of food. Raw scraped is sometimes applied to chapped nipples: it is a stimulant, occasionally proves a painful, application. Boiled carrots are employed in the form of poultice.

APLASMA DAUCI, D.; Carrot Poultice. (Root of Cultivated , any quantity. Boil the root in water until it becomes soft
sufficiently well to prove it must have been one of the and he tells us that it had a heavy odour, and a fruit like. The latter simile applies to our Conium, for a very integral mistook, in my presence, the fruit of the hemlock; and at the examination for M. B. at the University in 1839, a considerable number of the candidates, to whom lock fruit was shown, made the same mistake. Dioscorus, that the κόνιον of Crete and Megara was the most next to this came that of Attica, Chio, and Cilicia. Thorp found Conium maculatum growing near Consta unfrequently in the Peloponnesus, and most abundantly in Athens and Megara. So that the locality of our Conias has been ascertained, with that of the ancient όρος, Conium maculatum is at this present time called by κόνιον. We may gather from the poetical account of κόνιον given by Nicander, that this plant “brings off of the mental faculties, dimness of sight, giddiness stifling, coldness of the limbs, and death by asphyxia; effects,” says Dr. Christison, “which differs little from notions of the poisonous action of the spotted hemlock remarkable that the ancients regarded κόνιον as having discussing tumors—a virtue which has been assigned to writers of the present day.

I am fully aware that the characters of the ancient plus by Dioscorides and Pliny, are insufficient to distin some other Umbelliferae, yet I think the evidence of Conium maculatum is deserving of much greater co Dr. Christison is disposed to give it. The absence of
SPOTTED HEMLOCK.

writings of the ancients, of the purple spots on the stem, has
enured against the probability of this opinion. “Pliny’s term
Lycium, applied to the stem, is but a feeble approach,” says Dr.
Burton, “to the very remarkable character of the modern plant,
the purple spotted stem.” But in 1839 I showed to the pupils
attending my lectures a stem of hemlock to which the term blackish
might be applied without greater impropriety of language than is daily
made use of when a man is said to have a black eye; for the dark
purple spots had coalesced so as to cover most completely the lower
part of the stem. Admitting, however, that the term is not strictly
correct, I would observe, first, that there is no poisonous umbelli-
ferous plant to which it applies so well as to hemlock; and, secondly,
poisons, and Pliny may be well excused for using it, seeing that
distinguished living professor describes the spots on the stem as
blackish.

It is evident that our generic term Conium is derived from the
Greek word κωπας. Linnaeus has been censured by Lamarck for
using this name, since the Latin authors call our hemlock Cicuta,
which he, therefore, contends ought to be its designation now. But
ought to be remembered that Linnaeus has only restored its ancient
name, for the word Cicuta is unknown to the Greek language. By
modern botanists the latter term is applied to a distinct genus of
plants; and when, therefore, we meet with it in botanical works, we
must not confound it with the cicuta of the Romans. Especially
useful should the student be not to confound Conium maculatum with
Cicuta maculata. It is certainly much to be regretted that such a
round of confusion should exist, but I am afraid it is now too late
obviate it.

BOTANY. Gen. Char.—Margin of the calyx obsolete. Petals obcordate,
somewhat emarginate, with a very short inflexed lobe. Fruit
compressed at the side, ovate. Mericarps [half-fruits] with five,
convex, undulated, crenulated, equal ridges, the lateral ones mar-
stil. Channels with many striae, but no vittae. Carpophorus bifid
at the apex. Seed incised with a deep narrow groove, and con-
spun with it.—European, biennial, poisonous herbs. Root fusiform.
Stem round, branched. Leaves compound. Both partial and
general involucres, three to five-leaved; partial one, halved. Flowers
white, all fertile (De Cand.)

Sp. Char.—Leaflet of the partial involucr e lanceolate. Partial umbel
short (De Cand.)

Root biennial, tap-shaped, fusiform, whitish, from six to twelve
inches long, somewhat resembling a young parsnip. Stem from two
to six feet high, round, smooth, glaucous, shining, hollow, spotted
with purple. Leaves tripinnate, with lanceolate, pinnatifid leaflets,
of a dark and shining green colour, smooth, very fidel when bruised,
with long, furrowed footstalks, sheathing at their base. Umbels of

* See Orfila, Toxicol. Gén. ii. 299. 1818.
In distinguishing Conium maculatum from other Umbellifer characters should be attended to:—The large, round, smooth, the smooth, dark, and shining green colour of the lower leaves; volvere of from three to seven leaflets; the partial involucre, of the fruit with undulated crenated primary ridges. To these must be whole herb, when bruised, has a disagreeable smell (compared of mice, by others to that of fresh cantharides or of cats’ urine).

The indigenous Umbellifera most likely to be confused with Conium, are, Ethusa Cinopium and Anthriscus vulgarius. Ethusa Pool’s Parsley, is distinguished from hemlock by its smaller size, strong disagreeable smell which distinguishes the leaves; the want of a general involucre, by the three long, narrow, unilat leaflets composing the partial involucre, by the ridges of the fruit (not undulate or crenate), and by the presence of vitia. Anthr or Common Beaked-Parsley, is known from hemlock by the paler hairiness of the leaves, by the absence of spots on the stem, under each joint, by the absence of a general involucre, by the r fruit, and by the absence of a strong unpleasant odour when bruised. Anthriscus Sylvesteris (Charophyllum sylvestre), or Parsley, is scarcely likely to be confused with hemlock. The purplish, is striated, downy at the lower part, and slightly saw joint; the leaves are rough edged; there is no general involucre: one usually consists of five or more leaflets.

Description.—The leaves (folia conii) only are off should be gathered from wild plants, just before the commencement of flowering. If intended for drying stalks should be removed, and the foliaceous parts quite baskets, by the gentle heat (not exceeding 120° F.) of a. Exclusion from solar light contributes greatly to the preservation of the colour. If properly dried, the leaves should have colour, and their characteristic odour; and when rubbed potash should evolve the odour of conia. They should
SPOTTED HEMLOCK.

*semina conii*, has very little odour, and a slight, somewhat bitter taste. It retains for a much longer time than the leaves its live principle unchanged (see *Conia*).

**Composition.**—Schrader* made a comparative analysis of wild and cultivated hemlock, but with no important result. He also made a comparative examination of hemlock and cabbage (*Brassica oleracea*), the only curious part of which was, that he found a striking resemblance between them?. Peschier* found in hemlock a salt which he called *coniate of conia*, being composed of a peculiar crystallizable acid (*conic acid*), and a peculiar base. Hemlock juice is analyzed by Bertrand*; the leaves by Dr. Golding Bird*; the *ses* by Brandes*.* An analysis of hemlock (leaves?) by the last-mentioned chemist, is quoted by Merat and De Lens*.* Peschier* and Brandes first announced the existence, in this plant, of a peculiar base principle, which Giseke* in 1827, obtained in combination with sulphuric acid. But Geiger* in 1831, procured it, for the first time, in an isolated form, and described some of its properties and effects on animals. It was afterwards examined by Dr. Christison* and by MM. Boutran-Charlard and O. Henry*.

<table>
<thead>
<tr>
<th>Schrader's Analyses.</th>
<th>Brandes's Analyses.</th>
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</thead>
<tbody>
<tr>
<td><strong>Hemlock.</strong></td>
<td><strong>Cabbage.</strong></td>
</tr>
<tr>
<td>native</td>
<td>2.73</td>
</tr>
<tr>
<td>water extractive</td>
<td>3.22</td>
</tr>
<tr>
<td>ash</td>
<td>0.15</td>
</tr>
<tr>
<td>whole albumen</td>
<td>0.31</td>
</tr>
<tr>
<td>as feulna</td>
<td>0.50</td>
</tr>
<tr>
<td>as, with acetic acid and various</td>
<td>92.49</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100.00</strong></td>
</tr>
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</table>

**Volatile Oil of Hemlock. (Odorous principle).**—The distilled water of hemlock possesses, in a high degree, the characteristic odour of hemlock, but is, if at all, poisonous. Hence it is obvious that the odorous matter is not an active principle. Furthermore it shows that the characteristic odour of hemlock, in the different preparations of this plant, is not to be taken as a necessary indication of their activity. Bertrand isolated the odorous matter, and found it to be a volatile oil of an acrid taste and peculiar odour.

**Conia (Conicine; Coneria; Cicutine).**—Exists in hemlock in combination with acid (*conic acid*, Peschier); so that it cannot be recognized by its odour, nor mixed by distillation, without the assistance of an alkali. It exists, probably, all parts of the plant, but is more copious in the fruit than in the leaves; and, in a remarkably, it may be preserved for a much longer time in the former than in the latter. Geiger procured from six lbs. of fresh, and nine lbs. of dried fruits, but one ounce of conia, whereas from 100 lbs. of the fresh herb he obtained 8 drachms of this alkaloid. He could get traces only of it in fresh dried...
salty. While saturating, the liquor have a green-gold tint, quently passes to a reddish-brown. It combines with about a four of water to form a *hydrate of conia*. When placed in a vacuum, of bodies very attractive of water, it in part volatilizes, and leaves acrid, pitchy residue, which appears to be anhydrous (partially conia). The vapor of conia is inflammable. By exposure to the i acquires a dark colour, and is resolved into a brown resin and boiling point is 370° F., but it readily distils with water at 212° F.

Conia is characterized by its liquidity at ordinary temperature its peculiar odour, its reddening turmeric paper, its vapour form (hydrochlorate of conia) with the vapor of hydrochloric acid, water, forming, with infusion of nutgalls, a white precipitate (to its sulphate and other salts being deliquescent and soluble in being reddened by either nitric or iodic acids, and lastly, by its al not being precipitated by the alcoholic solution of carbazotic a the **salts of conia** are crystallizable. When solutions of them they lose a part of their base, the odour of which becomes sensi of conia, when decomposed by heat, yields brown pyrogenous pn added to a salt of conia sets the base free, which is then recogni

Liebig analyzed conia. Its constituents are:

<table>
<thead>
<tr>
<th>Atoms</th>
<th>Eq. Wt.</th>
<th>Per Cent.</th>
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<tbody>
<tr>
<td>Carbon</td>
<td>12</td>
<td>73</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Oxygen</td>
<td>1</td>
<td>8</td>
</tr>
</tbody>
</table>

**Conia**

1 108 100.00

The effects of conia have been tried on mammals (the dog, mouse), birds (pigeon, kite, and sparrow), reptiles (snake, frog), annelides (earthworm), and insects (fly and flea). C in the eye of a rabbit killed it in nine minutes; three drops et same way killed a strong cat in a minute and a half; five drops throat of a small dog began to act in thirty seconds, and in a ma and respiration had entirely ceased.

The following are the symptoms produced, as detailed by Dr. C is, in the first place, a local irritant. It has an acrid taste; whi
SPOTTED HEMLOCK.

excites to alter his position, proving that his senses are unimpaired. After the muscles are susceptible of the galvanic influence. MM. Boutonner and O. Henry state, that most of the animals to whom they gave conia were "a prey to the most dreadful convulsions. The plaintive cries, the convulsions, and the rigidity of the limbs, which have always preceded death, leave doubt as to the cruel pains which this kind of poisoning brings on." This fact agrees neither with my own observations, nor with those published by Christison.

oes conia become absorbed? In favour of the affirmative view of this action may be mentioned the fact, that this alkali acts on all the textures adding of absorption; and that the quickness with which the effects occur, are proportion to the absorbing power of the part. But the rapidity of its action, introduced into the veins, is a barrier to the supposition of its acting on nervous centres by local contact; for Dr. Christison states, that two drops, neutralized by dilute muriatic acid, and injected into the femoral vein of a young pig killed the animal in two or three seconds at farthest.

the primary seat of the action of conia is probably the spinal cord. In this state and strychnia agree; but in the nature of the effect, they seem, as Dr. Christison has observed, to be the counterparts of each other. Conia exhausts nervous energy of the cord, and causes muscular paralysis; strychnia irritates it, and produces permanent spasm of the respiratory muscles. It is evident, before, that, like strychnia and nux vomica (see p. 1299), its operation is on seat of the reflex functions, which, according to Mr. Grainger, is the gray matter of the spinal cord.

these effects of conia suggest its employment in convulsive or spasmodic diseases; as tetanus, poisoning by strychnia, brucia, or nux vomica, hydrophobia.

I have tried it on two rabbits under the influence of strychnia, and found it stopped the convulsions, but hastened rather than prevented death. In September, 1838, it was tried in a case of hydrophobia at the London Hospital, following is a brief report of the case:—"In the case of hydrophobia, in a diseased man, after the disease was fully formed, two minims of conia, dissolved in thirty drops of acetic acid, were applied endermically to the precordium (cuticle being previously removed by a blister). The effects were instantaneous. The pulse fell from 64 to 46, and became more regular. The vomiting convulsions ceased; the respiration became less difficult, and the symptoms of the disease appeared to be altogether mitigated. The man expressed himself feeling much better, and entertaining hopes of a complete recovery. These effects were, however, but transitory, and in about seven minutes the symptoms began to reappear, and shortly assumed their previous urgency. Three minims conia were injected into the rectum, about a quarter of an hour after the ernoic application of it, but it produced no effect in allaying the symptoms of disease. The remedy was not repeated, and the man became rapidly worse, and died in a few hours."

EMPYREUMATIC OIL OF HEMLOCK (Pyro-conia?).—This oil, obtained by the rective distillation of hemlock, resembles, according to Dr. Morries, that proved from foxglove (see p. 1209).

Characteristics for Medico-Legal Purposes.—Hemlock can be properly recognized by its botanical characters, already described: yet its remarkable odour may sometimes be of considerable assistance in recognizing the plant or its preparations; nor is it a fact to be lost sight of, that potash develops a strong smell of it. In some cases it might be possible to obtain some conia by diluting the alcoholic extract of the suspected substance with water, using potash.
On Vegetables.—Marcet placed Arceps (Ligarnis) in a solution of five grains of tellurium in a few minutes the two lower leaves wilted; afterwards the plant died. The effects of hemlock on animals in experiment.—The effects of hemlock on animals in experiment. Wepfer, Orfila, and Schubart. The conia plant was used as a hemlock on the solipedes and ruminants is very as in the plant to the young horse, 7 ounces the decoction of four ounces proved fatal to a horse, stupor, dilatation of the pupils, trembling, spasmodic contraction of the muscles of the eye, grinding of the teeth, and copious sweating of the body. The observations of Orfila, hemlock is a local irritant, its action was not constantly observed, and produces convulsions, loss of sensibility, palsy, and coma. Dr. Christie observes, does not agree with the symptoms caused by conia, which does not seem to affect the senses of respiration goes on. "But it is possible," he heeds, "sensation is more apparent than real, and that hemlock has no power to extinguish sensation, merely because by inducing it takes away the power of expression; at least in some cases I have made, sensation did not appear to be affected. In these experiments I used very strong extracts, prepared from the fresh leaves or full-grown seeds; of them occasioned, in doses of thirty grains, the voluntary muscles, with occasional slight convulsions, paralysis of the respiratory muscles of the chest and abdomen; finally cessation of the action of the diaphragm. Sensation appeared to continue so long as it was practicable to make an observation on the subject; and the heart contracted vigorously for a time after death." But from the united observations of the effects of hemlock on animals and man, I cannot help suspecting, either this plant contains a second active principle, whose operation is somewhat distinct from conia, or that the influence of this alkaloid is greatly modified in the plant by combination with other matters.

On Man.—In small or medicinal doses, hemlock has been frequently administered for a considerable period, with obvious results in certain diseases (tumours of various kinds, for example), with any other evident effect; hence the statement of some authors,

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5. Toprét. Gén. II.
7. Pharm. Vit. 359.
Spotted Hemlock. 1483

Hemlock acts insensibly on the system. "It seldom purges," says Dock, "and very rarely vomits. Sometimes it increases perspiration, and often it occasions a copious discharge of viscid urine. In many patients, nevertheless, it does not sensibly augment any of the emotions." Long-continued use, especially if the doses be increased, will sometimes occasion disorder of the digestive organs or the nervous system, dryness of the throat, thirst, and occasionally, as said, an eruption on the skin. Choquet mentions the case of a man who gradually increased the dose of the extract to half a drachm; produced slight delirium and syncope, which obliged him to suspend its use.

The ancients were of opinion that hemlock exercised a specific influence over the breasts and testicles. "It extinguishes the milk," says Dioscorides, "and prevents the development of the mammae of guine; moreover, in boys it causes wasting of the testicles." Pliny gives a similar account of it, and adds, "it reduces all tumours." Then notions of its effects seem to have been entertained by the abians; for Avicenna praises it as a remedy for tumours of the breasts and testicles. More recently, somewhat similar effects on the breasts have been ascribed to it. In two cases it is said to have caused atrophy of the mammae.

In large or poisonous doses the symptoms are those indicating disorder of the cerebro-spinal functions. In some of the best-recorded cases the leading symptom was coma; the effects being altogether analogous to those of opium. In other instances, convulsions, or delirium, or both, were the prominent symptoms. As an illustration of the comatose condition, sometimes brought on by this poison, I shall quote a case recorded by M. Haaf, a French army surgeon, which occurred to him while in garrison at Torrequemada, in Spain, in March, 1812.

A soldier having eaten of some broth, into which hemlock had been put, went to sleep immediately after his supper. In an hour and a half he was found groaning and breathing with difficulty; in consequence of which M. Haaf was sent for. He found his patient in a profound sleep, without sense, respiring with difficulty, and lying on the ground. His pulse was 30, small, and hard; the extremities cold; the face bluish, and distended with blood, like that of a person about to vomit. Twelve grains of emetic tartar were given, and occasioned the fruitless attempts to vomit. He became gradually worse, had violent palpitations of the heart, and died in three hours after his last supper.

Several other cases in which coma was the leading symptom might be quoted, but the one just related is the best.

We have no well-detailed cases in which delirium was the leading symptom. The following must suffice, by way of illustration; it is

* Essay on Hemlock, Eng. Tr. 2d ed. 1762.
* Orfila, Toxicol. Gén. ii.
* Orfila, Toxicol. Gén.
from Kircher*:—Two priests ate hemlock root by mistake; became raving mad, and mistaking themselves for geese, plunged in the water. For three years they suffered with partial pain and violent pain. Orfila also mentions a vine-dresser and his wife became mad and furious from hemlock.

As illustrations of the convulsions caused by hemlock, I may add the cases mentioned by Limprecht and Ehrhard. The former tells of an old woman who suffered for three months with abdominal and convulsive movements of the limbs, in consequence of hemlock root. Ehrhard mentions trismus as one of the symptoms.

Another case. Dr. Watson* has related two cases in which giglioma, and convulsions occurred.

These statements, as well as others of a like tendency which may be quoted, do not agree with the (as yet ascertained) effects of the post-mortem appearances throw but little light on the operandi of hemlock. Venous congestion, especially of the cerebral vessels, a fluid condition of the blood, and, in the lower animalness of the alimentary canal, are the occasional appearances.

Uses.—In the present state of uncertainty with respect to the real physiological operation of hemlock, it is obviously important to lay down indications or contra-indications for its use, which are not much relied on. Acute inflammation, fever, apoplexy, or convulsions, and paralysis, are among the circumstances which oppose the employment of hemlock.

The uses of hemlock may be reduced to two heads: those which depend on its influence over the organic functions; and, secondly, those which have reference to its influence over the cerebral system. The resolvent or discutient and alterative uses come under the first head; the antispasmodic and anodyne under the second.

1. As a resolvent or discutient and alterative.—Under the common name of a hemlock, glandular and visceromal processes have frequently subsided; hence has arisen the universal use of hemlock in all ages, of the resolvent and discutient powers of the hemlock, and of the stimulus which it communicates to the alimentary canal. The mammae and the skin are the parts in which hemlock powers have been supposed to be more especially manifested. The asserted effects (wasting of the breast, profuse sweating, eruptions) of hemlock on these parts, in healthy individuals, do not support to this opinion. But the influence of hemlock over the organic functions does not appear to be limited to this resolution. In foul ulcers the quality of the discharge has been improved, while pain has been alleviated, and the tendency of sores to spread has apparently been greatly diminished.

These effects have been asserted by so many writers in all ages, that we can scarcely be expected to admit them, they prove that this plant exercises a most powerful influence over the organic functions of the body.
fluence over nutrition and the other organic functions, and which have no better term to indicate than that of alterative. But so
sequently has this influence failed to manifest itself, especially in
se cases where it was most desired, that a very proper doubt has
evailed among practitioners of the present day, whether it really
exists, and whether those phenomena which have been supposed to
indicate it, are not really referrible to other influences and circum-
stances. That hemlock has some influence of the kind referred to, I
unless I do not doubt; but it has been greatly exaggerated, and thereby
uch unmerited discredit has been brought on the remedy; for practi-
ners, finding that it would not do all that had been ascribed to it,
are frequently dismissed it as altogether useless. Whether the failures
ought, in part at least, to be ascribed to imperfect modes of prepara-
and administering this plant, we are, as yet, unable positively to
irm. One fact, however, is certain, that many of the preparations
hemlock in ordinary cases are inert, or nearly so; and others,
hably, have had their properties greatly changed in the process of
ir preparation. The remark made by Dr. Christison, with respect
to the physiological effects of this plant, applies well to the point
over discussion. "If," says this writer, "physicians or physiolo-
gists would acquire definite information as to the physiological
effects of hemlock, in small or medicinal doses, they must begin the
quiry anew. Little importance can be attached to anything
ready done in this field, as I have no doubt whatever that by far
a greater proportion of the preparations of hemlock hitherto en-
joyed have been of very little energy, and, in the doses commonly
ed, are absolutely inert."

The diseases to which the preceding remarks especially apply, are,
agments and indurations of the absorbing and secreting glands, and
the visceræ, scrofula, obstinate chronic skin diseases, and foul ulcers.
I am not prepared to offer any opinion, as to whether the diseases to
ich the terms scirrhus and cancer are strictly applicable, have ever
ene cured by hemlock. One fact is undoubtedly, that diseases, sup-
osed to have been scirrhous and cancerous, have been greatly allevi-
ated, and, in some cases, apparently cured by this remedy. This fact
es not rest on the sole testimony of Storck, but on that of a multi-
bde of practitioners. Bayle has collected, from various writers,
ty-six cases of cancerous diseases, said to have been cured, and
enty-eight ameliorated, by hemlock. In scrofula, in which disease
mergill, and many others, have praised it, it seems to be occa-
ionally useful as a palliative in irritable constitutions. It allays
the pain, and assists in reducing the volume of enlarged lymphatic
lands, and in scrofulous ulcerations improves the quality of the dis-
charge, and disposes the sores to heal. Even enlargements of the
er, spleen, and pancreas, have been, at times, apparently, benefited
hemlock. In mammary tumors and profuse secretion of milk

\[\text{See Bayle, Biol. Therap. ii. 618.}\]
\[\text{Med. Obs. and Inq. iii. 409.}\]
\[\text{See Bayle, op. cit.}\]
Elements of Materia Medica.

(galactorrhoea), a trial of it should never be omitted. In bronchitis, it has been found efficacious by Dr. Gibson, Professor of Surgery at the University of Pennsylvania. In syphilis, it is useful, by abating nocturnal pains, and in diminishing the tendency to specific attacks. In chronic skin diseases (lepra, herpes, &c.) it is but rarely employed.

2. As a cerebro-spinal agent (antitysacomics and anodyne), power possessed by conia of paralyzing the motor nerves, some trials of it have been made in a few spasmodic diseases only, those having proved favourable to its reputation. In some specific affections of the respiratory organs it has gained a temporary celebrity only. In hooping cough, Dr. Butter spoke favourably of it, as having the advantage over opium of not being liable to expectoration. But though the violent and periodic fits of cough are obviously of a spasmodic nature, and, therefore, apparently adapted for the use of hemlock, experience has fully proved that disease is one which will run through a certain course. At the time, hemlock can prove a palliative only. In other forms of spasmodic cough, as well as in spasmodic asthma, hemlock does not appear to have further trial. In tetanus, conia or hemlock held out some hope. In lachrymal, I am afraid) of doing good. Mr. Curling has kind permission to have the notes of a case which occurred in the Hospital. A tincture of hemlock seeds was exhibited on the eighth day of the disease, at first in doses of 100 grains. Every hour, which were increased in the course of the three following days to 250 grains, every two hours of an hour, until the patient (a man aged 46) had taken, in a pint! without any decided effect on the spasms or brain. Morphine and laudanum were afterwards used, but the man died. A quantity of conia, obtained from three ounces of the same used in this case, killed a cat in less than four minutes. In a case of chorea, treated by Mr. Curling, no relief was obtained by the above-mentioned tincture, given to the extent of three ounces in twelve hours. The patient (a young man) ultimately died, exhibiting the long-continued and violent convulsions of nearly all voluntary muscles.

Hemlock has been frequently employed as an anodyne, and with apparent relief. As, however, conia does not appear to have the same paralyzing influence over the sensitive, that it has over motor nerves, some doubt has been raised on the real anodynic influence of hemlock. However, in tender glandular enlargement, painful ulcers, in scirrhus and cancer, in rheumatism, and in many cases hemlock has, at times, evidently mitigated pain; and its power of allaying troublesome cough, is, in some instances, referable to diminishing the preternatural sensibility of the bronchial mem

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* United States Dispensatory.
* Treat. on the Kink-cough. 1773.
**Spotted Hemlock.**

Properties have been ascribed to hemlock, and hence a remedy has been used in nymphomania and satyrasis.

**Administration.**—Hemlock is used in the form of powder, tincture, extract, ointment, and poultice.

**Antidotes.**—No chemical antidote is known for hemlock, though it is not improbable that an infusion of galls might be serviceable, as mentioned for conia. The first object, therefore, is to evacuate the symptoms; blood-letting is frequently required, to relieve the congested state of the cerebral vessels. Opium is generally prejudicial. Artificial respiration should not be omitted in extreme cases. A strychnia and nux-vomica appear to produce a condition of the spinal cord opposite to that of conia, would either of these agents be irreplaceable?

1. **PULVIS CONII; Powder of Hemlock.**—The powder, when properly prepared from the leaves, has the peculiar odour of the plant, and a fine green colour; but neither the odour nor the colour are absolutely indicative of activity. The test of the presence of conia is music potash, and, as the Edinburgh College properly observes, "the powder, triturated with aqua potassae, exaltes a powerful odour of conia." But the odour of the volatile oil of the plant being very analogous to that of conia, creates some difficulty with inexperienced persons. The vapour of conia, evolved from powdered hemlock by ocula, fumes with hydrochloric acid; but the same occurs with ammonium, set free by the same agent. As the powder, however well prepared, quickly spoils by keeping, it is not a preparation which deserves confidence, and should never be used if it have been kept beyond the year. The dose of it is three or four grains twice or thrice daily, the quantity being gradually increased until some obvious effect ensues, dryness of the throat, giddiness, headache, or disorders (i.e.,) in the system is produced. As different parcels of the powder possess very unequal powers, it is necessary, when changing the parcels, to recommence with small doses. I have already (p. 1479) referred to the observation of Geiger as to the small quantity, or even entire absence, of conia, in the dried leaves of hemlock.

2. **TINCTURA CONII, L. E. D.; Tincture of Hemlock.** (Hemlock leaves, dried, 3v. [3ij], D.]; Cardamom seeds, bruised, 3j.]; Proof spirit, Oij. [Oij. wine-measure, D.]; Macerate for fourteen [seven D.] ys., and strain. The formula of the Edinburgh College is as follows: "Fresh leaves of Conium, 3xij.]; Tincture of Cardamom, Oss.; rectified Spirit, Oiss. Bruise the hemlock leaves, and express the juice strongly; bruise the residuum, pack it firmly in a percolator; transmit first the tincture of cardamom, and then the rectified spirit, owing the spirits to mix with the expressed juice as they pass through; add gently water enough to the percolator for pushing through the spirit remaining in the residuum. Filter the liquor after..."
agitation."—The process of the Edinburgh College yields a more energetic preparation than that of the London and Dublin Colleges, as it obviates the necessity of drying the leaves, and, therefore, much deserves the preference. If, however, the percolation were conducted with, and the tincture prepared merely by adding spirit (tincture of cardamom) to the expressed juice, the process would greatly improved. If the leaves have been sufficiently pressed, percolation is scarcely necessary, and, therefore, only adds to the labour and expense of the process. Any active matter lost by one percolation, may be easily compensated for, by increasing the quantity of juice employed, the cost of which scarcely deserves notice. The employment of tincture of cardamom is objectionable, since it prevents the apothecary from forming a judgment of the colour, and smell of, and the effect of potash on, this preparation. Lastly, if the percolation process be adopted, surely the directions of the Edinburgh College are too loose. The quantity of water is to be employed "for pushing through the spirit" should be rately defined, or it will be impossible to have preparations made different times, and by different persons, of uniform strength.

Tincture of hemlock should evolve a strong odour of conia on addition of potash. In 1837 I recommended the use of an acid tincture of the bruised fruit. More recently, Dr. Osborne advised the same. Tinctura conii, L. D. is given in doses of f. 5j., which are to be gradually increased until some effect is produced. Tinctura conii, E. must be employed more cautiously; though in this country the dried, be scarcely half that employed by the London and Dublin Colleges (as 1000 parts of the fresh leaves yield only 185 parts of the dried, according to Henry and Guibourt). The drying, however, I have already noticed, greatly deteriorates the activity of the leaves.

Succus Conii; Preserved Juice of Hemlock.—The method of preparing preserved vegetable juices has been before described (see p. 365). Mr. B. informs me that from 1 cwt. of hemlock leaves gathered in May he procures twelve imperial quarts of juice. The preserved juice of hemlock appears to be an excellent preparation.

3. Extractum Conii, L. E.; Succus inspissatus Conii, D.; Extract of Hemlock. (Fresh hemlock leaves, lb. j.; bruise them, spirit with a little water, in a stone mortar; then press out the juice; evaporate it, unstrained, to a proper consistence, L. The D College directs it to be prepared as the inspissated juice of Aconite. The following are the directions of the Edinburgh College: "Take Conium any convenient quantity, beat it into a uniform pulp in a stone mortar, express the juice, and filter it. Let this juice be evaporated to the consistence of a very firm extract, either in a vacuum with

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3. Pharm. Raison. i. 27.
of heat, or spontaneously in shallow vessels exposed to a strong
vent of air freed of dust by gauze skreeen. This extract is of good
ity only when a very strong odour of conia is disengaged by de-
s, on its being carefully triturated with aqua potassae."—Most of
extract of the shops is inert, or nearly so. "We were one day,"
Orfila," in the shop of an apothecary, who had several times
shed us with the extract of hemlock, which we had administered
gs to the dose of ten drachms, without producing any serious
ten. We endeavoured to prove to him that the medicine was
prepared; and, in order to convince him effectually, we swal-
, in the presence of several persons who happened to be in his
a drachm of this extract (seventy-two grains) dissolved in two
n of water. We felt no effect from it, whilst twenty or thirty
is of the extract, well prepared, would have probably proved fatal.
Let it be conceived now what advantage a person is likely to
from such an extract, who takes one or two grains of it per
or even thirty or forty, with the hope of getting rid of a scirrhous
, or of any other disease."

the extract of hemlock contains very little conia; this has been
by Geiber and Christison, and has been verified by myself.
iv. of extract, procured from one of the most respectable drugg
in town, I was unable to procure any sensible quantity of
kali. "From what has come under my own observation," says
christison, "the extracts of hemlock may become feeble, if not
in one or two ways,—either by the heat being continued after
centration has been carried to a certain extent, or by long
. On the one hand, I have always observed, that from the
t which the extract attains the consistence of this syrup, am-
a begins to be given off in abundance, together with a modified
of conia. And, on the other hand, I have found extracts,
h were unquestionably well prepared at first, entirely destitute
nia in a few years,—a remark which applies even to the superior
act prepared by Mr. Barry, of London, by evaporation in
o."

Mr. Brande observes that "the most active extract is that which
asured by moderate pressure from the leaves only; when the
is and stems are used, and violent pressure employed, the extract
inous, dark-coloured, and viscid, and less active than in the
er case, when it has a somewhat mealy consistence, and an olive-
colour. With every caution, however, on the part of the op-
, the colour, odour, and efficacy of extract of hemlock, will vary
season, and with the situation and soil in which the herb
rown. The best method of preparing this and similar extracts,
ists in gradually heating the expressed juice to a temperature of
212° [by which the vegetable albumen coagulates, and retains,
anically or chemically, a portion of the active principle], then

1 Tencol. Gén. ii.
2 Dict. of Pharm. 193.
(Extract of Hemlock, 5v.; Ipecacuanna, powdered, Acacia, as much as may be sufficient. Beat them together.) — Antispasmodic, slightly narcotic, and sedative. Used in spasmodic coughs, bronchitis, the incipient stage of phthisis, &c. — Dose, grs. v. to grs. x. twice or thrice daily.

5. UNGUENTUM CONII, D.; Hemlock Ointment. (In the reding of the text.) — Prepare 1 lb. of each of Hemlock, Prepared Hogs’ Lard, 1 j. of each. Boil the lard until they become crisp, then express through a press. Apply as an anodyne application to foul, painful, and inflamed parts, to glandular and scirrhous swellings, and to painful swellings where a temporary substitute may be prepared with lard as a substitute for lard.

6. CATAPLASMA CONII, L. D.; Hemlock Poultice. (In the reding of the text.) — Prepare 1 lb. of each of Hemlock, 3 ij. of Ointment, and add Linseed, bruised and mixed with the other ingredients. The poultice may be sufficient to make it of a proper consistence, 1 lb. to the gallon of Water, 1 gallon of Ossianic Ointment. Boil down to a pint, and having strained it, add as much of the same kind of liquor as is sufficient to make a poultice. Apply as a poultice of hemlock to cancerous, scrofulous, venereal, and other ulcers. It is sometimes prepared with the unstrained bruised meal; occasionally the bruised leaves, or the bruised seeds, are used. Hemlock fomentation (fetus coni) is sometimes applied to painful swellings. It is prepared with hot water, when it can be procured, and hot water.

14. CORIANDRUM SATIVUM, Linn. L. E. D.—THE CORIANDER.

Sex. Synt. Pentandria, Digynia.

Sp. Char.—The only species.

Root tapering. Stem erect, twelve to eighteen inches high. Leaves scarcely stalked, all bipinnate and cut; the leaflets of some of the lowermost wedge-shaped, or fan-shaped; acute notched; of the first, in fine, linear segments. Flowers white, often with a reddish spot.

Hab.—Grows wild about Ipswich and some parts of Essex, but is not really indigenous. Native of the south of Europe. Cultivated in Essex.

Description.—The fruit, commonly termed coriander seeds, is globular, about the size of a grape, of a grayish-yellow colour, and is finely ribbed. It consists of two hemispherical mericarps, adherent by their concave surfaces. Each mericarp has five primary ridges, which are depressed and wavy; and four secondary ridges, more prominent and carinate. The tunnels are without vitre, but the commissure has two. The odour of coriander is peculiar and aromatic.

Composition.—The odour, taste, and medicinal qualities of the plant depend on volatile oil.

Volatile Oil of Coriander (Oleum Coriandri).—Yellowish; smells strongly of a pretty agreeably of the coriander.

Physiological Effects.—Aromatic stimulant, like the other carminative umbelliferous fruits (p. 181).

Uses.—Dr. Cullen considered coriander as more powerfully correcting the odour and taste of senna than any other aromatic; and hence it was formerly a constituent of the compound infusion of senna, though now ginger is substituted for it. It is only employed in medicine as an adjuvant or corrigent. It is used, however, by the confectioners and distillers. It is a constituent of the confectio senae.

The dose of coriander is 3ss. to 3j.

OTHER UMBELLIFERÆ, DIETETICAL OR POISONOUS.

All the more important medicinal Umbelliferæ have been noticed. It remains to enumerate those plants in common use for dietetic purposes, or which are indigenous and poisonous.

Of the Dietetical Umbelliferæ several have been already mentioned. To
these may be added Parsley (*Petroselinum *sativum*) and Chervil (*Anthriscus *sylvestris*), used as pot-herbs and garnishings; the Parmnip (*Pastinaca *sativa*) and Skirr (Sten *Sisirum*), employed on account of their succulent roots; *Apium graveolens*), an aceritious plant, the blanched leaf-stalks of which are eaten raw or in a salad; Common Samphire (*Crithmum maritimum*), pickled; Eryngo (*Eryngium campestre*), the root of which is preserved as a candy (*Candied Eryngo*; *Radix Eryngii condita*); and Lovage (*Levisticum officinale*), used by distillers for preparing a liqueur termed lawn.

The Poisonous Indigenous Umbelliferae are acro-narcotics. They lowered they cause gastric irritation, giddiness, delirium, convulsions, etc. The most important (after Conium maculatum, before mentioned), is Parsley (*Anthriscus *sylvestris*), which contains a peculiar alkaloid called Hemlock Water-dropwort (*Oenanthe crocata*); Celery-leaved Water (*Oenanthe apiifolia*); and Water Hemlock (*Cicuta virosa*).

**Order LVI.—Cucurbitaceae, Jussieu.—The Gourd Tribe.**

**Essential Character.**—*Flowers* usually unisexual, sometimes hermaphrodite. *Calyx* five-toothed, sometimes obsolete. *Corolla* five-parted, scarious, glandular from the calyx, very cellular, with strongly-marked reticulum, sometimes fringed. * Stamens* five, either distinct or cohering in three parietals, two-celled, very long and sinuous. *Ovary* inferior one-celled, three parietal placenta; *style* short; *stigma* very thick, velvety or fleshy, more or less succulent (occasionally dry, opening by a scar). *Fruit* fleshy, crowned by the scar of the calyx, one-celled (in some *Momordica* four-celled), with three parietal placenta. *Seeds* flat, ovate, enveloped in the aril, which is either juicy, or dry and membranous. *Testa* coriaceous, thick at the margin; *embryo* flat, with no *albumen*; *cotyledon* veined; *radicle* next the hilum. *Roots* annual or perennial, fibrous. *Stem* succulent, climbing by means of tendrils formed by abortive stipules, *Leaves* palmated, or with palmated ribs, covered with numerous asperities. *Flowers* white, red, or yellow. (Indicate properties.—Variable; suspicious. The roots and fruits of many are drastic cathartics. The fruits of other species are employed as food.

1. **Cucumis Colocynthis**, Linn. L. E. D.—*The Bitter Cucumber, or Colocynth.*

*Sex. Syst. Monoeccia, Syngenesia* *(Linn.)*

(Pepo *Pulpa Exsiccata*, L.—Pulp of the Fruit, E.—Fructus pulpa, D.)

**History.**—Colocynth is supposed to be the plant termed 'Cydonia' in the Old Testament; the *wild vine* (literally *the vine of the field*) or *fruit* the Sacred historian calls *pakkoth*, a word which in our

* The followers of Linnaeus are by no means agreed with their great master, or amongst themselves, as to the true order of Cucumis, and some other cucurbitaceous genera. The latter, apparently, three stamens; but of these two have an anomalous structure, and are regarded by botanists as staminodia with doubly-folded anthers; by others as being composed each of three stamens. Hence some have regarded the flowers as triandrous, some as polyandrous, taking into account the adhesion of the stamina, consider them to be *syngenesia, (polyandrophous), or monandrophous. So that while Linnaeus adopted *Monoeccium, Syngenesia* class and order, Turton placed Cucumis in *Monoeccium, Triandria; Smith in *Monoeccium, or Monocotyledonous, Polyandri]; Willdenow, *Pecolocynthis, Monoeccium*; Monocotyledonous, *Polyandria, Triandria*; in *Monoeccium, Monocotyledonous*; while Sprengel, in conformity with his modification of Linnaean system, places it in *Monoeccium, Monandria.*

*2 Kings, iv. 36.*
is rendered wild gourd. To understand the passage referred
s to be remembered that different kinds of gourd are commonly
in the East for shredding into pottages ⁸. Colocynthis was em-
ployed by the Greeks at a very early period. Hippocrates' em-
ployed ἰκ αὐγσα (cucurbita sylvestris, or wild gourd) only in pessaries
against menstruation. Dioscorides' gives a good description
of colocynthis. Pliny' calls it colocynthis.

Bitter Cucumber. 1498

ANY. Gen. Char.—Calyx tubular-campanulate, with subulate
sepals scarcely the length of the tube. Petals scarcely adherent
to each other and to the calyx. Males: stamens five, triadephous.
Females: stigmas three, thick, bipartite. Fruit (peponida) three-to-
seed. Seeds ovate, compressed, not marginate.—Flowers monoe-
or hermaphrodite, yellow (De Cand.)

Bar.—Stem procumbent, somewhat hispid. Leaves cordate-
many-lobed, white, with hairs beneath; the lobes obtuse; the
lobes as long as the lamina. Tendrils short. Flowers axillary,
stalked; females with the tube of the calyx globose, some-
tispid, the limb campanulate, with narrow segments. Petals
Fruit globose, smooth, yellow when ripe, with a thin solid
and a very bitter flesh (De Cand.)

Can.—Annual, white, branched. Stems herbaceous, angular, branched.
Bright green on the upper side, paler and clothed with whitish
underneath. Tendril filiform, branching, opposite each leaf.
five-toothed. Corolla yellow, with greenish veins. Males:
three, short, free; two of which have doubly-bent anthers,
which are not of two anthers; in which case the number of stamens is
five. Females: ovary round, smooth, inferior; style short,
rectangular; stigmas three; filaments without anthers. Fruit (pepo)
the size of an orange, with a thin but solid rind.

—Japan, the sandy lands of Coromandel, Cape of Good Hope,
Nubia, Egypt, Turkey, and the islands of the Grecian Archi-

Cultivated in Spain.

PARATION OF THE FRUIT.—The fruit is gathered in autumn,
ripe and yellow, and in most countries is peeled and dried,
by the sun or by stoves.

MERCE.—Colocynthis is imported from Spain (Almeria, Gibraltar,
Malaga, &c.), Trieste, Smyrna, Alexandria, Mogadore, &c.
es over in cases, casks, boxes, &c. In 1839, duty (2d per lb.)
paid on 10,417 lbs.

DESCRIPTION.—The fruit called colocynth or coloquintida (colocyn-
theim poma colocynthidis) is imported either peeled (generally), or
mes unpeeled. Its pulp (pulpa colocynthidis exsiccata) is nearly
inodorous, light, spongy, porous, tough, intensely and nau-
bitter. The seeds (seminia colocynthidis) are smooth, either
or yellowish white (white colocynth seeds), or brownish (black

⁸ Picture Bible, ii. 226.
⁹ Pages 263 and 265, ed. Flex.
¹ Lib. iv. cap. 178.
colocynth seeds), bitter (especially the dark-coloured ones) and odorous. By digesting them in repeated portions of boiling water and afterwards well washing them, the greater part of the bitterness may be extracted. Two kinds of colocynth, distinguished as Turkish and Mogadore colocynth, are known in commerce.

a. **Turkey Colocynth: Peeled Colocynth.** — This is imported from Levant, Spain, &c. The usual size of each pepo is about three inches in diameter; the shape is more or less globular, varying to the evenness with which the rind has been removed, degree of contraction in drying; the colour is white, or paleish white. One hundred parts by weight are said to consist of 73 parts pulp, and 72 parts seed.

b. **Mogadore Colocynth: Unpeeled Colocynth.** — The pepo of this kind is larger than the preceding, and is covered with a yellowish smooth, firm rind. It is imported from Mogadore in small quantities only, and is principally used by druggists for shew-bottles.

The seeds of colocynth are usually described as white, perfectly dry, and highly nutritious. Captain Lyon* states they constitute an important food in Northern Africa. "The seeds of Cucurbitaceae," says De Cesspron, "do not participate in the qualities of the pulp which surrounds them; bland, demulcent, of an oily nature, and susceptible of easily taking the form of an emulsion." These statements do not apply to Colocynth seeds of which I never found devoid of bitterness; and Hillefeld says a scrub or purged a dog. Heise* found them poisonous.

**Composition.** — In 1817, Braconnot analyzed the watery extract of the pulp of colocynth. The pulp was analyzed in 1818 by Meissner. Vauquelin determined the active principle.

---

**Meissner's Analysis.**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bitter matter (Colocynth)</td>
<td>14.4%</td>
</tr>
<tr>
<td>Extractive</td>
<td>10.6%</td>
</tr>
<tr>
<td>Bitter fixed oil</td>
<td>4.2%</td>
</tr>
<tr>
<td>Resin insoluble in ether</td>
<td>13.2%</td>
</tr>
<tr>
<td>Gum</td>
<td>9.5%</td>
</tr>
<tr>
<td>Bassolin</td>
<td>39%</td>
</tr>
<tr>
<td>Gummy extract (obtained from the ligneous fibre by potash)</td>
<td>17.0%</td>
</tr>
<tr>
<td>Vegetable jelly (pectin)</td>
<td>5.9%</td>
</tr>
<tr>
<td>Phosphate of lime and magnesia</td>
<td>2.7%</td>
</tr>
<tr>
<td>Ligneous fibre</td>
<td>19.2%</td>
</tr>
<tr>
<td>Water</td>
<td>2.9%</td>
</tr>
</tbody>
</table>

**Braconnot's Analysis.**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bitter matter (Colocynth) with resin</td>
<td>14.4%</td>
</tr>
<tr>
<td>Resin</td>
<td>10.6%</td>
</tr>
<tr>
<td>Vegetable jelly (pectin)</td>
<td>4.2%</td>
</tr>
<tr>
<td>Anemic matter</td>
<td>13.2%</td>
</tr>
<tr>
<td>Acetate of potash</td>
<td>9.5%</td>
</tr>
<tr>
<td>Deliquescent salt of potash</td>
<td>39%</td>
</tr>
<tr>
<td>Deliquescent salt of potash not soluble alcohol</td>
<td>17.0%</td>
</tr>
</tbody>
</table>

**Watery Extract of Colocynth.**

---

**Colocynth: Colocynthite: Bitter or Purgative Principle of Colocynth.** By digesting the watery extract of colocynth in alcohol, and evaporating the tincture thus procured, we obtain a mass, composed, according to Vauquelin, of a bitter principle and acetate of potash. A little water readily dissolves this mass, leaving the bitter resinoid matter, to which the name of **Colocynth.**
Bitter Cucumber.

It is a yellowish brown, translucent, brittle substance, dissolving in water, but much more readily in alcohol. The aqueous solution is precipitated by the tincture of galls, and by some metallic solutions (protosulphate of sulphate of copper, and nitrate of mercury).

Chemical Characteristics.—The cold infusion is pale yellow, very bitter; nitrate of mercury, sulphate of copper, and acetate lead, cause in it gelatinous-flocculent precipitates, (pectates?); quinichloride of iron and tincture of nutgalls do not render it turbid. Sordid colocynth gives scarcely any evidence of the presence of such, on mixing it with tincture of iodine and water.

Physiological Effects. a. On Animals generally.—The animals to whom the action of colocynth has been examined, are horses, oxen, sheep, and pigs. On dogs its operation appears to be analogous to that on man. Thus Viborg, states that two drachms caused a dog violent vomiting and purging; and Orfila has shown that three drachms introduced into the stomach (the oesophagus being left) are capable of causing death. It is remarkable, however, that this operation on horses is comparatively slight, at least according to the testimony of Viborg, Bourgelat, and Moiroud. The last-mentioned writer says he has given four drachms to a horse without exciting the least disorder; and he adds that another cucurbitaceous plant (briony) has likewise very little effect on the horse.

b. On Man. —Thunberg tells us that, at the Cape of Good Hope, colocynth fruit is said to be eaten when pickled, both by the hogs and colonists, although it is very bitter. Mr. Dunsterville, Surgeon, of Algoa Bay, formerly one of my pupils, tells me that the colocynth growing there does not possess the least bitterness. Is it nonis Colocynthis?

Colocynth taken in small or moderate doses acts as a very safe and useful purgative. Its operation is not limited to the acceleration of vermicular movements, but is extended to the secreting and excreting vessels of the alimentary canal, whose functions it promotes: moreover, it stimulates the other abdominal organs; and after the action of its bitter acid principle, it not unfrequently proves urticating. In full doses, it operates as a very active and drastic cathartic and hydragogue; but I have never seen any ill effects from its use. These remarks apply to the compound extract, the only preparation of colocynth of which I have personal experience. It would bear, partly from observation in the human subject, and also from experiments of Orfila on dogs, that colocynth is one of those purgatives which exert a specific stimulant influence over the large intestines.

In excessive doses, colocynth, both in powder and decoction, has on several occasions operated as a mortal poison, causing violent vomiting and purging, griping pain, and other symptoms of gastro-intes-
tinal inflammation. A tea-spoonful and a half of the powder (8iss.) has proved fatal 4. In a case related by Orfila 5 besides the preceding symptoms, dimness of sight and sild

rum. In M. Carron d'Annecy's case b the purging was followed by extreme tension and tenderness of belly, suppression of the urine, retraction of the testicles, and priapism. On a post-examination there were found, besides the usual evidences of inflammation of the bowels, traces of inflammation of the liver, and the bladder.

Considered in relation to other cathartics, colocynth will be seen to rank near gamboge, from which it is distinguished by all circumstances: first, its cathartic effect is not the mere result of a topical acrid operation, but, in part, of its specific influence on the bowels; secondly, its action on the large intestine is more powerful than that of gamboge. In the latter property, colocynth resembles aloe; but while it greatly exceeds the latter in its purgative and hydragogue effects, it is devoid of the tonic influence possessed by aloe, when used in small doses.

Uses.—Besides being useful as an ordinary purgative, colocynth is adapted for acting as a stimulus to the abdominal and peri-osteal nerves in cases of torpor or inactivity, and, on the basis of counter-irritation already explained (p. 145), for determining the peristaltic movements of other organs. The objections to its use are acute inflammatory actions of the alimentary canal, diseases of the large intestine, the following are the principal cases in which it is employed.

1. In Habitual Constipation.—As an ordinary purgative for the bowels regular, the compound extract of colocynth is in constant use both among the public and medical men. It operates certainly, and effectually. I am acquainted with individuals who have taken this substance for years, without suffering any inconvenience therefrom. The simple extract is sometimes employed as a substitute, but is less advantageous.

2. In Alvine Obstruction.—In some cases of obstinate constipation with sickness and other symptoms of an extremely irritable state of the bowels, the compound extract of colocynth occasionally proves invaluable. Occupying but a small bulk, it is retained on the stomach, proceeds in producing alvine evacuations, where the ordinary purgatives fail, in consequence of being vomited up. Doubtless, in cases of intus-susception and hernia, even with stercoraceous vomit, it has been incompletely relieved by it. More than once have I seen an operation averted by its use, in those who, in addition to the symptoms, had old herniae, which led the surgeon to suspect obstruc-

tion. A slight degree of abdominal tenderness is not to be regarded as absolutely prohibiting its use. Occasionally the extract is rubbed down with soap and water, and administered as an instillation (see Enema Colocynthidis.)

3. In Diseases of the Brain.—In apoplexy, or a tendency 4

Christison, On Poisons.

Tentative, Gen.

Ibid.
Bitter Cucumber

Analgesia, insanity, violent headache, &c. colocynth is sometimes employed with good effect, on the principle of revulsion or counteraction.

In Dropsey.—In dropsical affections, colocynth has been used as dragogue. But in this country it is less frequently employed for the same purpose; various other hydragogues (especially rhizinus and jalap) being usually preferred. It is sometimes employed as a diuretic, being given in the form of decoction. Hubert used it as a most effectual diuretic in persons of a cold and sluggish habit of body.

In Amenorrhea and Chlorosis.—In some cases of obstructed urination, benefit is obtained by the use of drastic purgatives, like colocynth, which act on the rectum, and, by contiguous sympathy, the uterus.

Administration.—The powder, which is rarely used, may be administered in doses of from two to eight or ten grains, intimately mixed with some mild powder (gum, or starch). The decoction (prepared by boiling 5 j. of colocynth in 5 oz. of water for six minutes, and then adding to Hueland, adding to the strained liquor, 5 j. of the sulphuric ether, and 5 j. of syrup of orange peel) is given in doses of 5 j. three times a day. The tincture (prepared according to the Russian Pharmacopoeia, by digesting 5 j. of colocynth pulp and star-anise in 1 j. of rectified spirit) is given in doses of twenty drops.

Colocynth has been employed iaftaleptically (see p. 148) by Threston. The tincture of colocynth, or twenty grains of the inner mixed with hog’s-lard, were used by way of friction on the new and inner side of the thighs, in disorders of the intellectualions. Diuresis was a common effect. The following are the usual preparations of colocynth.

Tincture. See Elaterium, p. 1509.

EXTRACTUM COLOCYNTHIS, L. E. D.; Extract of Colocynth: colocynth pulp [in pieces, L.] lb. j.; Water [Distilled, L.] Cong. j.; 5 j. wine measure, D. Mix and boil with a slow fire for six minutes, frequently adding distilled water, that it may always fill the same size. Strain the liquor while hot; lastly, evaporate it to a dry consistence, L. The directions of the Edinburgh College are nearly the same, except that the evaporation is directed to be performed by the vapour bath. The Dublin College directs the mixture to be boiled down to four pints, and the liquor filtered while hot; evaporated to a proper consistence. When the decoction is concentrated, it readily gelatinizes on cooling; hence it is necessary to strain it while hot. At Apothecaries’ Hall, the produce of lbs. of pulp is about 65 lbs. of extract.

EXTRACTUM COLOCYNTHIS COMPOSITUM, L. D. Ptilae Colocynthis, E.; Compound Extract of Colocynth. (Colocynth pulp, cut

1 Eberle, Med. Med. i. 119, 2nd ed.
3 Barker and Montgomery, Obs. on the Dub. Pharm.
The aloes used in the process should be purified (by straining by the London College); the necessity of this will be evident to who has ever seen a coals of aloes melted. Should thinner be substituted for the finer kind of aloes, the odour would be lost. The scammony employed should be of the best quality. If the common (i.e. adulterated) kinds be used, the preparation is thereby deteriorated. If the compound be heated into a ball and dropped into water, effervescence on the addition of hydrochloric acid, we may infer that the scammony employed has been adulterated with chalk. If the filtered decoction subsequently is left to stand for a few hours, it becomes blue or purplish on the addition of tincture of indigo. The presence of some starchy substance (as jalap or scammony) may be inferred. The mode of detecting scammony described hereafter (see Gumboge). If colocynth be employed as a substitute for the pulp, the tenacity of the preparation is greatly deteriorated. Some druggists add cardamoms for the powder of the seeds, and by this means the odour of the preparation; but unless some ingredient is added, to compensate for the powder of the seeds, the strength of the preparation would be somewhat less. The preparation is intended in the Pharmacopoeia.

Compound extract of colocynth is a powerful...
SQUIRTING CUCUMBER.

2. COCHICUM MINORES of Galen). The substitute sold under this name at Apothecaries’ Hall, London, is the pilulae colocynthidis, as Ed. without the sulphate of potash.

Colocynth is a constituent of Morison’s Pills.

PILULE COLOCYNTHIDIS ET HYOSCYAMI, E.; Pils of Colocynth Henbane.—(Colocynth-pill mass, two parts; Extract of Hyoscyamus, one part. Beat them well together, adding a few drops of alcohol or wine, if necessary; and divide the mass into thirty-six pills.)

Extract of hyoscyamus diminishes the pain and gripping frequently occasioned from the use of colocynth, but does not injure its expectorant properties. Both Sir H. Halford and Dr. Paris bear testimony to the efficacy of this pill.

ENEMA COLOCYNTHIDIS, L.; Colocynth Glycer.—(Compound act of Colocynth, 3 parts; Soft Soap, 3 parts; Water, 3 parts: Mix, and apply together.)—A useful cathartic enema in obstinate constipation, whether arising from colic, or from other non-inflamatory causes.

MOMORDICA ELATERUM, Linn. L. E. D.—SQUIRTING CUCUMBER.

Ecbalium officinale, Nees & Ebermaier.

Sex. Syst. Monocot, Syngenesia. Linn."

Eponæa recentis, L.—Feculentia of the juice of the fruit, E.—Fructus; Fecula, Folia; D.)

STORY.—The term ἀριθρός (from ἀρχή, I impel or urge forward) was employed by the Greeks to signify, not merely a medicine derived from the σφένδυρος, or wild cucumber (Momordica Elaterium), but also any purgative substance. Hippocrates employed the juice of the plant, as well as ἀριθρός, in medicine, corides minutely describes the method of preparing ἀριθρός by macerating the expressed juice of the fruit, and making it ROCHE. Pliny calls the plant cucumis sylvestris, and gives an account of the method of making elaterium. C. Bauhin terms elaterium cucumis asinus, or assæ cucumber.


Char.—Hispid, rough, glaucous. Stem short, without tendrils.

Leaves cordate, somewhat lobed, crenate-dentate, very rugose on stalks. Fruit ovate, obtuse, hispid-rough, with long pedicel. Seeds chestnut-brown (De Cand.)

Root annual. Stem thick, round, trailing, and branching, obtuse, grayish, and strongly reticulated on the under side; long and bristly. Flowers axillary; the males form racemes or six flowers. Calyx adherent, with five, lanceolate, acute Corolla campanulate, yellow, reticulated with green veins. Stamina three, two of which bear doubly-folded anthers [or] bundles of two anthers each [males: filaments three, sterile style inferior, one celled (sp) three-celled]; style simple, three, bifid. Pepo smooth, pedunculated, grayish covered with soft prickles; ripe separating from its stem expelling, with considerable violence, its brown seeds, and mucus through the apertures of the stalk.

The phenomenon of the expulsion of seeds of this plant has acquired increased interest, from the circumstances of Dutrochet having shown it as one of the effects of endosmosis, which is well known that when two fluids of unequal density are separated by a membrane (animal or vegetable), a double permeation of fluids takes place—that is, each fluid passes through the membrane, and mixes with the other fluid; the current in one is called endosmosis, that in the other osmosis. The instrument employed by Dutrochet in these experiments he called an endoscope; it consists of a bell-shaped glass bottle, bottomless, for example, the lower end by bladder, at the other end a cork, through which passes a tube; or we may have a cork issuing from the side of the tube (Fig. 278).

If syrup be put into the bell, and the bell then immersed in water, a syrup will expel the bladder, while a larger quantity of water is put in; and if mercury be placed in the curved portion of the tube (as in the liquid metal is pushed up. If, on the other hand, the bell contains and is immersed in syrup, the stronger current is from within out; in other words, the stronger current is, in general, from the lighter to the denser fluid. Hence we comprehend why cherries and plums sho
in syrup, but remain plump in brandy: in the first place exosmosis preponderates, because the syrup is denser than the juice of the fruit,—in the second, endosmosis, because the juice is denser than the brandy: the separating membrane is, of course, the skin or epiderm of the fruit.

Now to apply these facts to the phenomena of the Elaterium apple. In the centre of this fruit, and surrounding the seeds, is a very singular variety of organic matter, which appears like thick mucus. It is called by some botanists placenta matter (see fig. 277, c). More external to this, that is, in the tissue of the pericarp, there is another organic liquid, whose density is less than that of the placenta matter. Now these two fluids being separated from each other by membrane, are in the exact condition for the operation of endosmosis; consequently the central cell gradually becomes very much distended (at the expense of the liquid in the tissue of the pericarp), and ultimately gives way at the weakest

named, where the peduncle is articulated with the fruit, and the contents cells are expelled with great violence, from the sudden contraction of the added tissues.

of elaterium.—Some years since Dr. Clutterbuck ascertained that the substance, elaterium, "is neither lodged in the roots, leaves, flowers, nor in any considerable quantity; nor is it to be found in the body of the self, or in the seeds contained within it; it was only in the juice around it, therefore, that it could be looked for," and here it was found.

precise situation of it will be readily comprehended by inspecting a section of the elaterium (Clutterbuck). We observe that the excretion of the pericarp (namely, the epicarp) is furnished with rigid hairs; the epicarp is a whitish sarcocarp, forming what Dr. Clutterbuck terms the pulp, the placenta matter, juice around the seeds (Clutterbuck). It is paler than the sarcocarp, and is red of a very lax tissue, which, as the fruit maturates, takes on, says Aug. ariére, a gelatinous consistence, becomes disorganized, and melts into the centre of the fruit of Momordica Elaterium," says Dutrochet, "contains singular organic substance, and which has no resemblance to any other tissue. It seems to be a green very thick mucus. Viewed by the scope, it appears to consist of an immense quantity of very small globules, presented sometimes confusedly, sometimes so as to form irregular strics. Substance is penetrated by a whitish liquid, by a sort of emulsion, which is the more dense as we observe it at an epoch nearer maturity. This liquid escapes immediately we open the green fruit. By the microscope some almost imperceptible globules which swim in this liquid. At the of maturity this whitish liquid is much more abundant, and at the same much denser; the globules, which it holds in suspension, have become larger."

—South of Europe. Common on rubbish in the villages of and the Archipelago. A few acres of it are annually cultivated cham.

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is to be poured off; it is then to be thinly spread on fine lint to dry in the air to dry; a gentle warmth may be employed without injury, but the heat of sunshine destroys the fine green colour which the spirit acquires." From forty fruits, Dr. Clutterbuck obtained only eleven ounces of elaterium. The elaterium thus procured is of the finest quality, and is white, but the yield is very small.

5. *Process of the British Pharmacopoeias.*—The London Pharmacopoeia specifies the following directions for its preparation:—Slice ripe wild currants in the morning and press the juice, very gently expressed, through a very fine hair-net, and the juice of the thinner part should be discarded. The thinner part being rejected, dry the thicker part with a gentle heat. The Edinburgh and Dublin Colleges are essentially the same.

6. Process Actually Followed.—The following is the process by which I have seen practised at Apothecaries' Hall, London: the berries are removed longitudinally in halves by women, and are then placed in shallow white basins, and put into a common screw press. Apparently a tolerable pressure is obtained in a few minutes only, being removed before all the juice has been expressed. A greenish slightly turbid liquor runs out. When the fruits are in the press they are but very slightly crushed, so that the pressure is not always great. The juice as it runs from the press falls into a hair-screened press, and the juice flows into a cylindrical-lipped glass jar. Here it is allowed to stand for some hours, in which time a greenish feca, or deposit of the juice, has deposited. The supernatant liquor is then carefully poured off, and the thicker liquid at the bottom is filtered through a cloth or filter supported by a cloth one stretched on a wooden frame. The brown (sherry-coloured) liquor runs through, and the greenish deposit is separated off by the filter. The latter is then carefully dried by a stove, and the dried deposit is elaterium. The mother liquor which was poured off from the juice in shallow brown pans, and there left a fresh deposit, which is dried and forms a *paler* elaterium.

After the elaterium has deposited from the juice, the mother liquor subsides, which greatly deteriorates the elaterium, if not been previously separated), and renders it when dry white, and much curled.

The *Theory of the Process.*—Dr. Clutterbuck's...
nearly colourless and transparent. In a few minutes, by exposure to the air, it becomes slightly turbid (milky); white coagula are formed in it. By slow and spontaneous crys-
tals of a rhomboidal figure are perceptible on the examined by a magnifier. These crystals are elaterin. They are formed by the influence of the air on the juice. Elaterium consists essentially of this elaterin contaminated with colouring matter, cellular tissue, and starch, expressed fruit, and mixed with the residue obtained by drying the or above referred to, with which the tissues and elaterin

Elaterium (elaterium: extractum elaterii, seu elaterium, D.) of commerce, is a very variable article.

are distinguished, the English and the Maltese.

Elaterium (Elaterium anglicum) is manufactured at Apo-
Hall, at Mitcham, and perhaps at other places. The finest album, Auct.) occurs in light, friable, thin, very slightly
tes, or flat cakes, or fragments, which frequently bear the
of the paper or muslin on which the elaterium was dried.
els pale, greyish green, which by exposure becomes yellowish.
acrid and bitterish; it has a faint animal odour (not very
to that of ergot of rye), but combined with a fragrancy
inds me of senma or tea. By keeping nine or ten years,
if good elaterium in my museum has assumed a sparkling
2, as if it contained very minute crystals.

tings (elaterium nigrum, Auct.) are sometimes hard, break-
ually, or with a resinous fracture, are much curled, gummy,
oured (brown or olive-green). They are probably pre-
 the juice, after the finest elaterium has been separated.
ium, I have several varieties of this inferior kind, which
sted by Dr. Clutterbuck. One is in the form of a brownish

Clutterbuck states, that of the best specimens of elaterium becaries' Hall, spirit dissolves more than half; while of in-
a fourth part only is dissolved. Mr. Barry* says that the
of elaterium, manufactured by Dr. Clutterbuck's process,

<table>
<thead>
<tr>
<th>Elaterium, manufactured according to Dr. Clutterbuck's process</th>
<th>Dissolved in spirit of Specific Gravity 0·889</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st sample</td>
<td>5·5 grains.</td>
</tr>
<tr>
<td>2nd sample</td>
<td>6·2 grains.</td>
</tr>
<tr>
<td>3rd sample</td>
<td>6·4 grains.</td>
</tr>
<tr>
<td>Hall</td>
<td>6 grains.</td>
</tr>
</tbody>
</table>

Elaterium (Elaterium melitense).—This is imported from

* Paris, Pharmacol.
Malta. It is in much larger flakes than the best English slate and frequently has some adherent paper on which it has been on its colour is much paler, sometimes with hardly a trace of. Some specimens are more friable and softer, and occasional rather chalky to the touch. My specimens are mixtures of and starch; hence they effervesce with acids, and become bluish with iodine. I am assured that Maltese elaterium is mixed, in country, with buckthorn juice, to deepen its colour, and prompt purgative operation.

Composition.—Braconnot analyzed the expressed, boiled, and evaporated juice of the plant. Soon after Dr. Clutterbuck's experiments on elaterium, Dr. Paris analyzed this sub. In 1831, Mr. Hennell published an analysis of it. In 1831, Dr. Derer examined the juice of the fruit growing in Nauplia. Furthermore, the active principle of elaterium was examined by Dr. Morries; and afterwards by Marquart.

<table>
<thead>
<tr>
<th>Dr. Paris's Analysis</th>
<th>Mr. Hennell's Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elaterin</td>
<td>Crystallizable substance (Elateria)</td>
</tr>
<tr>
<td>Bitter matter</td>
<td>Green resin</td>
</tr>
<tr>
<td>Extractive</td>
<td>Starch</td>
</tr>
<tr>
<td>Fuscum</td>
<td>Woody fibre</td>
</tr>
<tr>
<td>Gluten</td>
<td>Saline matters</td>
</tr>
<tr>
<td>Woody matter</td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td>Elaterium</td>
</tr>
</tbody>
</table>

1. Elaterin (Elaterin; Momordicina). Dr. Clutterbuck showed that the active principle of elaterium was insoluble in water, but soluble in alcohol; for he found a watery infusion of eight grains had no effect, while an alcoholic extract in the dose of one-sixteenth of a grain produced copious purging, and often vomiting; and when the dose was increased to a grain the effect was more considerable, and often took place in a minute. The action of these liquids on elaterium led Dr. Clutterbuck to believe that the active principle was of a resinous nature. But the appearance of elaterium contains three principles: elaterin, the green resin; bitter matter. By treating this alcoholic extract with boiling distilled water, the bitter matter is dissolved: the residue (elaterin and green resin) was by Dr. Paris elatin. Dr. Morries, in 1831, separated the green resin and elaterin; though Mr. Hennell seems to have discovered it about the same time. Dr. Morries obtained it by evaporating the alcoholic tincture of elaterin to a consistency of thin oil, and then throwing it into boiling distilled water. Crystalline precipitate was formed, which increased as the liquor cooled, and the precipitate was afterwards purified by a second solution in alcohol and subsequent precipitation by water. Mr. Hennell's process was different. He took the resin from the crystalline matter of the alcoholic extract of elaterin, which took up the resin and left the elaterin; the latter was purified by solution in hot alcohol and subsequent crystallization. Marquart's process is less likely to yield pure elaterin, since he procured it from a preparation by evaporating the expressed juice. Another method (B
SQUIRTING CUCUMBER. 1505

me on the directions of the Edinburgh College, for the determination of the
ess of elaterium, see p. 1506) is to treat the alcoholic extract of elaterium
solution of potash, which takes up the bitter matter and the resin, and
the elaterium. The quantity of elaterin in elaterium is thus stated by
authorities:—

<table>
<thead>
<tr>
<th>100 parts of Elaterium.</th>
<th>Quantity of Elaterin.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prepared according to the London College (Hennell)</td>
<td>44</td>
</tr>
<tr>
<td>Best British Elaterium (Morries)</td>
<td>38</td>
</tr>
<tr>
<td>Worst ditto (Morries)</td>
<td>15</td>
</tr>
<tr>
<td>French Elaterium (Morries)</td>
<td>5 or 6</td>
</tr>
<tr>
<td>Elaterin (Edinburgh Pharmacopoeia)</td>
<td>14 to 25</td>
</tr>
<tr>
<td>Best specimens (Baillie)</td>
<td>33</td>
</tr>
<tr>
<td>Fine sample, prepared at Apothecaries' Hall in 1839, and dried by steam heat (Forcina)</td>
<td>25</td>
</tr>
</tbody>
</table>

These discrepancies must arise principally from the different degrees of good-
samples examined; but partly also from different modes of proceeding-
said that 30 grs. of fine elaterium prepared at Apothecaries' Hall in 1839,
y drying on a steam bath 15 grs. Boiled in repeated portions of rectified
the dried mass lost 18 grs. The concentrated green tincture poured into
liquor potasse (see process of the Edinburgh Pharmacopoeia, p. 1506) ce-
crystals which dried by steam heat, weighed 7-5 grs.

Elaterin possesses the following qualities: it is crystalline, and has a silky
ranceness; the crystals, viewed by a magnifying glass, are observed to be
prisms with striated sides; it is very bitter, but odourless; it is neither
nor alkaline, and is insoluble in water, but soluble in hot alcohol. Mr.
all says it is only very slightly soluble in ether; whereas Dr. Morries states
readily soluble in both ether and fixed oil. It is fusible, according to
fennell, at 350° F. The latter chemist states that it is composed of Carbon
Hydrogen 23-9, and Oxygen 39-2, which nearly corresponds to the formula
2 O.

Dr. Morries says, that at a high temperature it is dissipated in a
white, pungent vapour, having an ammoniacal odour: if so, nitrogen
be a constituent. But neither by the odour, nor by turmeric, can I detect
nia in this vapour. The late Dr. Duncan, of Edinburgh, ascertained
in doses of one-twelfth or one-sixteenth of a grain it had all the effects
of elaterium. "A tenth of a grain," says Dr. Christison, "as I have
witnessed, will sometimes cause purging in man; and a fifth of a grain, in
ses, administered at an interval of twenty-four hours to a rabbit, killed it
ten hours after the second dose." Dr. Golding Bird thinks one-sixteenth
grain a fair dose to commence with: he repeats it every two hours until
effect is produced. It may be taken dissolved in spirits, and by this diffused
in an aqueous vehicle.

GREEN RESIN (Chlorophylle) — Is insoluble in water, but dissolves in
alcohol, ether, and caustic potash. It does not reddish litmus, though from
its solubility in caustic potash its acid nature might be suspected. Some of
pared by Mr. Hennell was tried at St. Bartholomew's Hospital, and found
powerfully as a purgative in doses of less than a third of a grain. Perhaps
might have arisen from the presence of elaterin; for twenty-one grains of
resin yielded four grains of elaterin.

Bitter Matter.—This is soluble both in water and alcohol. Its taste
is intensely bitter: its colour is brownish yellow.

CHARACTERISTICS.—Good elaterium is friable, has a pale greenish-
colour, and an animal odour. Digested in rectified spirit it
is a fine green tincture. Thrown into water it swims. It does
esservesce in diluted hydrochloric acid: the acid liquor being
ed on elaterium, and subsequently rendered nearly neutral by
[H]onia, gives scarcely any cloudiness on the addition of oxalate of

ammonia. Touched with tincture of iodine, it gives no evidence of the presence of starch; though if it be boiled in water, the decoction, when cold, gives traces of starch, by the blue colour developed on the addition of iodine. If the cinder formed by the burning of elaterium in the air be ignited in the outer cone of the flame of a candle, the presence of potash is indicated by the bluish or violet tinge.

Maltese elaterium has no odour, and scarcely any green tinge. Examined by the microscope, it is found to contain globules of wheaten starch. It sinks in water, effervesces with diluted hydrochloric acid, yielding a solution which, when nearly neutralized by ammonia, gives a copious precipitate (oxalate of lime) on the addition of oxalate of ammonia. Tincture of iodine stains it bluish or greenish black (iodide of starch). If the cinder obtained by burning Maltese elaterium in the air be ignited in the outer cone of the flame of a candle, it communicates an orange tint to the flame. The adulteration of elaterium by starch was known to Dioscorides. The Edinburgh College, (1841), gives the following characteristics of genuine elaterium:

"Colour pale-gray: when exhausted by rectified spirit, the solution, concentrated, and poured into hot diluted aqua potassae, deposits, on cooling, minute silky, colourless crystals, weighing from a seventh to a fourth of the elaterium."

In the Edinburgh Pharmacopoeia for 1839, it was stated that elaterium should yield "at least a seventh" of elaterin; and in a first edition of the "Elements," I observe that "these characters are not sufficiently accurate. Good elaterium is pale greenish-gray" and when treated as the College directs, should yield 26 per cent crystals (i.e. elaterin)." It will be seen that the College has not somewhat modified its original statement.

Physiological Effects. a. On Vegetables.—Macaire found a branch of the Momordica Elaterium was speedily destroyed by imersing it in a solution of the extract of this plant".

β. On Animals.—Viborg gave a pound of the fruit of Momordica Elaterium to the horse without any effect. Two and a half pounds of the whole plant (roots, leaves, and stem) also appeared inert.

The only experiments made with the extract of elaterium that I am acquainted with, are those of Orfila on dogs. They are three in number, and prove that this substance is a powerful local irritant, producing death even when it has been applied to the cellular tissue of the thigh, in consequence, as he supposes, of the nervous system being sympathetically affected. Moreover, he concludes, from his own observations, that elaterium exerts a special action on the rectum.

γ. On Man.—The acridity of elaterium in its local operation is well shown by various facts. Pliny truly observes that the juice of the elaterium apple is dangerous when applied to the eye; and De Clutterbuck mentions that some of it "getting accidentally into the eye in one instance, it occasioned severe pain and inflammation.

† Wilm. Wirk. d. Anzeige u. Gifte, Bd. iii. s. 289.
‡ Tor. Gén.
SQUIRTING CUCUMBER.

1507
cysipelatous swelling of the eyelids, that continued till the next day. We have a further proof of its irritant properties in the inflammation and ulceration of the fingers of those employed in the extraction. Swallowed, therefore, it irritates the gastro-intestinal membranous occasions vomiting and violent purging; hence it is called purgative. Fine elaterium, in the dose of 1-8th of a grain, fails to purge violently, and sometimes to vomit. This was noticed by Dr. Clutterbuck, and I can verify his statement from my own observations. Even 1-16th of a grain will generally produce considerable purging.

Elaterium of the shops, however, is rarely so active as this; and known two grains given with no more effect than the pure elaterium excites the secreting and exhalating vessels of the alimental, and thereby occasions very watery stools; hence the term purgative applied to it. In some dropsical cases I have known a dose discharge several pints of fluid by the bowels. The tongue and the increased number of evacuations prove that the patient is not confined to the mucous coat, but is extended to the skin. Under the influence of a full dose, the pulse is excruciatingly weak, the tongue becomes dry, and sometimes furred, and great thirst and thirsted. Occasionally the skin becomes damp under the operatio

Elaterium has been supposed to exert a specific influence over the fetus. Thus Dioscorides and even later writers state that it provokes menses, and is apt to produce the death of the fetus in utero. Elaterium, however, is probably not greater, in its cathartic property, than that of other violent drastics, but powerfully on the large intestines.

Elaterium become absorbed? We have no stronger evidence in favour of the affirmative of this question than that mention of Hippocrates, that the milk of women and goats who have elaterium, or the wild cucumber, possesses purgative properties. More, the accident which occurred to Dr. Robert Dickson, on Botany at St. George's Hospital, seems to prove that elaterium must have taken place by the skin. Dr. Dickson carried a piece of the plant in his hat to his lodgings, in Paris, from the Rue de la Roi. In half an hour he experienced violent headache, fever followed by colicky pain, violent purging, vomiting, and

1erred with respect to other cathartics, we find it pre-eminent distinguished by the violence of its purgative effect. Croton approximates to it. Its hydragogue operation exceeds that of not all other, ordinarily used drastics.

The principal use of elaterium is to excite watery evacu-

\[a\] Enquiry, lib. vi. sect. 9.

\[b\] Jour. de Chim. Med. iv. 61.
ations in dropsy, by which a two-fold effect is to be hoped for: first, absorption of the effused fluid; secondly, the stoppage of further effusion in consequence of the metastasis of vital action, the seat of the dropsy to the intestinal membrane. In dropsy dependent on, or accompanied with, disease of the kidney, the excretion of water from the bowels is much to be preferred to the excretion of stimulating diuretics which may add to the severity of the malady. Of the violent hydragogue purgatives, elaterium is to be the most useful in dropsy. It evacuates more watery flux than the others; while, if it be good, its operation may be relied on is objectionable where there is great debility, and where any inflammatory or other disease of the bowels exists. I have seen the termination of dropsy apparently accelerated by the use of elaterium. A dropsical patient, much debilitated, took, by order of his physician, a dose of elaterium, which caused excessive alvine evacuation, exhaustion, sinking of the pulse, syncope, and death. There was no contra-indication to the use of elaterium except a case of hypercatharsis and maniacal delirium were produced by the prolonged use of elaterium; the delirium, however, went off in a few hours. Some tonic (usually gentian) is commonly conjoined with elaterium. Thus a pill composed of elaterium and extract is frequently employed; or we may exhibit infusion of on alternate days with the elaterium. Where there is a feverish condition of the system, and also where there is an irritable or inflamed condition of the alimentary canal, elaterium is inadmissible best adapted for cold phlegmatic constitutions. Sydenham recommended elaterium in dropsy. Afterwards Lister, Heberden, Clutterbuck, and other experienced practitioners, bore testimony to its exceeding great efficacy. But judging by the commendation, all of them, except the last-mentioned writer, have been unaware of the great activity of the medicine when used in cases of cerebral affections, such as apoplexy, or a tendency (manifested by sleepiness, stupor, or giddiness), mania, &c., &c., as a drastic purgative, sometimes proves serviceable on the principle of counter-irritation or revulsion (see p. 145).

2. In obstinate constipation from sluggishness of the intestine, elaterium is occasionally useful. But care must be taken to ascertain that the constipation does not depend on any marked impediment (as hernia, intus-susception, &c.) to the passage of the feces.
A combination of elaterium and opium has been found to be effective in gout (see p. 945).}

**I.**—The dose of good elaterium is from one-sixth to one-half of a grain. I have repeatedly seen elaterium, and have always observed a quarter of a grain of good elaterium acted very powerfully, sometimes bringing away several pints of fluid; and half usually occasioning vomiting, as well as violent purging. I should not venture to exhibit a grain of the same preparation usually given in the form of pills. The basis of the pills is usually given in the form of pills. The basis of the pills is usually given in the form of pills.

**II.**—In the event of a case of poisoning by elaterium, the would be demulcent drinks and clysters, opium, the warm fomentations to the abdomen; stimulants (such as ammonia) if the circulation fail; bloodletting to subdue the inflammatory symptoms, should the state of the general system not contravene the principles of treatment.

### DIETETICAL, MEDICINAL, OR POISONOUS CUCURBITACEAE.

Some of several cucurbitaceous plants are employed as articles of food. (Cucumis sativus) the Melon (Cucumis Melo), the Watermelon (Cucumis Citrullus), the Vegetable Marrow (Cucurbita pepo), and the Melon-Pumpkin or Squash (Cucurbita pepo), are those in most frequent use. They contain a sweet or acidulous cooling pulp, which is slightly nutritious when taken; also some habits proves laxative.

The root of Bryonia dioica is sold by herbalists under the name of mandrake root (see p. 1250). Fashioned into a rude representation of a human figure, I have seen it exhibited at an herb-shop as a sign. It contains a peculiar bitter matter called bryomin. The root operates as a strong stomachic and purgative. I have seen one case of poisoning by it. The symptoms of cholera. As the accident occurred at the time when this drug was in common use, the practitioner who was called in concluded it was a case of poisoning by some other substance. The patient (a woman) recovered. It is employed as a topical application to bruised parts.

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* Also Sutton, *Tracts on Gout*, p. 281.
ORDER LVII.—MYRTACEÆ, R. Brown.—THE MYRTLE TRIBE.

Characters.—Sepals four—six, generally five, concreted into a tube, which is adnate to the ovary, sometimes distinct at the apex, and as far as the apex of the ovary, at other times concreted at the apex, and as far as the third. Petals inserted on the calyx, as many as the sepals with which they alternate and quincuncial in estimation, very rarely absent. Stamens inserted within petals, often in many rows, double, or generally many times the number of petals; filaments either free or variously all connected or polyadephous, with flowering somewhat incurved; anthers ovate, bilocular, small, dehiscing by double chink. Carpella four—six, generally five, by abortion often fewer, concreted into a many-celled ovary, which is adnate to the calyx. Style, composed of many partial styles, concreted, and, therefore, called single, with a single stigma. Fruit various, many-celled, many-seeded. Seeds various; embryo exalbuminous (De Cand.)—Trees or shrubs. Leaves generally opposite, rarely alternate, exstipulate, quite entire, dotted with pellucid glands, usually with a vein running parallel with their margin. Inflorescence variable; usually axillary. Flowers red, white, occasionally yellow or blue.

Properties.—Aromatic volatile oil and astringent matter (especially the former) are the principles to which the medicinal properties of Myrtacées are attributed. The pellucid dotting of the leaves and other parts indicates volatile oil.

1. MELALEUCA MINOR, Smith, L. E.—THE LESSER MELALEUCA

Melaleuca Cajuputi; Maton; Roxburgh.

Sex. Syst. Polyadelphus, Icosandria.

(Oleum et foliis destillatum, L.—Volatile oil of the leaves, E.)

History.—This tree was described by Rumphius under the names of Arbor alba minor, Cajuputi, Dany kitsji, and Cajee. It has got its name from its colour kaju-puti, which signifies red wood, and hence its appellation, as given to it by Rumphius, arbor alba.

Botany. Gen. Char.—Tube of the calyx almost hemispheric, limb five-partite. Petals five. Bundles of stamens five, elongated, alternate with the petals; anthers incumbent. Style filiform; stigma obtuse. Capsule connate with, and enclosed in, the thickest tube of the calyx, which is adnate at its base to the branch: the seeds, many-seeded. Seeds angular (De Cand.)—Trees or shrubs. Leaves alternate or opposite, quite entire, equal at the base. Florets sessile, or somewhat adnate, spiked or capitulate, white, yellowish, purplish.

Sp. Char.—Leaves alternate, elliptical-lanceolate, somewhat more or less slightly falcate, three-five-nerved. Flowers spiked, rather densely. Rachis, calyx, and branchlets, villose (De Cand.)

* Herb. Ambigum, lib. ii. p. 76.
tolerably erect, but crooked: bark thick, spongy, whitish, the exterior lamina peeling off in thin flakes. Branches, often drooping. Leaves short-stalked, while young silky, l grown smooth, deep green, from three to five inches long, half to three-quarters of an inch broad, very aromatic when spikes terminal. Bracts solitary, lanceolate. Calyx. Corolla white. Filaments from thirty to forty, united portions at the base: anthers with a yellow gland at the style rather longer than the stamens; stigma obscurely three-vary ovate, united to the calyx. Capsule three-valved ".

Moluccas.

Action of the Oil.—Rumphius states that the leaves are on a warm day, and placed in a sack, where they become damp. They are then macerated in water, and left to ferment, and afterwards submitted to distillation. Two of the leaves yield scarcely three drachms of oil, which is yellow, and volatile. Lesson has described the method of distilling the oil at Boureau, one of the Molucca islands. The leaves are gathered in the latter end of September, and put in a copper alembic, surmounted by a neck, termina capital without a refrigeratory, and a sufficient quantity of water is then added. By distillation, this liquid is made to traverse, immersed in a hogshead filled with water, and is collected in the oil which floats is very light, and of an herbaceous odour, which is owing to chlorophyll, or perhaps a somewhat resinous principle. By rectification it becomes colourless.

Preparation.—Cajuput or Kyapootie oil (oleum cajuputi) is usually in green glass bottles (in appearance similar to long-necked jugs). Its colour is green, the tint being that of a strong solution of copper. It is transparent, limpid, of a strong pene- nneal, resembling the combined odour of camphor, rosemary, amom, and of an aromatic camphoraceous taste, succeeded sation of coolness like that caused by oil of peppermint. In the odour is disagreeable, but in small quantity, as when in the hand, is much more fragrant. An apparently pure which has been several years in my museum, has a sp. gr. of Dr. Thomson states, the sp. gr. varies from 0.914 to 0.9274: c. Brande states it to be 0.980. Oil of cajuput is soluble in water. When carefully distilled with water, the first portion of oil is very light, and quite colourless; but towards the end the process, a heavier and greenish oil distils over.
Composition.—According to Blanchet the composition of oil cajuput is as follows:

<table>
<thead>
<tr>
<th></th>
<th>Atoms</th>
<th>Eq. Wt.</th>
<th>Per Cent.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon</td>
<td>10</td>
<td>60</td>
<td>77.01</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>9</td>
<td>9</td>
<td>11.39</td>
</tr>
<tr>
<td>Oxygen</td>
<td>1</td>
<td>8</td>
<td>9.59</td>
</tr>
<tr>
<td>Cajuputi Oil</td>
<td>1</td>
<td>77</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Adulteration.—M. Guibourt detected in several samples of cajuputi, oxide of copper in solution. It is, he says, easily recognized by shaking the oil with a solution of ferrocyanide of potassium, when a red precipitate (ferrocyanide of copper) is formed. To this M. Guibourt ascribes the green colour of the oil. His conclusion, however, was somewhat premature; for all the samples of the oil which I have examined were, though green, quite devoid of copper; and Mr. Brande observes, that none of the samples which he has examined have contained even a trace of copper.

In 1831, oil of cajuputi was extolled as a remedy for cholera, a consequence of the great demand for it, which was thereby created, the price rose from two to fourteen shillings per ounce; and various imitations of it soon made their appearance in the market. Of these consisted of oil of rosemary flavoured with camphor and cardamom, and coloured. Except on this extraordinary occasion the oil of cajuputi met with in the shops of this country, I believe to be pure as imported.

Physiological Effects.—Cajuput oil is a powerful antispasmodic, diffusible stimulant and sudorific (see p. 184). From the oils of the distilled oils (as those of the labiate plants and umbelliferous herbs) it is distinguished by its stronger influence over the nervous system (evinced by its antispasmodic qualities) and by the greater diffusibility of its stimulant operation. It is allied to valerian (p. 1367), between which and camphor (p. 1153) it ought perhaps to be placed in physiological classification; but in large doses, it does not disturb the mental faculties as these two medicines do.

Uses.—Cajuput oil has acquired considerable celebrity among Malays; and has been more frequently employed in Germany than any other European nation. By British practitioners its use hitherto has been very limited. As a diffusible stimulant it is useful where we wish promptly to raise the energy of the vital powers, especially when at the same time any spasmotic movements are to be allayed. With these views it has been employed in low fevers, putrid affections, and cholera. In the last-mentioned disease

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* Quoted by Thomson, op. cit.
CLOVE-TREE.

In ephemeral reputation, in consequence of the favourable Sir Matthew Terney, and others. * As an antispasmodic, y efficacious remedy, in painful spasmodic affections of the and in flatulent colic; but of its uses in epilepsy, chorea, tetanus, spasmodic asthma, and some other spasmodic in which its efficacy has been extolled by oriental and contracturers, I have no experience. * As a stimulating sudoriffic occasionally useful in chronic rheumatism. * As an exudant, it is probably scarcely superior to most other volatile has sometimes been applied to a carious tooth, to relieve and mixed with olive oil, has been used as a stimulating in chronic rheumatism, painful affections, local paralysis, an anthelmintic, it was used by Rudolphi.

Illustration.—The dose of it is from two to ten, or even more, may be taken on sugar, or in the form of an emulsion.

**AYOPHYLLUS AROMATICUS, Linn. L. E.—CLOVE-TREE.**

Engelmania caryophylla in. Thunberg. D.

Sex. Syg. Icosandria, Monogynia.

A explicati, exsiccati; Oleum & floribus distillatum. L.—Dried undeveloped flower; of the undeveloped flowers, Et.—Flores nodum explicati, et Oleum volatile, D.)

Y.—The *garyophyllum* of Pliny * cannot have been our that naturalist describes it as being like a peppercorn, and more brittle. Indeed it is not certain who first speaks re. Paulus Egineta * notices καρυόφυλλον, and, I think, pross to the clove; though Sprengel * regards Simeon Seth as tho mentions cloves.

1. Gen. Char. — Tube of the calyx cylindrical; limb four-Petals four, adhering by their points in a sort of calyx. distinct, arranged in four parcels, inserted in a quadrangular row near the teeth of the calyx. Ovary two-celled, each containing twenty ovules. Berry, when ripe, one- or two-celled, two-seeded. Seeds cylindrical or semi-ovate: cotyledons by, concave externally, sinuous in various ways internally; rising from the centre of the cotyledons, straight, superiorly by the cotyledons. — Trees. Leaves opposite, coriaceous, Cymes terminal or in the forking of the branches; somewhat (De Cand.)

—Leaves obovate-oblong, acuminate at both ends. Cymes (De Cand.)

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5 *De Re Medica* lib. vii. cap. iii.

6 *Hist. Rei Herb.* i. 217.
Trunk from 15 to 30 feet high. Its branches are about four inches long, with a strong rib and parallel lateral nerves; foliage slender, aromatic; almost two inches long. Flowers odorous. Calyx at first green, afterwards purplish-red. Petals larger than the calyx, imbricated in a compact globe in bud, at length spreading, ovate-elliptic, concave, yellowish-red, vestigial and caducous. In the centre of the calyx and occupying the top of the ovary is a short, quadrangular elevated line (or girdle) surrounded, but not embracing, the ovary, obtusely subulate. Filaments much longer than the ovary, two-celled. Ovary oblong, cylindrical. Berry purplish, one-seeded. Seed with a thin, smooth coat; embryo elliptical, greenish, dotted (Condensed from Hooker, Bot. Mag. t. 2749.)

Hab.—Molucca Islands; where, as well as at Sumatra, Bourbon, Martinique, St. Vincent’s, &c., it is now extensively cultivated. The short-sighted and selfish policy of the Dutch has prevented the cultivation of the plant to the Molucca Islands, has, in fact, completely failed.

Collection.—Clove is collected by the hand, or by beating the reeds, so as to fall upon cloths placed under the tree, and catching in the sun.

Commerce.—They are imported in casks or bags. They are produced in the Molucca Islands usually come by way of R. In 1839 duty (6d. per lb.) was paid on 93,549 lbs.

Description.—The clove of commerce (Caryophyllus) is a panned flower, the corolla forming a ball or sphere at the base of the four teeth of the calyx, and thus with the tapering what quadrangular tube of the calyx, giving the appearance (whence the word clove, from the French clou, a nail). The tube of the clove is from five to ten lines; its thickness from one and-a-half lines. Its colour is dark-brown with a yellowish sheen, the corolla somewhat deeper. Good cloves should be dark and perfect in all parts, have a strong fragrant odour, and are easily visible, and when slightly pressed with the nail, give out an oil and are distinguished in commerce by their place of growth. The cloves of the East Indies (Ambroyna and Bencoolen clvees) are the best, and are the largest, plumpest, and most oily. The Bencoolen clove

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Clove-tree.

Clove-tree.

Steemed. Cloves produced in the French possessions (Bourbon yenne cloves) are smaller, more shrivelled, contain less oil, and inferior value. The Cayenne clove is the least esteemed.

Under the name of Mother cloves (matricae Caryophylli seu anthophylli) are described, in several authors, the fruits of the clove (fructus Caryophylli aromatici) which have been occasionally introduced as articles of commerce, and a sample of which has been preserved in the collection of the East India House. On the 8th of Feb. 1841, five bags of mother cloves were put up for sale in London. They have the shape of an olive, than which they are smaller. Superiorly they are crowned with the four teeth of the calyx, with the remains of the style in the centre. Their colour is similar to that of the clove: their odour and flavour similar, but much weaker. Internally we find the embryo with its two sinuous cotyledons.

Clove. The broken peduncles of the clove (clove stalks; griffe de girafe) are sometimes substituted by distillers for cloves (Guibourt).

Position.—Clove were analyzed by Trommsdorf, who found to consist of, volatile oil 18, almost tasteless resin 6, peculiar tannin 13, difficult soluble extractive with tannin 4, gum 13, fibre 29, and water 18.

Latile oil (See p. 1516.)

Genin (Stearoptene of Oil of Cloves).—This was found in oil of cloves by e. It is in thin, white, pearly scales, which become yellow by keeping soluble in alcohol and ether; has the odour and taste of cloves, but and is reddened by nitric acid. According to Dumas, its composition is 72-25, Hydrogen 7-64, Oxygen 20-11; or C_{20}H_{18}O_{4}.

Caryophyllin (Clove sub-resin).—First described by Lodibert, and after examined by Bonastre. It is extracted from cloves by alcohol. The a clove yield the largest quantity of it; those of Bourbon contain less.

Cayenne cloves none. It is a satiny, crystalline, odourless, tasteless, and volatile substance; insoluble in water, soluble in alcohol and ether; so in caustic alkalis. It is reddened by sulphuric acid. According as it is composed of Carbon 79-5, Hydrogen 10-5, Oxygen 10-0; hence its is C_{20}H_{18}O_{4}; so that its composition is similar to that of camphor.

Glove-tannin.—The tannin of cloves is less acerb than ordinary tannin, compound with gelatine has less elasticity.

Chemical Characteristics.—Nitric acid reddens infusion of Tincture of sesquichloride of iron renders it blue. The oil also undergoes similar changes to the infusion. These facts especial attention in relation to opium and morphia (see ) on account of the analogous phenomena presented by morphia acted on by nitric and sesquichloride of iron. Infusion and tincture are similarly affected.

Biological Effects.—Clove have a very agreeable flavour, and are devoid of the fiery taste and acridity which disspice and pepper and ginger; in other respects their effects agree with
those of other spices (see p. 181). Though volatile oil is by far the most important of their active principles, yet the tannin, extractive, and resin, must contribute something to their operation.

Uses.—Clove are principally used for culinary purposes, as flavouring ingredients. They are not employed in sufficient quantity to prove of much importance as condimentary stimulants, yet they are applicable as gastric excitants, in dyspeptic cases connected with relaxation of the alimentary canal. In medicine clove are rarely employed alone, or as the basis or principal medicine, but usually as an addition to other medicines, the flavour of which they improve, or whose operation they correct. When, however, they are given alone, it is merely as a stomachic and carminative, to relieve nausea, vomiting, flatulence, or some allied stomach disorder. Distillers prepare a liquor called clove.

Administration.—In substance clove may be taken in doses of five or ten grains, or ad libitum.


2. Oleum Caryophylli, L. E.; Oleum Eugenie Caryophylla, D. Oil of Clove. — (Obtained by submitting cloves, with water, to repeated distillation).—No directions are given by the London and Dublin Colleges for the preparation of oil of clove, which is placed by them among the articles of the Materia Medica.

To extract the whole of the oil from clove, they must be subjected to repeated coucherations. On an average they yield from 17 to 20 per cent. of volatile oil (including the heavy and light oils). By distillation with water, clove yield two volatile oils—one lighter, the other heavier, than water. Mr. Whipple informs me, that by the ordinary modes of distillation the heavy oil comes over first. The oil of clove of commerce is a mixture of these two oils. When carefully and recently prepared it is colourless or light-yellow, but on keeping becomes brownish-red. It has a hot, acrid taste, and the well-known odour of clove, and is soluble in alcohol, ether, concentrated acetic acid, and the fixed oils. Its sp. gr. is probably variable though always greater than that of water. Lewis found it to be 1.034. Bonastre² says, that of the unrectified oil is 1.035, but by rectification part of the light oil is lost, and the sp. gr. is then 1.081. Ettling⁵ says its composition is, Carbon 74*6279, Hydrogen 8*1531, and Oxygen 17-2189. To separate it into the two ols he mixed it with potash ley, and distilled: a light oil passed over, while a

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⁵ Foggerides's Annales, xxxi, 226.
the heavy oil (clove acid) and potash remained in the retort, distillation with phosphoric or sulphuric acid, gives out the

Oil of Cloves (Clove Hydro-Carbon).—Colourless. Sp. gr. Incapable of combining with bases, but absorbing hydro-
acid gas without yielding a crystalline compound. It con-
C\(^{10}\) H\(^{8}\); hence it is isomeric with oil of turpentine (see

Oil of Cloves (Clove Acid; Caryophylic Acid; Eugenic

It is colourless when recently prepared, but becomes co-
ong. Its sp. gr., according to Bonastre, is 1·079. It com-
h alkaloids to form crystalline salts (alkaline caryophyllates or
; clove-oil alkaloids). If a salt of iron be added to one of
yields a blue, violet, or reddish compound (a ferruginous
late), varying somewhat according to the nature of the fer-
salt used: thus the protosulphate of iron yields a lilac, the
ite a red, which becomes violet and afterwards blue: while
ichloride gives a vinous tint, which turns to red (Bonastre).
d redens caryophylic acid.

Composition of caryophylic acid is as follows:

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<td>199</td>
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The statement does not agree with that of Dumas, who from his first

gave the formula C\(^{20}\) H\(^{18}\) O\(^{3}\); and from his second one\(^{3}\),

\(\text{Caryophylic Acid} = 
\text{Cloe Acid} = 199\text{ mol. wt. = } 100\text{%}
\),

But various reasons, not necessary here to enumerate,
believe that Etling’s formula is the correct one, supported
by Boeckmann’s analysis and by Dumas’s statement, that the

the vapour of caryophylic acid is 6·4\(^{\circ}\).

of cloves is sometimes placed in the hollow of a carious
relieve toothache; but its more frequent medicinal use is
ition to purgatives (e.g. pilulae colocynthidis, E.) to check
and griping.—The dose of it is two to six drops. Distillers
makers extensively use oil of cloves.

TURA CARYOPHYLLI: Tincture of Cloves—(Closes, 3; Rec-
rit, 3iv. Macerate for seven days, and then filter).—Though
ained in any of the British pharmacopoeias, this is a very
d elegant preparation, and has a place in the French Codex.

n of the oil in spirit is less agreeable, and becomes milky
addition of water.—Dose, 1\(\text{mL} \times \) to 1\(\text{mL} \). It may be usefully
as an addition to purgative, stomachic, and tonic mix-

\(^{4}\) Ibid.; also Thomson’s Org. Chem. p. 1046.
3. EUGENIA PIMENTA, De Candolle, E.—THE COMMON ALLSPICE
(Myrthus Pimenta, Linn. L. D.)

Sex. Sepal. Icosandria, Monogynia.
(Bacca immature exsiccatà, L.—Unripe berries, E.—Fructus, D.)

History.—It is scarcely probable that the ancients should have been acquainted with allspice, which is a native of the West Indies, and therefore could not have been known to Europeans before the discovery of America. Yet Clusius* thought that it was the *phyllon* of Pliny†; an opinion, however, which, for the above-mentioned reason, can scarcely be correct‡.

Botany. Gen. Char.—Tube of the calyx roundish; limb as far as the ovary, into four segments. Petals as many as the petals of *Stamens* indefinite, free. Ovary two- or three-celled; cells containing many ovules. Berry nearly globose, crowned by the calyx when ripe, one-, rarely two-celled. Seeds one or two, somewhat rounded, large; embryo spuriously monocotyledonous; coat very thick, combined into one mass; radicle scarcely distinct from the short (De Cand.)—Trees or shrubs.

Sp. Char.—Peduncles axillary and terminal, trichotomous and alternate. Flowers four-cleft, in the forks of the peduncle, nearly as long as others paniculate. Leaves oblong or oval, pellucid-dotted, sub-opaque, smooth. Branches terete; branchlets compressive or slender; younger ones, as well as the pedicels, pubescent (De Cand.).

Trunk about 90 feet high. Leaves about four inches long; short foot-stalks. Flowers numerous. Sepals roundish. Perianth reflexed, greenish-white. Berry succulent, black or dark-purple when ripe; two-seeded. Embryo roundish, with the cotyledons united.

Hab.—West Indies. It is cultivated in Jamaica in regular (Pimento walks).

Collection.—When the fruit has attained the full size, but is green, it is gathered and sun-dried on platforms and sheets. Nearly dry it is frequently winnowed. It is afterwards put into bags of 100 cwt. each, for the European market. Some plants are dried in their natural state.

Description.—Pimento or Jamaica pepper (pimenta sancta jamaicensis), commonly called allspice (because its flavour resembles that of cinnamon, cloves, and nutmegs), is the size of, or somewhat larger than, a peppercorn. It is brown, dull, roughish but not wrinkled, crowned with the remains of the calyx, and occasionally, though rarely, has a short stalk. It consists of an external, somewhat hard but brittle shell, v

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* Exotic, lib. i. cap. 17.
† Hist. Nat. lib. xii. cap. 13, ed. Valp.
‡ Sloane's Jamaica, ii. 77.
§ Condensed from Botanical Magazine, t. 1256.
* Wright, Med. Plants of Jamaica; Brown, Nat. Hist. of Jamaica, 38.
thin, and encloses two dark brown cochleate seeds. Allspice aromatic agreeable odour (intermediate between pepper and and a strong aromatic clove-like taste.

PIMENTO (Brazilianischer oder Kron-Piment, Dierbach; Piment cou-
Poivre de Thevet, Goubourt).—This is the fruit of Myrtus pimentoides,
Schenck, called by De Candolle Myrcia pimentoides, a native of the
iles. Except in shape, it strongly resembles the common allspice. It
or oval, terminated superiority by a large crown, formed by the five-
imb of the calyx. It is usually two-, more rarely three- or four-celled,
containing one seed. Goubourt has always found three, four, or six
ach fruit. In the only sample I have seen, and which came from St.
, there were in most of the fruits only two seeds.

VERSE.—Pimento is imported in bags, usually from the West
almost entirely from Jamaica). In 1839, duty (9d. per lb.) was
277,185 lbs.

OSITION.—Pimento was analysed by Braconnor, and in 1825
aastre.

Bonastre's Analysis.

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Braconnor's Analysis.

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<tr>
<td>Wax, with red colouring matter</td>
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<tr>
<td>Gum</td>
<td>6 0</td>
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<td>Nitrogenous matter</td>
<td>5 0</td>
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<td>Citrate of Potash</td>
<td>6 0</td>
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<td>Phosphate of Potash and loss</td>
<td>3 4</td>
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<tr>
<td>Insoluble matter</td>
<td>6 7 8</td>
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</table>

LATILE OIL. (See 1520.)

EN OIL (Resin?) This substance, which has an acrid burning taste,
to the activity of pimento. Its odour is rancid, but somewhat clove-
dissolves readily in alcohol and ether, to which it communicates a
our.

ENTO-TANNIN.—Is soluble in alcohol, strikes a green colour with the
of iron, and precipitates emetic tartar.

ICAL CHARACTERISTICS.—See Chemical Characteristics of
p. 1515.

IOLOGICAL EFFECTS.—Allspice possesses the general proper-
he species already noticed (p. 181). It holds an intermediate
between pepper and cloves.

* Hist. des Drog. ii. 351.
* Prodr. iii. 543.
* Duncan, Edinb. Dispens.
3. **EUCHEA PIMENTA, De Candolle, E.**—**THE**
(Myr'tus Pimen'ta, Linn. L. D.)

Sex. Spet. Icosandria, Monogynia (Bacce immature exsiccata, L.—Unripe berry)

**History.**—It is scarcely probable that we have been acquainted with allspice, which is, and therefore could not have been discovered in America. Yet Clusius' phyllon of Pliny—; an opinion, however, more reasonable, can scarcely be contested.

**Botany.** Gen. Char.—'Tube as far as the ovary, into four sepals, indefinite, free. Originating many ovules. Berry yellow when ripe, one- or rarely two-lobed, large; embryo very thick, combined into short (De Cand.)—Tree

Sp. Char.—Peduncles fragrant. Flowers four-cleft. Petals others panicleate. Pedicellus, calyx and corolla, fragrant. It is opaque, smooth. Petals become reddened by herbaceous nature, and younger ones, as well as all acted on by it.

Trunk about 9 in. (Pimentic Acid)—short foot-stalks of Stamen, with the alkalis, crystalled, greenish, which become blue or greenish; ripe; two-seed, made of iron (owing to the foul, dated). Nitric acid acts violently on it.

Hab.—Wood and leaves (Pimento used in all uses of the oil of pimento as employed to relieve tooth-ache, to continue green, it cures, as purgatives and tonics, and is nearly cl pimentæ. The dose of it is from two to 100 cts.

Dry it. **GRITUS PIMENTA, L. E. D.; Spirit of**

Dry. (Pimento, bruised, fijss. [fij. D.]; jam fijss., D.) Water, Oj. [sufficient to provide the Edinburgh College directs half a pound of balsam, and to proceed as for spirit of caraway

**3. AQUA PIMENTA, L. E. D.;** Pimento Water
(Pimento, bruised, lb. j. [lb. ss. D.]; or Oil)

[Proof Spirit, fijvij. L.; Rectified Spirit, fijij. (sufficient to prevent empyreuma, D.) Mix, a. The Dublin College macerates first for two...

...
The inspissated juice of the leaves of a plant native of Aus-
tinea is usually prepared with the oil.

...
Uses.—Its principal employment is by the cook, for flavouring dishes; it may be taken with advantage by those troubled with relaxed sthomas tic conditions of stomach. In medicine, its uses are similar to those of cloves; viz., to relieve flatulence, to cover the flavour of nauseous remedies, and to promote the operation of tonics and stomachics, and to prevent the griping of purgatives.

Administration.—In substance, allspice may be taken in doses from ten grains to a drachm or more.

1. Oleum Pimenti, L. E. D.; Oil of Pimento; Oil of Allspice (Obtained by submitting allspice, bruised, with water, to distillation. Mr. Whipple informs me that from 8 cwt. of pimento he procured 41 lbs. 6 oz. of oil (heavy and light). This is nearly six per cent. He also informs me that the light oil comes over first,—the remark being the case with oil of cloves (see p. 1516). The oil of pimento in the shops is a mixture of these two oils. Except in odour, its properties are almost identical with those of oil of cloves. By distillation with caustic potash, the light oil is separated; the residue, mixed with sulphuric acid and submitted to distillation, gives out the heavy oil.

a. Light Oil of Pimento (Pimento-Hydro-Carbon).—Has not, to my knowledge, been previously examined. Its properties appear to be similar to those of the light oil of cloves. It floats on water and dissolves in alcohol and potash, and is slightly reddened by nitric acid. Potash and alcohol separate in a scintillating mixture, and it is scarcely if at all acted on by it.

b. Heavy Oil of Pimento (Pimentic Acid).—Very similar to carminic and phyllinic acid. It forms with the alkalis, crystalline compounds (kaline pimentates) which become blue or greenish on the addition of a little water, and turn the tincture of chloride of iron (owing to the formation of a ferrous pimentate). Nitric acid acts violently on and reddens it.

The medicinal uses of the oil of pimento are very limited. It is sometimes employed to relieve tooth-ache, to correct the operation of other medicines, as purgatives and tonics, and to prepare the spirit and aqua pimenta. The dose of it is from two to six drops.


The Edinburgh College directs half a pound of bruised pimento to be used, and to proceed as for spirit of caraway [see p. 1446]. Cinematin and stomachic. Used in dyspepsia, and flatulent colic.

Dose, f3j. to f5iv. In the shops, a spirituous solution of the oil is frequently substituted for the pharmacopoeial preparation.

3. Aqua Pimentei, L. E. D.; Pimento Water; Allspice Water (Pimento, bruised, lb.j. [lb.ss. D.]; Oil of Pimenta 3ij L; Proof Spirit, f3vij. L.; Rectified Spirit, f3vij. E.]; Water, Cons. [sufficient to prevent empyrema, D. ]; Mix, and let a gallon distil. The Dublin College macerates first for twenty hours.)—Carminic...
OTHER MEDICINAL MYRTACEÆ.

A substance called Botany Bay Kino is the astringent inspissated juice of Eucalyptus resinifera or Iron Bark, a native of Australia and Van Diemen’s Land. This tree, we are told, sometimes yields on incision sixty gallons of juice. Botany Bay kino is imported in boxes. That which I have met with came from Van Diemen’s Island. It occurs in irregular odourless masses, many of which are in the form of tears, somewhat resembling those of cherry-tree gum in form, and as large as the tears of Senegal gum. The purer pieces are vitreous, almost black in the sun, but transparent, and of a beautiful ruby-red in small and thin fragments. Some of the pieces, however, are opaque and dull, from the intermixture of wood and other impurities. When chewed it sticks to the teeth, and has an astringent taste. Digested in cold water it swells, becomes soft and gelatinous (like red-currant jelly), and yields a red liquid which reddens litmus, and yields precipitates with lime water, gelatin, acetate of lead, sesquichloride of iron, and, if caustic potash or ammonia be previously added, with the chloride of calcium. Alcohol and emetic tartar occasion no precipitate. Digested in rectified spirit, Botany Bay kino becomes gelatinous, as with water, and yields a similar red solution, from which water precipitates nothing, but which reddens litmus, and deposits a copious precipitate when potash, ammonia, or lime-water, is dropped in. From these and other experiments, I infer that Botany Bay kino consists principally of a peculiar substance (Eucalyptin) analogous somewhat to pectin and tannic acid. It has been used in diarrhoea*. Ainslie says it is the only kind employed in India; but I suspect there is some error in this statement.

**58.** LYTHRACEÆ, LINDLEY.—THE LOOSESTRIFE TRIBE.

**Salicaria, Jeancou.—Lythraceæ, De Candolle.**

**I. CHARACTER.**—Sepals definite in number, coherent beyond the middle, free, tubular or campanulate; lobes valvate, or distant in activation; stamens sometimes lengthened into conical lobes or external teeth, inserted on the upper part of the tube of the calyx, between the lobes, in number, sometimes none, generally very caducous. **Stamens** inserted

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* White, op. cit.
* Mat. Indica.
into the tube of the calyx below the petals; equal, double, triple, or quadruple the number of petals, sometimes fewer. Anthers oval, bilocular, aneur. Ovary free; style filiform; stigma capitate. Capsule membranous, covered surrounded by the calyx; of two to four carpels; while young granular (always?) two-celled by the slender margins of the carpels being fused, but when ripe one-celled by the disappearance of the disseminates, either dehiscing longitudinally, or more rarely and irregularly with a circinate dehiscence. Placenta central, adnate to the disseminates when present, or fus., thick, either compressed-cylindrical or obscurely trigonal or tetragonal; apex with some threads, conveyers of the seminal aura, continuous with the base of the style. Seeds many, small, exalbuminous; embryo straight; radicle turned towards the hilum; cotyledons flat, foliaceous. (De Candolle.)

Properties.—Variable. Except Lythrum Salicaria, which is astringent, the medical properties of few species are well known. Neea salicifolia is said to be diuretic, diaphoretic, and purgative.

LYTHRUM SALICAR'IA, Linn. D.—SPIKED PURPLE LOOSESTRIFE

Sex. Syst. Dodecandria Monogynia.

(Herba, D.)

History.—As this plant is a native of the Grecian Archipelago, must have been known to the ancients; but hitherto it has not been satisfactorily identified with any plant described by them.

Botany. Gen. Char.—Calyx cylindrical, striated, toothed at apex; teeth eight to twelve, of which four to six are broader than rest, and erect, and the remaining four to six alternate ones, subulate, often horn-shaped, sometimes not present, or very small. Petals to six, arising from the apex of the tube, alternate with the teeth. Stamens arising from the middle or base of the calyx, double or equal the number of the petals, or by abortion fewer. Style long; stigma capitate. Capsule oblong, covered by the calyx, one-celled, many-seeded. Placentae thick, adhering to the disseminates.—Herbs, or rarely undershrubs. Leaves entire. Flowers axillary, purple or white (De Cand.)

Sp. Char.—Leaves lanceolate, cordate at the base. Flowers spike-like, almost sessile (De Cand.)

Stems two or three feet high, four-sided. Spikes very long. Flowers purple. Petals oblong, cuneiform. Stamens usually twelve, of the six are long and six short.

Hab.—Ditches and watery places of this and other countries Europe, west of Asia, New Holland, and North America.

Description.—The herb (Herba Salicariae seu Lysimachiae purae) when dry, is odorous, but has an herbaceous, somewhat astringent taste, and by chewing becomes very mucilaginous. An infusion is darkened by the ferruginous salts.

Composition.—I am unacquainted with any analysis of this herb. Its obvious constituents are tannic acid, mucilage, chlorophyll, and woody fibre.

Physiological Effects.—Demulcent and astringent.
COMMON POMEGRANATE.

Principally employed in diarrhoea and dysentery. In the of these complaints it was recommended by Bangs, De Haeners. In dysentery, it was spoken favourably of by Gardners.

PRESCRIPTION.—Dose of the powdered herb ʒj, twice or thrice. A decoction of the root, prepared by boiling ʒj. of the root in oiling water, may be taken in doses of ʒj. or ʒj.

LIX.—GRANATEŒ, Don.—THE POMEGRANATE TRIBE.

Char. Tube of the calyx turbinate; limb five- or seven-cleft, lobes valvate by estivation. Petals five or seven. Stamens inde-filaments free; anthers anteriorly two-celled, dehiscing by a double style filiform; stigma capitately, pimpled. Fruit large, spherical, ed with the somewhat tubular limb of the calyx, coated with the tube of pyx, indehiscent, unequally divided into two chambers by a horizontal sgrn; the upper one five- or nine-celled, the lower one smaller, three- the sepiments of both membranous. Placenta of the upper cham-shy, spreading from the sides to the centre; those of the lower chamber processes from its base. Seeds innumerables, mixed with a pellucid that crystalline pulp, exalbiminosus; embryo oblong; radicle short, straight; flesions foliaceous, spirally convoluted.—Trees or shrubs. Leaves deciduous, oblong, entire, without dots. Flowers scarlet (De Cand.)

NICA GRANATUM, Linn. L. E. D.—THE COMMON POME- GRANATE.

Sex. Syt. Icosandria, Monogynia.

Cortex, L.—Root-bark, E.—Bucca tunica exterior; Radicis cortex; Flores, D.)

NOTES.—The pomegranate is repeatedly referred to in the Bible. It also mentions it. The leaves, the flowers, and the fruit, employed in medicine by the ancients.

Gen. Char. Only one genus (See the characters of the

Char. Leaves lanceolate. Stem arborescent (De Cand.)
Small tree, with a brownish bark. Leaves on short stalks, smooth. Flowers terminal on the young branches. Calyx thick, red. Petals much crumpled, membranaceous, rich scarlet. Stamina numerous, inserted on the calyx; anthers yellow. Ovary oblong; style simple; stigma globular. Fruit larger than an orange, with a thick, fleshy rind, and crowned by the teetable calyx; cells several, arranged in two strata, the upper one upper, the other lower, separated by a transverse diaphragm; lower stratum three, upper one of from five to nine cells. Some difficulty having been experienced in comprehending the structure of this delicious fruit, Dr. Lindley has explained it thus: within the calyx are two rows of carpella, a lower and an upper one, consisting of three or four carpella surrounding the style, and placed in the bottom of the calyx, an upper and outer one, consisting of five to ten carpella, surrounding the style, but adherent to the upper part of the calyx. The two strata of cells in the pomegranate are formed by two rows or tiers of carpella; the upper row being forced to the top of the fruit by the contraction of the tube of the calyx from which they arise. The transverse diaphragm is formed by the adhesion of the upper to the lower stratum of carpella. The outer part of the rind of the pomegranate is formed by the calyx which surrounds the carpella.

Hab.—Northern Africa, from whence it has been introduced into Europe, where it is now naturalized. Asia (Bengal, China, etc.).

Description.—The flowers, called balaustine flowers (flores balaustiae), are odourless, of a fine red colour, and slightly bitter in taste. They communicate a reddish colour to the saliva. The fruit (cortex granati: malicorium), when dry, occurs in irregular, arched, dry, brittle, odourless, very astringent, and slightly bitter fragments, which are brownish (more or less yellow or reddish) on the outside, paler within. The seeds (semina granati) are each surrounded by a thin vesicle filled with an acidulous styptic juice. The root (radix granati) is woody, knotty, hard, heavy, of a yellow colour, and has a bitter, astringent taste. Its bark (cortex radicis granati) occurs in small
COMMON POMEGRANATE.

A leafy extract of a yellowish- or ash-gray color externally, yellow within, sticky, not fibrous; of an astringent, but not bitter taste. By its taste of bitterness it may be distinguished from the bark of the box (Buxus sempervirens), which is said to be sometimes substituted for. Moisten with water, and rubbed on paper, it leaves a yellow film, which becomes deep-blue by the contact of sulphate of iron.

Composition.—Reuss* examined the watery extract of the rind of fruit. The bark of the root has been analysed by Wackenroder‡; 1824 by Mitonart; and, in 1831, by Latour de Trie.

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<thead>
<tr>
<th>Extract of the Rind</th>
<th>Wackenroder's Analysis</th>
<th>Latour de Trie's Analysis</th>
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<td>Bark of the Root</td>
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Mannite (Granadin).—The sweet substance which Latour de Trie considered to be peculiar, and called granadin, has been satisfactorily shown to be sinitic (described at p. 1320).

Tannic Acid.—On this the astringency of the fruit and root almost solely depends. It is this principle which enables the infusion, or decoction, of the herb and bark to produce precipitates (tannates) with a solution of gelatine, and the ferruginous salts.

Resin.—Latour de Trie describes this as being without any remarkable odor and taste. It is insoluble in water, slightly so in cold alcohol, and more in hot alcohol, and in small quantity in ether.

Physiological Effects.—All parts of the plant (root-bark, rind of fruit, juice surrounding the seeds, and flowers) possess astringency, owing principally to tannic acid, and in some slight degree to minute quantity of gallic acid. The bark of the root, taken in small quantities, occasions no remarkable effects. In full doses, however, causes nausea, vomiting, and purging, and occasionally giddiness and faintness.

Uses.—Rarely employed in medicine. The root-bark has been commonly used as a vermifuge. Celsus, Dioscorides, Pliny, and other ancient writers, speak of its anthelmintic qualities. The Greeks, also, were acquainted with them at a very early period. Of late years attention has been again drawn to this bark as a remedy for tape-worm, by the recommendations of Dr. Fleming, Dr.

* Guibourt, Hist. des Droog. i. 591.
‡ Gmelin, Handb. d. Chem. ii. 1372.
‡ Ibid.
‡ Journ. de Pharm. x. 352.
‡ Ibid. xvi. 503-601.
‡ Journ. de Pharm. xxii. 109.
* Astruc Recherche, vol. xi.
Buchanan, Mr. Breton, Gomes, Deslandes, and others; in this country it has been almost entirely superseded by oil of turpentine. The **rind of the fruit** has been employed on account of its astringency, in the form of decoction, as a gargle, in relaxed throat; as an injection, in leukorrhea; and, internally, in dysentery, and colliquative sweats. The powder of the rind is administered as a tonic. The **flowers** are mild astringents, but not employed in this country. The **fruit** may be eaten to allay thirst; and as a refreshing refrigerant and astringent in febrile diseases, especially those called bilious. It contains an acidulous juice, which is inclosed in a thin vesicle surrounding the seed.

**Administration.**—The **root-bark** is given in decoction, prepared by boiling 3 j. of the fresh bruised bark in Oij. of Oj.; the dose is a wine-glassful every half hour till the symptoms are alleviated. It usually occasions slight sickness, but seldom destroys the worm. The patient should be prepared for the use of a dose of castor oil and a strict regimen the day after. The **rind of the fruit** may be given, as an astringent tonic, in doses of 5 ss. to 5 j.

**Order LX.**—**Rosaceæ, Jussieu.**—**The Rose Tribe.**

**Essential Character.**—**Calyx** generally of five sepals, cohering at the base; therefore five-lobed, generally persistent, usually five times adherent to the ovary. **Petals** as many as the sepals, rarely more, inserted on the calyx, quincuncial in a single whorl, generally of two, inserted with the petals, mostly indefinite; **filaments** indurate; **anthers** two-celled, dehiscing by a double chink. **Carpels** united, either solitary by abortion, or having the appearance of a single ovary, either together or with the tube of the calyx. **Ovules** in each carpel usually one or two, seldom numerous; erect or exalbuminous (Hirtella and Neillia excepted). **Embryo** straight; either foliaceous or fleshy. **Herbs, shrubs, and trees.** **Leaves** alternate or opposite at the base, simple or compound. **Inflorescence** various (De Candolle).

**Properties.**—The prevailing quality of Rosaceæ is astringency. The name is especially obvious in the root. The tribe Amygdaleæ is distinguished from other rosaceous plants by the poisonous properties of the kernels and their bitter flavor when distilled with water, and by the oxalic acid from the stems.

**Tribe I.**—**Amygdaleæ.**

1. **Amygdalus communis, Linnae. L. E. D.**—**Common almond.**

   **Sex.** Syst. **Icosandria, Monogynia.**


**History.**—Almonds were well known to the ancients. They were mentioned in the earliest part of the Old Testament. Hipp...
COMMON ALMOND.

Dioscorides describes the mode of expressing oil. 1

**Gen. Char.**—*Drupe* pubescent, velvety; with a fibrous, dess cortex, which falls off irregularly; *putamen* (shell) pitted or smooth. *Young leaves* folded flat (conduplicate). *Flowers* somewhat sessile, solitary or in pairs, earlier than the leaves, arising from buds. *Fruit* woolly (De Cand.).

**Char.**—Leaves oblong-lanceolate, serrulate. *Flowers* solitary. *Fruit* ovoid-compressed, tomentose (De Cand.) and small; *tree* small. *Leaves* on glandular footstalks, acuminate. *Flowers* rarely large, rose-red or white, nearly sessile, appearing before the leaves. *Calyx* reddish, campanulate, five-cleft; the segments of the calyx. *Ovary* woolly; *style* simple; *stigma* rounded. *Ovary* ovoid, compressed, leathery, marked with a longitudinal furrow, and it opens when ripe; *epicarp* greenish-gray, tomentose; *mesocarp* (or sarcocarp) fibrous, cracking and dropping off; *endocarp* woody or almost osseous, oblong or ovate, acute, marked with pitted or furrowed. *Seed* one (rarely two) in each drupe.

Candolle admits five varieties of this species:

**maria.** Bitter Almond.—*Styles* almost as long as the stamens, tomentose. *Seeds* bitter—*Flowers* larger; *petals* white, roseate at the base. It varies in hard and brittle *putamen*.


**macrocarp.** Large fruited. —*Leaves* broader, acuminate, scarcely ashy. *Peduncles* shorter, turig. *Fruit* larger, umbilicated, acuminate at the *putamen* hard. *Flowers* white-roseate, large, appearing before the leaves, broadly obovate, undulate. It varies—1st, with a lesser fruit called the *Almond*; 2ndly, with a very small fruit termed the *Pistacia Almond*. 2

**Soricoideae.** Peach Almond.—*Leaves* like those of the peach. *Fruit* oval, *Putamen* succulent. *Putamen* yellowish-black, *Seeds* sweet. On the branch the fruit is sometimes ovate, obtuse, and somewhat fleshy; and *puteus*-compressed, and acuminate.

**b.—Barbary and Syria.** Cultivated in the southern parts of the

**E.**—Almonds in the shell (Amygdala cum putamine) are of the seed, or kernel (Amygdala), enclosed in the endocarp (putamen or shell), which may be hard or soft. The seed is of an
oval shape, compressed, rounded at one and somewhat pointed at the other. The covering of the seed (epidermis see Bischoff) is glanduliferous, bitter, of a brown colour, and veined by the rami of the raphé. At the pointed extremity of the seed is a small perforation (foramen), one side of this, at the edge, is the rug (hilum) which constitutes, botanically, of the seed. The seed is connected with the shell by the umbilicus. The large or round end of the almond is dark-coloured, indicating the situation of the chalaza. By almonds in warm water, the seed-coats (pellicle or skin) are removed. Blanched almonds (amygdale decorticate) consist embryo only, composed of the two large fleshy cotyledons, which, at the pointed extremity of the seed, we observe the radicle pointing towards the foramen (see fig. 284.)

1. Sweet Almonds (Amygdale dulces).—These are odorless and have a bland, sweetish, agreeable taste. Three varieties are in commerce:—1. Jordan almonds, which are the finest, of Malaga. Of these there are two kinds; the one above an inch length, flat, and with a clear brown cuticle, sweet, mucilaginous, rather tough; the other more plump and pointed at one end, but equally sweet with the former.—2. Valenția almonds at three-eighths of an inch broad, not quite an inch long, round end and obtusely pointed at the other; flat, of a dingy-brown and dusty cuticle.—3. Barbary and Italian almonds resemble the latter, but are generally smaller, and less flattened. Rancid eaten, and broken almonds should be rejected. Sweet almonds are rarely employed for pressing, on account of their greater the less value of their residual almond cake (placenta amygdalæ). Almond powder (farina amygdalæ) is the ground cake, and is employed as a soap for washing the hands, and is 2. Bitter Almonds (Amygdale amara).—These are brought from Mogadore. In external appearance they resemble the almond, but are somewhat smaller. They are distinguished by a bitter flavour, and, when rubbed with a little water, remarkable. They are extensively used for pressing. Their cake (placenta amygdalæ amarae) is distilled with water to yield the volatile oil of almonds, and is afterwards employed to fatten pigs, and for other purposes.

Commerç.—The following table shows the quantity of a

---

* Brande, Diet. of Pharm. 55.
COMMON ALMOND. 1529

Almonds are imported in barrels, casks, boxes, bales, &e.

Composition.—Sweet almonds were analysed by Proust; in 1817 in 1825 by Payen and Henry fils. — Bitter almonds were analysed by Vogel.

<table>
<thead>
<tr>
<th>Sweet almonds</th>
<th>Bitter almonds</th>
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</thead>
<tbody>
<tr>
<td>100.0</td>
<td>100.0</td>
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</tbody>
</table>

**FIXED OIL OF ALMONDS (See p. 1533.)**

Emulsin (Vegetable Albumen of Almonds).—This remarkable constituent of the oil of almond is white, and soluble in cold water: hence it is a constituent of emulsion. From its watery solution it is precipitated in thick white flocks by 1; these flocks dissolve in water, even if they have been previously dried. The watery solution be heated to 212° F. the emulsin congelates, and the becomes thick, like starch mucilage. From ordinary vegetable albumen, n is distinguished by its producing the decomposition of amylcelin, and among other products, the volatile oil of bitter almonds and hydrocyanic acid. When, however, emulsin has been coagulated by heat, it loses its power of acting on amylcelin. The composition of emulsin, according to Mr. Richar

<table>
<thead>
<tr>
<th>Atoms</th>
<th>Eq. Wt.</th>
<th>Per Cent.</th>
<th>Richardson.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon</td>
<td>24</td>
<td>144</td>
<td>46.91</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>24</td>
<td>22</td>
<td>7.97</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>4</td>
<td>56</td>
<td>18.99</td>
</tr>
<tr>
<td>Oxygen</td>
<td>9</td>
<td>72</td>
<td>24.71</td>
</tr>
</tbody>
</table>

Emulsin: 1 295 100.00 100.200

with baryta, emulsin evolves ammonia, and yields a barytic salt containing a peculiar acid, which has been termed emulisc acid. It is probable, then, that emulsin is an amide of emulisc acid (i.e. emulsate of ammonia, an atom of water). Robinet regards the emulsin of Wöhler and Liebig as a complex product.

Amygdalin.—A crystallizable substance found in the bitter, but not the sweet, almond. From four lbs. of bitter almonds Liebig obtained one ounce of pure amygdalin. It is white, odourless, has at first a then a bitter taste, is very soluble in boiling alcohol and water,

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4 Trade List.
5 Gmelin, Handb. d. Chem.
6 Ibid., vi, 406.
9 Wöhler and Liebig, Journ. de Pharm., xxxii., 391.
10 Thomson, Organ. Chemist., 663.
11 Journ. de Pharm., xxiv., 190.
In the crystallized state it consists of 1 atom of \textit{Amygdalin} = of Water = 54.

4. Volatile Oil of Bitter Almonds (see p. 1534).

\textbf{Physiological Effects and Uses.} \textit{a. Of Sweet Almonds.} Almonds are nutritive and emollient; but on account of oil which they contain, they are somewhat difficult least if taken in large quantities, or by persons whose digestive organs are weak. When rancid they are still more apt to cause nausea, uneasiness in the stomach and bowels, oedematous swelling of the face, followed by a sensation of heat. Winterbottom, a sufferer twice in this way from the use of unblanched sweet almonds, but blanched almonds caused no inconvenience.

For dietetical purposes, almonds are employed as a confectionery ingredient. Cakes, \&c. On account of the irritant qualities of the kernels, almonds for the table should always be blanched and roasted. They have been used as a substitute for coffee, and are also used in the preparation of the \textit{confection, c\&c.}

\textit{b. Of Bitter Almonds.}—Bitter almonds are more or less poisonous, and are found in all classes of animals. As in the cases of other poisonous substances, the larger herbivora are much less powerfully affected by them. Thus, three-quarters of a pound of bitter almonds, given to a horse, caused merely dulness and a small pulse. Of the same number of bitter almonds has killed some of the smaller animals. Twenty seeds have killed a small robust dog. The symptoms they induce in animals, are, trembling, weakness, pal
In small doses bitter almonds sometimes act on man as irritants to digestive organs, and occasion nausea, vomiting, and purging to idiosyncrasy, some individuals are remarkably affected by it. On the late Dr. Gregory they caused, "first, sickness, general tremors, then vomiting, next a hot fit, with an eruption of urticaria, particularly on the upper part of the body. At the same time face and head swelled very much, and there was a general feeling of intoxication. The symptoms lasted only a few hours. The rash not alternately appear and disappear, as in common nettle-rash." Mr. Kennedy has noticed the case of a stout labourer, who, after the use of a great quantity of bitter almonds. These, and observations referred to by Wibmer, Coullon, and others, show that the poisonous effects of the bitter almond are similar to those of hydrocyanic acid (see p. 436).

The emulsion of bitter almonds partakes of the properties of the oil. Pouzaire (quoted by Wibmer) states that a child of between five and seven years of age suffered colic, headache, grinding of teeth, insensibility, and death, from the use of a strong extract of this liquid.

The distilled water of bitter almonds (aqua amygdalae amarae) possesses poisonous properties, when either swallowed or applied externally. Sömmering states that half an ounce of concentrated bitter almond-water killed a dog.

Macaroons and Ratafia cakes, as well as Noyau, which owe their diuretic power to bitter almonds, act injuriously when taken in large quantities.

The effects of the volatile oil of bitter almonds will be noticed presently (see p. 1537).

The principal consumption of the bitter almond is for pressing, rendering, and scenting. For flavouring, the seeds, or their essential oil, are used by the cook and confectioner (see p. 1538).

The medical practitioners in this country, bitter almonds are rarely administered. They sometimes enter into the composition of almond emulsion, but usually as a flavouring ingredient only. They are applicable, however, to all the uses of hydrocyanic acid (p. 441); as pulmonary affections, gastroduodenal, hooping-cough, but the objection to their use is their varying and uncertain action. Bergius, and subsequently Frank, Hufeland, and others,

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* Recherches, etc., sur l’Acide Hydrocyanique. 1819.
* See Dötz’s experiments, in Wibmer, op. supra cit.
* Guérin, Texte.
* See Viny, Journ. de Pharm. ii. 204, for the ill effects of the first of these.
* See Hufeland, Amygdalorum, Th. D., 2nd Ed. 1821.
* Ibid. vol. i. 453.
have successfully administered them against intermittent fever, have also been used to expel tape-worm, and, it is said, with effect. Pitcairn prescribed bitter almond water to relieve menstruation. The emulsion has been employed as a wash to alleviate irritation in various skin diseases; as herpes, prurigo, acnē, tigo, &c.

Administratīon.—Bitter almonds may be taken in subcutaneous emulsion. Kranichfield employed the powder of the bitter almond cake (farina amygdale amara) in doses of one to six grs. in place of the distilled water of bitter almonds (aqua amygdale amara), which is of variable strength, Wöhler and Liebig recommend the following emulsion (emulsio amygdale cum amygdalinum) in place of the distilled water, which is of uniform strength:—Sweet almonds, 5ij.; Water sufficient to make 1ij. of emulsion, in which, when cold, dissolve Amygdalin, grs. xviij. This quantity of amygdalin will, when added to the emulsion, yield a grain of anhydrous hydrochloric acid, and eight grains of volatile oil. The dose of this emulsion is one to three drops. Almond paste is sold in the shops for softening and preventing chaps. Dr. Paris gives the following recipe for making it:—Bitter Almonds, blanched, 5iv.; the white of an egg; Rose Water and Rectified Spirit, p. æ., as much as will support the after-effect.

1. CONFECTION AMYGDALÆ, L. Conserva Amygdalarum, A. Amygdalorum, D.; Almond Confection.—(Sweet almonds, 3vij.; Powder of Gum Arabic, 3j.; Sugar, 5iv.) The almonds are macerated in cold water, and their pellicles removed, and the ingredients are worked up to a smooth paste. The process of the London College is essentially the same.—The London College recommend that this confection can be preserved unaltered for a long time, the almonds, gum arabic, and sugar, are separately powdered and subsequently mixed. Then, whenever the confection is required, all the ingredients are worked up to a smooth paste, and the mixture is beaten until it becomes a smooth, creamy mass. The confection, prepared without water, is not very stable, and may become rancid; but if, in order to preserve it, a little water be added, it will become more stable, or both. The only use of almond confection is in the preparation of the emulsion.

2. MISTURA AMYGDALÆ, L. Mistura Amygdalarum, E. Amygdala; Almond Emulsion; Almond Milk.—(Almond Confection 3jiss.; Distilled Water, Oj. Gradually add the water to the confection, while rubbing, until they are mixed; then strain.)
The Edinburgh College employs 3ij. of the Confection to Oij. Water, and strains the mixture through linen or calico; or they let it to be prepared by the following process: "Sweet Almonds, 2d 3ij.; Pure Sugar, 5v.; Muilage, fss.; Water, Oij. Steep almonds in hot water and peel them, and proceed as for the vera Acacie."—The Dublin College prepares it as follows: Sweet Almonds, blanched, 3iss.; Bitter Almonds, 3ij.; Refined Sugar, 5ss; or, Oijss. Rub the almonds with the sugar, adding gradually water, then strain.—Notwithstanding that the formulae of the Colleges are different, none of them precisely agree with that is in common use. No one who wishes to procure good almond milk would prepare it with the confection, on account of the cases which this preparation suffers by being kept. Powdered Arabic is, for ordinary purposes, a more convenient and ready dient than mucilage, and does not undergo any change by anng. Lastly, the emulsion containing bitter almonds, though able to most persons, and perhaps useful in some cases, is not capable to all the purposes for which the ordinary emulsion is used, and is apt to disagree with some individuals. The following formula yields a preparation identical with that of the London College: Sweet Almonds, 3iv.; Powdered Gum Arabic, 5j.; White r, 3ij.; Water, fssvjs.. Having blanched the almonds, beat with the sugar and gum, the water being gradually added.— And milk agree in many of its properties with animal milk. Even white; when examined by the microscope it is seen to con of myriads of oelaginous globules, suspended in water by the of an albuminous principle (emulsion) and sugar; and, lastly, it is milk, in possessing nutritive and emollient qualities. It ed as a demulcent and emollient in pulmonary affections, to ap e cough and allay irritation; and in inflammatory affections of alimentary canal or of the urinary organs. It is an excellent cle for other remedies; as for the saline refrigerants (nitre, for nple) in febrile cases, for expectorants and paregorics (squills, acuanha, opiates, &c.) in pulmonary affections, for sudorifics (tic tartar, for example) in febrile and inflammatory cases, for lis and their carbonates in affections of the urino-genital organs, for hydrocyanic acid in gastrodynia and pulmonary disorders. ls and alcohol (hence tinctures) coagulate the emulsion, and cause and mixture to separate into a kind of curd and whey; a change which also takes place spontaneously when the mixture has been, and which is accompanied with the development of free acid. ases where the hydrocyanic acid is admissible (see p. 441), the almond may be used, as in the formula of the Dublin College. The dose of almond emulsion is f.5j. or f.3ij., or ad libitum.

OLEUM AMYGDALAE, L. Oleum Amygdalarum, D.; Almond Oil; of Sweet Almonds.—(Obtained by expression from either bitter sweet almonds; usually from the former, on account of their ripeness as well as of the greater value of their residual cake).—The average produce is from 48 to 52 lbs. from 1 cwt. of almonds.
When recently expressed it is turbid, but by rest and filtration becomes quite transparent. It usually possesses a slightly-yellow tinge, which becomes somewhat paler by exposure to solar light. It is insipid or nearly so, and has a purely oleaginous bland taste. It coagulates less readily by cold, than olive oil. Braconnot states that at 14° deposits 24 per cent. of margarine (margarate of glycerine) fuses at 43° F. The residual oleine (oleate of glycerine) did not coagul at the greatest degree of cold. The accuracy of these statements has, however, been called in question. Its sp. gr. w appear to vary: Brandis found it 0·911, Brisson, 0·917, Sann 0·920, at 53° F. Sulphuric ether dissolves it. Six parts of benzyl or twenty-five parts of cold alcohol, are required to dissolve one of this oil.

<table>
<thead>
<tr>
<th>Proximate Composition</th>
<th>Ultimate Analysis</th>
</tr>
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<tbody>
<tr>
<td>Oleine</td>
<td>Carbon</td>
</tr>
<tr>
<td>Margarine (Stearine of Braconnot)</td>
<td>Hydrogen</td>
</tr>
<tr>
<td></td>
<td>Oxygen</td>
</tr>
<tr>
<td></td>
<td>Nitrogen [loss]</td>
</tr>
<tr>
<td>Almond oil</td>
<td>Almond oil</td>
</tr>
<tr>
<td>70</td>
<td>7</td>
</tr>
<tr>
<td>24</td>
<td>2</td>
</tr>
<tr>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

The nitrogen mentioned in Saussure's analysis is probably an error. Almond oil is said to be adulterated with teel oil (see p. 139).

It possesses the dietetical and medicinal properties of the fixed oils (see pp. 51 and 1317). Its local action is emollient, p. 190). Swallowed in moderate doses it is nutritive, but does not of digestion. In large doses it acts as a mild laxative (see p. 318).

Almond oil may be employed for the same purposes as oil (see p. 1318). Mixed with an equal volume of syrup of viol, syrup of roses, it is given to new-born infants as a laxative. Sometimes used with gum (in the form of mucilage), alkalis, or of egg, to form an emulsion, which is used in the same cases. mistura amygdalae. To assist in allaying troublesome cough not unfrequently administered in the form of linctus, with com of dog-rose, syrup of poppies, &c.

4. OLEUM AMYGDALAE AMARE: Oleum Amygdalae amare de tum; Oil of Bitter Almonds; Essential Oil of Almonds. (Oil by submitting bitter almond cake [left after the expression of fixed oil from bitter almonds] to distillation with water, either or more usually with salt. To increase the quantity of volatile Geiger recommended the cake to be macerated in the water twenty-four hours before distillation).—The theory of this proc curious. Chemists formerly supposed that the volatile oil resid the bitter almond, and that by distillation it was merely volat and subsequently condensed. But in opposition to this view urged the following facts:

1. Neither bitter almonds, nor their residuary cake, yield any volatile pressure, yet we know that the volatile oil is soluble in the fixed oil, and, fore, when the latter was expressed it ought to contain traces of the volatile if this existed in the bitter almonds.

2. They yield no oil when digested in alcohol or in ether, though the oil is soluble in both of these liquids.
The essential oil of bitter almonds of the shops possesses the fol-

g properties. It is highly poisonous, has a golden-yellow
r (by rectification it may be rendered temporarily colourless),
greeable odour (usually compared to that of hydrocyanic acid, 
ich, in fact, bears but little resemblance to it), and an acrid, 
taste. It is combustible, and burns with a white flame. Its 
r., though always greater than that of water, probably varies 
what. I find that a sample, which had been prepared for about 
onths, had the sp. gr. of 1.0836. It is soluble in alcohol and 
. Oil of vitriol forms with it a magnificent crimson-red thick 
d, which, on the addition of water, yields a yellow emulsion.

Oil of bitter almonds, as found in commerce, is a mixture or com-
d of hydrocyanate of benzule, hydrocyanic acid, a little benzoic acid, 
ine, benzimide, and probably other substances.

Hydrosyl of Benzule.—This is obtained by forming the oil into a thin 
with hydrate of lime, chloride of iron and water, and redistilling. It is a 
derless oil, whose sp. gr. is 1.043, and whose odour and taste are 
different from those of the ordinary oil. Robiquet found it innocuous, 
gel, and more recently Liebig, declare that it still retains its poisonous 
ies. In some earlier experiments which I made on this subject, I found 
highly poisonous, though I could not detect an atom of hydrocyanic
acid in it. After the sample had been kept a few months, however, I
detected the acid in it by the potash and iron test. By a second and
thirdification I completely deprived it of all traces of the acid; and I then
four drops of it, given to a small rabbit, had no more effect than the
quantity of any other volatile oil: that is, the animal appeared dull in
minutes, and the respiration was quickened. Hydruat of benzule is
of C14 H6 O6. Now, certain changes which it undergoes are best explained
assuming that this oil is a compound of the base of benzoic acid and
alkali. To this base, whose composition is C14 H6 O6, the name of Benzule or Benzule
has been given; so that the oil is the hydruat of benzule, and its proximate
composition is as follows:

\[
\begin{array}{ccc}
\text{Proximate Composition} & \text{Atoms} & \text{Eq. Wt.} \\
\hline
\text{Benzule} & 1 & 106 \\
\text{Hydrogen} & 1 & 1 \\
\hline
\text{Hydruat of Benzule} & 1 & 106 \\
\end{array}
\]

By exposure to the air it absorbs 2 eq. oxygen, and is converted into
benzoic acid C14 H6 O6. Aq.

3. HYDROCANIC ACID.—The presence of hydrocanic acid in the oil
of bitter almonds may be detected by the usual tests, especially by the
salt of iron (see p. 435). The quantity of this acid is different in the
oil of almonds, and is, probably, not uniform. Schrader got, from
sample, 8.5 per cent., and from a new sample, 10.75%; but Göppert obtained
another specimen, so much as 14.33 per cent. Water in which the oil
is washed gives evidence of the presence of hydrocanic acid by the
iron test before referred to.

γ. BENZOIC ACID.—This is formed by the action of the oxygen of
iron on hydruat of benzule as above mentioned. It is more readily
in the pure hydruat than in raw oil of bitter almonds.

5. BENZOIN; Camphor of Oil of Bitter Almonds.—Liebig states that
constituent of oil of bitter almonds. It is a crystalline substance
obtained by the action of alkalis on the oil. It cannot be procured from
benzule (with which it is isomerous) unless hydrocanic acid be present
soluble in boiling alcohol. Oil of vitriol also dissolves it with a
colour; if the solution be heated it becomes brown, green, and at
with disengagement of sulphurous acid.

6. BENZIMIDE.—This separates from oil of bitter almonds under
circumstances. Its formula is C20 H11 O N. It is soluble in alcohol. No
sulphuric acid dissolves it, assuming a deep indigo colour; if moisture
the colour is at first emerald green. By the action of potash and a little it
evolves ammonia and forms benzoate of potash.

A crystalline matter is frequently deposited by oil of bitter
when it has been kept for some time. Exposure to the air, the oil is enabled to absorb oxygen, and the removal of hyd
acid from the oil, facilitate the deposition. In 1822, Grise
Bahlmann, and, in 1823, Stange, declared the crystals to be
benzoic acid; a statement which was confirmed, in 1830, by
quet and Boutron. I have met with three kinds of crystal
posit, differing essentially from each other, and from benzoic.

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* Quoted by Dr. Christison, Treat. on Poisons.
* Buchner’s Repert. xiv. 229; xvi. 92.
One of these is characterised by the emerald-green colour which it presents when dropped into oil of vitriol. In a few minutes, however, the green changes to red. This deposit is orange-yellow, soluble in boiling water, alcohol, ether; when alcoholic or ethereal solutions cool, numerous white, light, silky crystalline plates (resembling crystalline boracic acid) are deposited. If white crystals be dropped into oil of vitriol they also become emerald green, very slightly so: the mother liquor is rendered much more intensely green by addition of vitriol. Boiled with caustic potash they give out ammonia. By keeping two years in a stoppered bottle, both the raw and purified crystals lost the pungency of becoming green by oil of vitriol: they now became red on the addition of this liquid; and the crystals on being redissolved in alcohol and recrystallised were scarcely coloured on the addition of oil of vitriol.

From raw oil of bitter almonds washed with solution of potash I have observed, at the end of twenty-four hours, crystals which, like the above, become green on the addition of oil of vitriol.

A second crystalline deposit is characterized by the cherry-red colour which it assumes when dropped into oil of vitriol, and by its not evolving ammonia when boiled with caustic potash. Its appearance resembles solid oil of vitriol. When dissolved in boiling alcohol and re-crystallized, it yields silky lenticular crystals somewhat similar to those of nitrate of ammonia. At the end of two years it had almost lost its quality of being reddened by oil of vitriol; but when boiled with this liquor it gave out a crystalline sublimate. Heated with solution of potash it evolved faint traces of ammonia.

The third kind of deposit I did not receive until after it had been distilled in alcohol. A short notice of it has been given by Mr. Lethaby. The crystals are small, acicular, and lemon-yellow; they dissolve in oil of vitriol, giving a yellow or orange coloured solution. They are insoluble in water and alcohol. When heated they fuse, but, unlike the two preceding deposits, do not sublime. They do not evolve ammonia when heated with a solution of caustic potash. At the end of two years these crystals were unchanged. In all the cases in which they are found the oil had been put aside contaminated with water.

The volatile oil of bitter almonds is a most potent poison, acting rapidly as the ordinary hydrocyanic acid of the shops, and giving rise to similar symptoms. A single drop has killed a cat in five minutes. Sir B. Brodie happening to touch his tongue with a probe which had been dipped in the oil, suffered, almost instantaneously, an indescribable sensation at the pit of the stomach, feebleness of limbs, and loss of power over the muscles. These effects, however, were quite transient. Several cases of poisoning with it are recorded. The best detailed is that related by Metzendorf (quoted by Dr. Christison):—"A hypochondriacal gentleman, 48 years old, swallowed two drachms of the essential oil. A few minutes afterwards, his servant, whom he sent for, found him lying in bed, with all features spasmodically contracted, his eyes fixed, staring, and turned upward, and his chest heaving convulsively and hurriedly. The physician, who entered the room twenty minutes after the draught had been taken, found him quite insensible, the pupils immovable, the breathing stertorous and slow, the pulse feeble, and only thirty in minute, and the breathing exhaling strongly the odour of bitter almonds. Death ensued ten minutes afterwards." Another case of...
poisoning with this oil occurred a few years since in Alder- gate street:—A lady, intending to take beech-nut oil, for worms, swallowed (by mistake) oil of bitter almonds, sold to her by a druggist who supposed she inquired for peach-nut oil. Recovery has occurred in one case, after about half an ounce (?) of the oil had been swallowed.

In this country, essential oil of bitter almonds is not employed in medicine. It is applicable in the same cases that hydrocyanic acid is employed in. But it must not be forgotten that, though in strength it is somewhat variable, it is in general four times the strength of officinal hydrocyanic acid. The dose of it is a quarter of a drop and a half in an emulsion. It is extensively employed in flavouring by the cook and confectioner; and by the perfumer in scenting toilet-soap, and for other purposes.

Essence of Bitter Almonds.—This term is sometimes applied to essential oil, and sometimes to a solution of the oil in rectified spirit. Fluidrams of the oil and six fluidrams of rectified spirit, form an essence for flavouring and scenting.

2. PER'SICA VULGA'RIS, Miller.—THE PEACH.

Amygdalus Persica, Linn. D.
Sec. Syst. Icosandra, Monogynia.
(Folia, D.)

History.—Both Dioscorides and Pliny speak of the peach under the former term μηλον; the latter malum persicum.

Botany. Gen. Char.—The same as Amygdalus, except that the drupe is more fleshy. Epicarp either velvety or quite smooth. mesocarp (stone) extremely rugose, with furrows (De Cand.)

Sp. Char.—Fruit tomentose (De Cand.)

A small tree. Leaves lanceolate, acuminate or crenate, with or without glandular trichomes. Flowers roseate, large or small. Fruits and kernels exhalate the odour of the almond.

Two varieties of the peach are usually cultivated:—

1. Melters or Free-stones.—Flesh separate from the stone.
2. Cling-stones or Pavin.—Flesh adheres to the stone.

The Nectarine (Persica loris, De Cand.) is distinguished from the Peach by its smaller fruit. This trivial distinction leads botanists to regard these two fruits as varieties of the same species.

Hab.—Native of Persia. Cultivated in gardens. Flowers in April or May.

Description.—Peach leaves (folia persica) have the peculiar odour and taste of the bitter almond. The kernels (semina persica) closely resemble the latter, both in appearance and properties.
smaller. The flowers (flores persice) lose the greater part of
flour by drying.

Position.—The leaves have not been analyzed. They yield
Ilaison, a volatile oil (oleum folii persice), which is yellow
than water, and contains hydrocyanic acid. After eight
a crystalline substance was found on the water. The non-
sextremities of the twigs of the peach-tree yielded Gauthier
er cent. of very volatile oil, which was heavier than water.
analyzed the juice of the peach, both in the ripe and unripe
the constituents were, colouring matter, sugar, gum, vegetable
boumen, matic acid, lime, and water.

Physiological Effects.—The highly palatable flesh of the peaches (on account of its sugar, gum, &c.), and slightly refrig-
tom the matic acid which it contains). Taken in moderate
ies it is wholesome, but if eaten too freely is apt to disorder
wells. The kernels, the blossoms, the leaves, and the bark,
poisonous properties. The flowers, as well as the leaves, in
m of infusion, have been used to purge and destroy intestinal
especially in children; but their employment has sometimes
attended with fatal results. Bertrand says, that a child,
months old, experienced convulsions, vomiting, and bloody
ca, from the use of a strong decoction of the flowers; and
states, that an elderly gentleman, having partaken of a
flowers, was seized with giddiness, violent purging, cons-
s and stupor, and died in a three days. The irritation of the
ary canal, manifested by vomiting and purging, and the slow
distinguish the operation of peach-flowers from that of hydro-
acid. The same author also states, that the peach-bark
injurious to a cock, and caused difficulty of breathing, and
gs.—The fruit, both fresh and preserved, is employed as a
Its use is objectionable in gouty persons, and in those
bowels are easily disordered. When stewed with sugar, it
given as a mild laxative to convalescents. The kernels may
as the bitter almond. The blossoms are scarcely ever ad-
ced in this country; but they have been recommended as a
age. The leaves are sometimes employed by the cook and
-maker, for flavouring. They have also been used as a sub-
for China-tea. They have been recommended as a vermi-
more recently to allay irritation of the bladder and

Administration.—The dose of peach-blossoms is half an ounce
fresh, or a drachm of the dried, flowers, infused in water. The
c of the infusion of peach-leaves (prepared by digesting 38s. of
ed leaves in Oj. of boiling water) is fasser. three times a day.

* Brugnatelli, Ann. Chem. xcvii. 96.
* Journ. de Pharm.
* Thomson, Org. Chem. 890.
* Coste et Willemer, quoted by Murray, App. Med. iii. 245.
* Christison, Treat. on Poisons, p. 726.
* Wilhmer, op. supra cit.
* Murray, op. supra cit.
3. PRU'NUS DOMEST'ICA, Linn. L. B. D.—THE PLUM-TREE.

Sex. Syst. Icosandria, Monogynia.
(Drupe exiccate, L.—Dried fruit, E.—Fructus siccatas, D.)

History.—Dioscorides* calls this tree the κοχύμαλδα, while the fruit he terms κοχύμιλνιον.

Botany. Gen. Char.—Drupe ovate or oblong, fleshy, quite succulent, covered with a pruinose powder. Putamen (stone) compressed, acute on both sides, somewhat furrowed at the edges, otherwise smooth. Young leaves convolute. Pedicels umblillato-fasciculate; one-flowered, evolved before or after the leaves (De Cand.)


Gardeners cultivate several hundred varieties†. De Candolle admits the following varieties:

a. Armenioides, including the Mirabelle Plum.
b. Claudia, including the Green Gage.
c. Myrobalana, including the Myrobalan Plum.
d. Damascena, including the Damask Plum.
e. Turonensis, including the Orleans Plum.
f. Juliana, yields the Official Prune.
g. Catharina, including the St. Catharine Plum.
h. Aubertiana, including the Magnum Bonum, or Mogul Plum.
i. Prunella, including the Damson.

Hab.—South of Europe. Cultivated in gardens and orchards.

Description.—The dried fruits of the Prunus domestica are prunes (fructus siccatas pruni; drupe siccatas pruni). In most countries they are dried on hurdles by solar heat; but in cold climates artificial heat is employed. In France both methods are adopted; the fruit being exposed to the heat of an oven and to the sun, on alternate days. Table prunes are prepared from larger kinds of plum—as the Saint Catharine and the Reine-Clé (Green Gage): Medicinal prunes from the Saint Julien (P. domes var. ζ Juliana). The former have an agreeable, very sweet taste; the latter are somewhat austere. They are principally imported from Bourdeaux. The part employed in medicine is the pulp (pulvis pruni).

Composition.—John§ analyzed the Mirabelle Plum, and the Reine-Claude (Green Gage), both in the ripe and unripe state. The constituents of the ripe fruit, according to the last-mentioned chemist, are, sugar 11·61, gum 4·85, albumen 0·93, malic acid 1·52, vegetable fibre 1·21, lime a trace, water 80·24, [loss 0·06].—Pectin is also a constituent of these fruits.

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* Lib. i. cap. 174.
† Don (Syst. of Gard. ii. 490) mentions 270 varieties.
§ Gmelin, Handb. d. Chem. ii. 1850.
§ Thomson, Org. Chem. 890.
PHYSIOLOGICAL EFFECTS.—Fresh ripe plums, taken in moderate quantities, are wholesome and nutritive; but in large quantities they disorder the bowels. The immature fruit still more easily affects ill effects. The medicinal prune is a mild laxative.

Uses.—The finer kinds of plums are employed at the table as a dessert: the inferior qualities are used in pies, tarts, cones, and sweetmeats. The larger prunes are employed at the table dessert. The medicinal prunes are employed as an agreeable mild laxative for children, and during convalescence from febrile inflammatory disorders. They are sometimes added to cathartic actions or infusions (as infusion of senna), to improve the flavour, promote the purgative effect. They enter into the composition of a confection of senna.

CER'ASUS LAURO-CER'ASUS, Loisel.—COMMON OR CHERRY-LAUREL.

Pru'nus lauro-ker'asus, Linn. D. E.

Sec. Syt. Icosandria, Monogynia.

(Leaves, E.—Folia, D.)

HISTORY.—Belenius terms this plant the Cerastus trapezuntina as introduced into Europe, from Trebizonde, in 1576.

BOTANY. Gen. Char.—Drupes globose or umbilicate at the base, dry, quite smooth, not covered with a pruinose powder. Nucleus one) somewhat globose, smooth.—Young leaves conduplicate. Stigmas one-flowered or ramose (De Cand.)

p. Char.—Racemes shorter than the leaves. Leaves ovate-lanceolate, remotely serrate, with two or four glands beneath. Fruit ovate, black (De Cand.)

An evergreen under-shrub. Smooth in every part. Leaves short-lanced, coriaceous, shining. Petals roundish, spreading white, black, the size of a small cherry.


DESCRIPTION.—Cherry-laurel leaves (folia lauro-cerasi) have rarely any odour until bruised, when they give out the characteristic or bitter almond odour of the plant. Their taste is very bitter, pungent, and slightly astringent. By drying they lose their odour, retain their flavour. Their watery infusion is rendered green by sesquichloride of iron.

COMPOSITION.—I am unacquainted with any complete analysis of the laurel leaves. They were imperfectly examined in 1797 by Spandaw du Cellie. In 1802, Schrader discovered hydrochloric acid in the volatile oil obtained from them. The recent re-

1 Sprengel, Hist. Rei Herb. i. 377.
3 Ibid. S. 151.
 Element of Materia Medica.

Searches into the origin of the volatile oil of the bitter almond (see p. 1584), render it probable that the volatile oil of the cherry laurel does not pre-exist in the leaves. The supposed constituent cherry laurel leaves are amygdelin (probably, according to Wöhler and Liebig, though they failed to procure it), resins (Spanish myricin (the shining appearance of the leaves is, perhaps, owing to this), chlorophyll, or green colouring matter, extractive, tannin, ligneous fibre, and water.

Volatile Oil of the Cherry-Laurel (Oleum Lauro-cretani).—By distillation with water, cherry laurel leaves yield a volatile oil and a distilled water (lauro-cerasi). As the oil, like the volatile oil of bitter almonds, contains hydrocyanic acid and hydruret of benzole, it is natural to suppose that oils are produced in a similar manner. And though they did not succeed in procuring amygdalin, MM. Wöhler and Liebig think its presence in laurel leaves highly probable; but what substance effects its decomposition is not yet ascertained.

Cherry laurel oil is pale yellow, and heavier than water. It attracts from the air, and deposits benzoic acid. Oil of vitriol colours it red. It contains hydrocyanic acid, which may be detected by an alkali and a ferruginous reagent (see p. 435). The quantity, according to Schrader, is 7.6 per cent; Goppert declares it to be only 2.75 per cent. It appears, therefore, to be a poison than the oil of bitter almonds, with which, according to Robins, agrees in all its chemical properties.

Physiological effects.—Most parts of the plant, but not especially the leaves and seeds, possess poisonous properties.

a. On Vegetables.—The distilled water of the cherry-laurel strays plants, like hydrocyanic acid. Goppert asserts, that poisonous operation does not depend on the small quantity of this which it contains, but on some poisonous quality peculiar to it; its activity is greater than that of water containing the same quality of hydrocyanic acid.

b. On Animals.—The effects of cherry-laurel water on animals have been examined by a considerable number of observers; these it will be sufficient to mention the names of Madden, Langrish, Fontana, and Orfila. It appears, says Dr. Christison, that whether cherry-laurel water is introduced into the stomach, into the anus, or into the cellular tissue, or directly into the venous system, occasions giddiness, palsy, insensibility, convulsions, convulsions, convulsions, convulsions, convulsions, convulsions, or death; that the tetanic state brought on by the purgative, not always so distinctly caused by cherry-laurel water; and tetanus is most frequently induced by medium doses. Cherry laurel oil acts on animals as a powerful poison in the dose of

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1 *Journ. de Pharm.*, xxiii. 411.
3 *Journ. de Pharm.* viii. 304.
6 *Phil. Trans.* for 1731.
7 *Phys. Exp. upon Beules*, &c. 1746.
8 *Treat. on the Venom of the Viper*, &c. 1783.
9 *Textol. Gen.*
10 *Christison, op. cit., p. 722.*
the symptoms which it excites being similar, if, indeed, they are identical, with those induced by the volatile oil of bitter gums (see p. 1537).

In Man.—Liqueurs, sweetmeats, creams and puddings, flavoured with the cherry-laurel, have oftentimes acted injuriously, and proved fatal. Where death occurred, the symptoms were similar to those caused by hydrocyanic acid; viz. painful sensation at the heart, sudden insensibility, and death within a few minutes. Cases, however, have not been frequent. In the case referred to by Madden", in which brandy, mixed with a fourth part of laurel water, proved fatal, there was no vomiting, purging, or convulsions. But in the instances mentioned by Fodéré", the individual expired in convulsions. The effects of medicinal doses of laurel water are stated to be similar to those of small doses of hydrocyanic acid.

—Cherry-laurel leaves are not unfrequently employed by the ancients for their flavouring. Though the distilled water of the cherry-laurel is not mentioned in the Edinburgh and Dublin Pharmacopoeias, yet it is employed in medicine in this country. It is applicable to all cases for which hydrocyanic acid has been used (see p. 441). It is used as a sedative narcotic in tic-douloureux, phthisis pulmonalis, spasmodic cough, and palpitation of the heart.

**LAURO-CERASI, D.**; **Water of Cherry Laurel; Laurel Water.** Leaves of the Cherry Laurel, lb. ; Water, Oijss. [Oij. wine, D.]; Compound Spirit of Lavender, $\frac{1}{3}$. Chop down the leaves with the water, distil off one pint, agitate the distilled liquid, filter it if any milkiness remain after a few seconds of standing, and then add the lavender spirit.)—The compound spirit of laurel is added, as a colouring ingredient, to prevent the preparation from being mistaken for common water. Dose $\frac{1}{3}$° to $\frac{1}{2}$°. The tablets, and, therefore, the dose, are, however, liable to considerable variations. Fouquier has, in some cases, given twelve ounces of the compound daily, without any evident effect.

**TRIBE II.—DRYADEÆ.**

**GE'UM UR'BAN'UM, Linn. D.—COMMON AVENS.**

**HERB BENNET.**

Sex. Syst. Icosandra, Polygynia.

(Radix, D.)

—Pliny speaks of the medicinal properties of Geum. 

**Gen. Char.**—Tube of the calyx concave; limb five-cleft, with five-bracteolate. Petals five. Stamens numerous. Car-
pels juiceless, tailed, disposed in a head. *Style*, after flowers articulate or barbed. *Seed* ascending.—*Herbs*. *Leaves* variously pinnatisect (De Cand.)

**Sp. Char.**—*Stem* erect, branched, hairy. *Leaves* radical or pinnatisect; caulinar ones ternate-palmatisect, with ovate to toothed crenate-lobes; upper ones one-lobed, ovate. *Stipules* what orbicular, large. *Petals* obvolute, as long as the calyx. *Papillar head* spherical. *Ovaries* hairy, numerous. *Styles* with somewhat hairy appendices (De Cand.)

*Root* of many brown fibres. *Stem* one or two feet high, grass-green, veiny, hairy. *Flowers* terminal, solitary. *Petals* yellow.

**Hab.**—Indigenous. Growing in woods, hedges, and dry places.

**Description.**—The root (*radix caryophyllata*, seu *gei urbi sanamundae*) consists of a rootstalk of from one to three inches from which issues a considerable number of cylindrical fibres; externally it is brownish; internally, reddish. When recent it is aromatic and clove-like; but this is greatly diminished by its taste is aromatic, astringent, and bitterish. It should be gathered in the spring.

**Composition.**—The root has been the subject of repeated experiment. Thus it was examined by Muehlenstedt¹, Bouillon-Lagrange², Melandri and Moretti³, and Trommsdorf, the latter chemist found the constituents of the dried root to be as follows:—volatile oil 0·039, resin 4, tannin soluble in alcohol and water 10, tannin insoluble in alcohol and ether, with traces of gum 15·8, bassorin 9·2, ligneous fibre 30 [excess 0·039].

**Physiological Effects.**—Aromatic, tonic, and astringent.

**Uses.**—Scarcely employed as a medicine in this country. It has been used in chronic diarrhoea and dysentery, leucorrhoea, hemorrhages, and intermittent. It is put into ale, to command an agreeable clove-like flavour, and to prevent the liquor from sour. Infused in wine it has been used as a stomachic.

**Administration.**—Dose 5 to 10s., in powder or decoction, or four times a day.

6. **POTENTIL’LA TORMENTIL’LA, Sibthorp, L. E.—Common TORMENTIL, OR SEPTFOIL.**


*Sex. Syst.* Icosandria, Polygynia.

(Radix, L.—Root, E.)

**History.**—Sprengel⁴ considers this plant to be the "potentilla officinalis."
COMMON TORMENTIL.

Botany. Gen. Char. — Tube of the calyx concave; limb four- or five-cleft, externally four- or five-bracteolate. Petals four or five. Stamens numerous. Carpels numerous. Style lateral. Receptacle scumbent, persistent, juiceless, capitulate. Seed appended. — Herbs under-shrubs. Leaves compound. Stipules adnate to the petioles. Flowers white, yellow, rarely red (De Cand.)

Sp. Char. — Multiform, hairy. Root tuberous. Stem ascending, chotomous. Leaves ternate-palmatisect, the caulinar sessile; leaflets obovate-wedge-shaped, more or less deeply toothed. Stipules one or three-toothed. Flowers axillary, solitary, with long peduncles. Bracts palmate-incised. Segments of the calyx lanceolate-ear, as long as the corolla. Carpels rugose. Receptacles villose (De Cand.)

Stems weak, slender, often procumbent, branched. Leaves dark brown, somewhat hairy, especially the veins. Flowers bright-yellow.

Hab. — Indigenous; growing on barren pastures, heaths, and bushy brooks.

Description. — The root (radix tormentillae) is large, compared in size with the size of the plant. Its external form is very irregular; sometimes it is more or less cylindrical, at others tuberculated and lobby. Its colour externally is dark red-brown, internally flesh-coloured or brownish. Its taste is astringent. Its watery infusion is poured blackish-green (tannate of iron) by the sesquichloride of iron. A solution of gelatine causes a precipitate (tannate of gelatine) to form. By iodine, starch is detected in the root.

Composition. — Neumann and Pfaff submitted tormentilla root to a chemical investigation. Meissner made an analysis of it, and found the constituents to be as follows: — volatile oil a trace, tannin 4, colouring matter 18.05, ditto altered 2.57, resin 0.42, cerin 2.51, myricin 0.20, gummy extractive 4.32, gum (pectin?) 28.20, tractive 7.70, woody fibre 15.0, and water 0.45 (excess 0.82.)

Physiological Effects. — Astringent and tonic (see pp. 188). Uses. — Employed in chronic diarrhoea and dysentery, passiveorrhages, and intermitments. The decoction is also used as an astringent wash and injection; as in flabby ulcers, leucorrhoea, &c. The dysenteries of cattle it is reputed efficacious. In the Feroe and Orkney islands it is used to tan leather; in Lapland as a red dye.

Administration. — Dose 5 ss. to 5 j., in powder or decoction, three or four times a day.

Decoction of Tormentilla. (Kranz, bruised, 5 j.; Distilled Water, Ojss. Boil down to a pint, 1 strain). — Astringent and tonic. Used internally in chronic
diarrhoea.—Dose, f3j. to f3ij. Sometimes employed as an injection in leucorrhoea.

TRIBE III.—ROSEÆ.

7. RÓŠA CAŅÌNA, Linn. L. E. D.—COMMON DOG-ROSE.

Sex. Syst. Icosandria, Polygynia.

(Fructus Pulpa, L.—Hip of R. canina, and of several allied species, deprived of the carp. Fructus, D.)

HISTORY.—The κωνυφοῖδες, or Dog-Rose, of Hippocrates, is, perhaps, the same as the Rosa canina, Linn., which, according to Sibthorp, is a native of Greece. Pliny speaks of Rosa sylvestris, which he says is cynorrhodon (i.e., Dog-rose); but as he describes the sponge as growing on it, he probably referred to Rosa rubiginosa (Sweet Briar, Eglantine), on which it is more frequently found than on any other species.

BOTANY. Gen. Char.—Apex of the tube of the calyx divided into five; segments during aestivation somewhat imbricated at the apex, often pinnatisect. Petals five. Stigmas numerous. Carpels many, inserted on the calyx, subsequently united, inclosed within the calyx, dry, indehiscent, somewhat succulent, bearing the style on the inner side. Styles exerted from a narrowed tube of the calyx, free or aggregated into a column. Seed in an achenium, solitary, exalbuminous, inverted; straight; cotyledons flat.—Shrubs or small trees. Leaves pinnatisect, an odd one; leaflets serrate. Stipules adnate to the petiole (Cand.)

Sp. Char.—Prickles uniform, hooked. Leaves naked or hairy; their disk eglandulose. Calyx-segments fully pinnatisect, duous. Styles not united. Shoots assurgent (Hooker).

The British roses answering to these characters are subdivided by De Candolle (British Flora) as follows:

4. R. dametorum Woods, Smith. Leaflets more or less hairy, flat.
5. R. Fosteri, Smith. R. collina Woods. Leaflets more or less hairy.

De Candolle admits no less than nineteen varieties of R. canina, Linn.

Ramification variable in denseness. Shoots more or less aerial, according to the vigour of the plant. Prickles not very numerous, hooked in various degrees, and compressed; their base

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1 Opera, p. 387, ed. Fus.
2 Prod. Fl. Græc. 1. 349.
3 Hist. Nat. Lib. xxv. cap. 6, ed. Valp.
4 Prodr. M. 63.
COMMON DOG-ROSE. 1547

Leaflets variable in width; their serratures, although cely compound, except in β., are mostly irregular in size. Bracts able in size. Peduncle and calyx-tube commonly naked; their, when present, feble and not numerous; calyx-segments free a glands, or more or less copiously fringed with them. Styles ry. Fruit coral-red, or more scarlet [usually oblong, elliptical or de, rarely somewhat globose], soft and pulpy when ripe, with a...somewhat acid taste (Hooker).

Tab.—Indigenous. Thickets, hedges, &c.; very common. Flowers June and July. Perennial.

Description.—The fruit, used in medicine under the name of the tor hep (fructus rose caninae seu f. cynosbati), is oval, composed externally of the persistent calyx, whose sides have become thick, hy, beautifully red, shining; and internally, of numerous, hard, y akenia (commonly called seeds, but which, in fact, are the car, or real fruits), containing each an exalbuminous seed. The p or fleshy matter of the persistent calyx is sweet, acidulous, and ant to the taste, especially when mellowed by the frost. The s surrounding the akenia act as mechanical irritants, like the hairs ie pods of the cow-hage, and when swallowed are apt to occasion ic uneasiness, vomiting, and pruritus about the anus; whence of the French vulgar names for the fruit, gratte-culs.

Composition.—According to Bilz a, 100 parts of the dried ripe, deprived of akenia and hairs, consist of the following subces:—volatile oil a trace, fatty oil 0·065, myricin of the scale, soft resin of the pulp 1·419, reddish-yellow hard resin 0·463, in 0·260, incrystallizable sugar 30·6, gum 25·0, epidermis 4·552, illary fibre 14·0, citric acid 2·95, malic acid 7·776, citrates, stes, mineral salts, water (and loss) 12·865.

Physiological Effects and Uses.—The pulp is nutritive and ty refrigerant and astringent. It is only employed in medicine preparation of a conserve.

INFECTIO ROSE CANE, L.; Conserva Rose Fructus, E.; Cone a Cynosbati; Conserve of Dog-Rose; Conserve of Hips. (Dog- a [Pulp of the fruit], lb. j.; Sugar, powdered, 5xx. Expose the of the Rose to a gentle heat in an earthen vessel; then gradually the Sugar, and rub together until they are thoroughly incorpo, L.—Take any convenient quantity of Hips, carefully deprived heir carpels; beat them to a fine pulp, adding, gradually, thrice a weight of white sugar, E.)—In the preparation of this conserve akenia or carpels (commonly termed seeds), with their hairs, must carefully separated, on account of the irritation they are apt to arson (see above).—It is probable that the fruit of several varieties species?) are employed indiscriminately in the preparation of this serve. The observation of Sir J. E. Smith deserves notice, that flavour of the fruits, casually gathered late in autumn, present a

great diversity of flavour. This conserve, being saccharine and acidulous, is nutritive and refrigerant. It is usually employed as a convenient and agreeable vehicle for other remedies; as a basis, or for the making of electuary or linctuses. A very agreeable pectoral linctus containing almond oil, and, sometimes, opium, is made with this conserve, acidulated with dilute spirit of wine. A drawback to the use of this conserve is its tendency to solidify or concrete by keeping.

8. RÓSA GAL' LIC A, Linn. L. E. D.—FRENCH OR RED ROSE

Sex. Syst. Icosandra, Polygynia.

(Petala, L. D.—Petals, E.)

History.—Perhaps our red rose may be the Rosa Milesia of the colour of which, he says, was very warm ardentissim, whose petals did not exceed twelve in number. The Rosa Turbinata he adds, stands next to this, but is less red.

Botany. Gen. Char.—See Rosa canina.

Sp. Char.—Prickles unequal. Stipules narrow, straggling at point. Leaflets five to seven, coriaceous, rigid, ovate or lanceolate, deflexed. Flower-bud ovate-globose. Sepals spreading, suberect. Fruit somewhat globose, very coriaceous. Colyces denticles more or less very finely glandulose-hispid, somewhat pubescent.

(De Cand.)

A small shrub. Very variable in form.—De Candolle enumerates twelve distinct varieties. Mr. G. Don enumerates more than five hundred sorts cultivated by gardeners. And we are told that Dutch cultivators have more than five hundred varieties. They are cultivated at Mitcham, where it is called the Damask Rose, but is to me to be R. gallica, var. officinalis, De Candolle.

Hab.—South of Europe. Common in gardens. For culinary purposes cultivated at Mitcham.

Description.—The dried petals of the unexpanded flower of the damask rose, proved by their white claws or heels (ungues), constitute the leaves (flores rosa rubrae) of the shops. The flower-buds are to market when about the size of a large nutmeg. The claws of the petals being cut off, the petals are speedily dried. At Mitcham they are dried in a stove. Slow desiccation impairs both the tenderness and colour. The petals of the buds are much more tender than of the full-blown flowers; hence they are preferred for medicinal use. When dried they are sifted to remove the stamens, &c. 2,000 flowers yield about 100 lbs. of fresh petals, or 1 lb. of dried ones. The dried petals have a velvety appearance and a rich, purple-red colour; their odour, which is principally de
RED ROSE.

Resiccation, is agreeable; their taste is bitterish and astringent; they lose their fine colour when exposed to light and air, apt to become mouldy or worm-eaten, they should be carefully preserved in bottles or canisters.

Situation.—The petals were analyzed by Cartier, who found various substances:—volatile oil, colouring matter, tannin, id, fatty matter, albumen, soluble potash salts, calcareous salts, silica, and oxide of iron.

Astringent Matter (tannic and gallic acid).—The presence of an astringent brown by the very dark colour (tantate and gallate of iron) produced in a of red roses by the ferruginous salts, and by the slight precipitate (gelatine) caused on the addition of a solution of gelatine.

Oxidation Matter.—Has not yet been isolated. A watery infusion of leaves has a pale yellowish red colour: the alcoholic tincture is also pale. On the addition of sulphuric acid an intense bright red colour is produced (of the colouring matter). Alkalis communicate a greenish tint to the infusion (probably by neutralizing the free acid to which, with the matter, the red tincture is owing). Sulphurous acid destroys the colour of roses (sulphate of colouring matter?) but on the addition of sulphuric acid the intense bright red (sulphate of iron) is produced with an evoluble sulphurous acid gas. Dr. Clarke and others supposed that the red oxide of iron; but both Gay-Lussac and Cartier found more iron in red roses. Thus 1000 grains of the white rose yielded the latter, grains of ashes containing 12.4 of iron; while the like quantity of rose yielded 50 grains of ashes, in which were only 4 grains of oxide.

Sonic Effects and Uses.—Red rose leaves are mild solvents and tonics; but their power is exceedingly slight, and deserves notice. By the Arabian physicians, Avicenna and as well as by more recent writers, Riverius, Krüger, and conserve of roses was esteemed a valuable remedy in phthisis. Present time red rose leaves are principally used for their dried flavour. They yield several officinal preparations, which are forming elegant vehicles for the exhibition of other active medicines. The full-blown flowers are said to be as those of R. centifolia. "Poterius relates, that he found of powdered red roses occasion three or four stools, and in a few instances, but constantly, in an extensive practice of years."

SUM ROSE COMPOSITUM, L.; Infusum Roseae, E.; Infusions Roseum, D. Infusion of Roses.—[Petals of Rosa gallica delimited claws, D.], dried, 5ij. [3ss. D.]; Diluted Sulphuric acid, 5ij. [3ij. D.]; Sugar [pure, E., refined, D.], 3v. [3ss. D.]; Water [distilled, L.], 0ij. [Oij. wine-measure, D.]. Pour the on the Rose petals in a glass vessel; then mix in the Acid. for six hours [half an hour, D.], and strain the liquor 3l, D.]; lastly, add the sugar to it, L. D.—The Edinburgh

* Journ. de Pharm. vii.
* Murray, App. Med. iii. 158.
College infuses the petals in the water for four hours, in a vessel of glass or porcelain, not glazed with lead; then adds the acid, through linen or calico, and dissolves the sugar in the spirit or liquor.—The lengthened maceration of six, or even four hours, is unnecessary. An hour, or perhaps even half an hour, is sufficient. Infusion of roses is a mild, but very agreeable, refrescentic astringent, and is a very pleasant drink in febrile disorders, rhages, diarrhoea, and colliquative sweats. It forms a very good vehicle for other medicines; as for saline purgatives (especially the free sulphate of magnesia, the unpleasant taste of which it serves greatly to correct), for disulphate of quina (which is dissolved in the water), for the free sulphuric acid, which also serves to prevent the tarnishing of the roses precipitating the quina), the mineral acids, tinctures and infusions, alum, &c. It serves as a very useful granulator which purpose acids, nitre, alum, or tincture of capsicum, and is conjoined. Of course the alkalis and the earths, as well as the carbonates, are incompatible with it; they neutralize the acid and change the colour of the preparation to green. Sulphate of roses communicates a deep olive colour, and after some hours of precipitate. The sulphuric acid of the infusion of roses detaches and destroys the activity of acetate of lead, by forming sulphydrous lead. It is a common practice, however, though of course ignorant practitioners only, to administer, in hemorrhages composed of acetate of lead and opium, and at the same time infusion of roses? (see p. 809). The dose of infusion of roses is 4f. Each 4f. contains 41xvss. of dilute sulphuric acid, which is nearly equivalent to three-sevenths of a minim of strong sulphuric acid.

2. CONJECTIO ROSEM AGLICAE, L.; Conserva Rosae, E. D. of Red Roses.—(Petals of the Rosa gallica [petals of the rose] j. lb. j.; Sugar refined, D. jb. iij. rose petals in a stone mortar, then, the sugar being added, be again until they are thoroughly incorporated, L. D.—Beat the petals of the Rosa gallica to a pulp, gradually adding thrice their weight of white sugar, E.)—This preparation is slightly astringent. It is merly much esteemed in phthisis (see p. 1549). Its principal use is as a vehicle for the exhibition of other medicines. The common pill-basis for calomel, disulphate of quina, &c. hydrargyri (see p. 724) are prepared with it. Alone or with the confection of dog rose (see p. 1547) it forms the base of some elegant pectoral liniments or electuaries, containing about a third of concentrated sulphuric acid, syrup of poppies, &c. Over the course of dog rose it has the advantage of having no tendency to ferment. Furthermore, it does not ferment or become mouldy.—Dose 3 or more.

3. MEL ROSE, L. E. D.; Honey of Roses.—(Petals of Rose [Petals of the buds, deprived of their claws, D.], Boiling Water, Oijss. [Oij. wine measure, D.]; Honey, Boil for six hours; then cerate the Rose petals in the Water for six hours; then
CABBAGE ROSE.

1. floats on the water in the receiver.

...it should be preserved in well-
...it of wine ought not to be
...added to preserve the
...Rose water is
...in addition to lotions,

Obtained in the
...concretes and floats
...in southern India, rose water
...The precise species of
...where the attar is exten-
...n Persia, has not been satisfac-
...place a rose with white flowers is
...\textit{Rosa centifolia}, a crystalline volatile oil with
...It is something less than three drachms of
...in India, the season must be very
...evaporation carefully performed. Jackson states,
...in roses it is generally calculated that 180 grains,
...can be procured. Heber\textsuperscript{f} says, 20,000 roses
...weight to that of a rupee. According to Donald
...is procured without distillation, merely by mace-
...n water. But Trommsdorff\textsuperscript{h} tried the method, and
...any oil.

...imported from Constantinople and Smyrna. The
...d. per lb. In 1838, 973 lbs.; in 1839, 745 lbs. paid

...below 90° F. attar of roses is a crystalline solid.
...most colourless, but Polier says, colour is no criterion
...of quality, or country. Undiluted, its odour is some-
...ful to be agreeable, but, when properly diffused
...some liquid, is most delicious. It is combustible,
...forms an explosive mixture. It fuses at between
...F. Its sp. gr. at 90° F. is 0.832; water at 60° F.
...F. 1000 parts of alcohol (sp. gr. 0.806) dissolve
...2° F. 33 parts of attar.

...has been analyzed by Saussure and Blanchett, but
...not accord.

\textsuperscript{1} Research. i. 332; Jackson, \textit{Ed. New Phil. Journ.} xxviii. 236.
\textsuperscript{2} i. 201.
\textsuperscript{3} \textit{Pharm.} ii. 127.
\textsuperscript{4} 266.
\textsuperscript{5} id and Pharm. Chym. ii. 311.
\textsuperscript{6} \textit{makogn.}
\textsuperscript{7} \textit{Chim. et Phys.} xiii. 337.
When freed from the calyx cups and stamens they are to be dried in the air. Unlike the petals of R. gallica, desiccation diminishes its fragrance. Their odour is said to be singularly exalted by iodin. Their taste is sweetish, though somewhat acidulous and bitter. Preserve them rose leaves are frequently pickled or salted (flora saliti) like elder flowers (see p. 1443).

**Composition.**—I am unacquainted with any analysis of the petals of the Rosa centifolia. The following, however, may be regarded as ascertained constituents:—volatile oil, gallic (and tannin), colouring matter, a saccharine matter (sweet extractive of flowers), woody fibre, mineral salts, and oxide of iron.

1. **Volatile Oil.** (see p. 1553).

2. **Laxative Principle.** (Sweet extractive of Pflafl)—The nature of the extractive principle of the hundred-leaved rose has scarcely been examined. It declares it to be sweet extractive.

**Physiological Effects and Uses.**—The petals are mildly laxative, and are employed, on this account, in the form of syrup Syrupus Rose.

On account of its delightful fragrance, this rose is in common for nsegayas and scent-bags, and is employed for the distillation of rose water. Its odorous emanations, however, are not always salutary; but on some persons have acted as a poison, causing vomiting, which, for the most part, are those indicating a disorder of the cerebro-spinal system—such as headache, fainting, muscular symptoms; and occasionally giving rise to local irritation, manifested by sneezing and inflammation of the eyes.

1. **Syrupus Rose.** L. D.; Syrupus Rosa centifolia. E.; Syrupus Rose; Syrup of Damask Rose. (Petals of Rosa centifolia [L. Rose, E.] dried, 5vij. [lb. j. E.]; Sugar [pure, E.], lb. vj. [E.]; Boiling Water, Oij. [Oij. wine measure, D.].) Macerate the Ros petals in the Water for twelve hours, and strain. [Eva the strained liquor, in a water-bath, to Oij. L. D.] Then add sugar [dissolve with the aid of heat, E. and strain].—Gently tive. Used only for young children. Dose, f5ij. to f3j. 1 colour is heightened by acids; alkalis change it to green or yellow.

2. **Aqua Rose.** L. E. D.; Rose Water. (Petals of Rosa centifolia [L. Rose, x.]; Proof Spirit, f3vij. [Rectified Spirit, f3ij. E.]; Water, j). Let a gallon distil.—"The petals should be preferred when but it also answers well to use those which have been preserved beating them with twice their weight of muriate of soda," E.-Dublin College directs lb. viij. of the petals of Rosa centifolia, in sufficient quantity of water, to prevent empyreuma. Distil a gallon—Rose water is prepared both from fresh and pickled rose leaves of course the former are preferable. During its distillation...
CABBAGE ROSE.

Cabbage oil comes over with it, and floats on the water in the receiver. Prevent the water becoming sour it should be preserved in well-closed bottles, kept in cool places. Spirit of wine ought not to be added with it, for if a sufficient quantity be added to preserve the oil, it renders it unfit for some medicinal purposes. Rose water is used, on account of its odour only, as an addition to lotions, tinctures, &c.

OLEUM ROSEAE, E.; Attar or Otto of Roses. Obtained in the East by distilling roses with water. The attar concretes and floats the distilled water when cold. In Northern India, rose water and attar are distilled from R. damascena. The precise species of rose used at Ghazeepoor, in Hindostan, where the attar is extensively distilled, as well as at Shiraz, in Persia, has not been satisfactorily ascertained. At the latter place a rose with white flowers is said to be used. Is it R. moschata? In the manufacture of rose water in England, from R. Centifolia, a crystalline volatile oil with the odour of the attar is frequently obtained (English attar of roses). One of the Attar of roses imported from Constantinople and Smyrna. The price on it is 1s. 4d. per lb. In 1838, 973 lbs.; in 1839, 745 lbs. paid for.

Attar of roses is imported from Constantinople and Smyrna. The price on it is 1s. 4d. per lb. In 1838, 973 lbs.; in 1839, 745 lbs. paid for.

At temperatures below 80° F., attar of roses is a crystalline solid, is usually almost colourless, but Polier says, colour is no criterion of its goodness. Quality, or country. Undiluted, its odour is somewhat powerful to be agreeable, but, when properly diffused through the air or some liquid, is most delicious. It is combustible, and with oxygen forms an explosive mixture. It fuses at between 69° F. and 80° F. Its sp. gr. at 90° F. is 0.832; water at 60° F. 1° 0.5. At 57° F. 1000 parts of alcohol (sp. gr. 0.806) dissolve it, and at 72° F. 33 parts of attar.

Attar of roses has been analyzed by Saussure and Blanchett, but the results do not accord.

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7 Yeo, Hist. Nat. Pharm. ii. 127.
8 Narrative, i. 355.
10 Martius, Pharmacogn.
11 Trade List.
Sandal-wood oil, oil of rhodium, some of the fixed oils, and es-maceti, have been said to be occasionally employed for adulterating attar of roses. But as far as my observation extends the attar found in the shops of London is very pure.

Attar of roses consists of two volatile oils; one solid, the other liquid, at ordinary temperatures, in the proportion of about one part of the first to two parts of the second. To separate them the attar is to be frozen and compressed between folds of blotting paper which absorbs the liquid and leaves the solid oil; or they may be separated by alcohol (of sp. gr. 0.8), which dissolves the liquid, it takes up scarcely any thing of the solid oil.

a. Solid Oil of Roses (Rose-Camphor; Stiaroptène of Oil of Roses).—Occurs in crystalline plates, fusible at about 95° F. It is composed, according to Saussure, of carbon 86.743, and hydrogen 14.889; or an equal number of atoms of carbon and hydrogen. Blanchet states its composition, to be, carbon 85.86, hydrogen 14.46.

b. Liquid Oil of Roses (Éléoptène of Oil of Roses).—Has not been accurately examined. But from Saussure’s analysis of the ordinary attar and of its stearène, it would appear to contain oxygen and nitrogen, in addition to carbon and hydrogen. By calculation the proportions appear to be, carbon 80.56, hydrogen 12.42, oxygen 3.92, nitrogen 1.98.

Attar of roses is employed for scenting only. In the shops various perfumes are sold, which owe their odour to the attar. Thus oil of the hair, sold as huile antique rouge à la rose, is merely olive oil flavoured by alkanet (see p. 1262), and scented with the attar. Oil of roses also contains the attar. Several compound scents owe a portion of their fragrance to this oil, as lavender water. Edinburgh College has, very properly, as I conceive, introduced this oil into the pharmacopoeia; for, as medicines frequently require to be perfumed, I cannot conceive why the most delicious perfume should be excluded from the Materia Medica. It may be employed as an addition to ungents, spirit washes, &c.

**Tribe IV.—Pomaceæ.**

10. CYDONIA VULGA'RIS, Persoon, L. E.—COMMON QUINCE.

_Pyrus Cydonia, Linn.

_Sex. Syst. Icosandria, Pentagynia._

(Semina, D.)

**History.**—Hippocrates ¹ employed the quince-apple (cretona) in

¹ Dumas, _Traité de Chim. l. 494.
² Opera, 497, ed. Fexs.
a little ball (pilula), in another a sponglet (spongiosa). It is produced by the puncture of several insect species; viz. Cinips Rosei and Dendrii (both of which are elaborately described by Ratzeburg*), and a species of Epipolidae are also found in these cases. The Bedeguar is a memorable size, somewhat over and a half inch in diameter, and it looks more like a sponge than covered with a revolute skin, which are at times of a dark purple. The wall of the capsule is composed of cells, and where the spiral vessels join the wall of the capsule is the larva. The sponglets (larvae) are usually slightly astringent, and it was formerly given in small doses as a remedy against toothache. More recently it has been used as a liniment for baldness, being mixed with bear's grease, for the

L. Jussieu.—THE BEAN TRIBE.

Phaseae. Lindley.

The legumes, or a single (rarely of four) sepals, more or less united five-toothed, five-cleft, or five-partite; sepals unequally coherent, in others concreted into two lips; sepals, which are either free at the apex or united; generally distinct at the apex. Petals five, or, by e, or none; generally unequal, inserted usually rarely on the torus; in general variously imbricate, always free, sometimes united into a gamopetalous Papilionaceae, the petals form a butterfly-shaped or papilionaceous corolla, composed of a large upper petal called vexillum or standard, two lateral ones termed alae or wings, and an inferior keel-shaped one denominated carina or keel, and which is, in fact, composed of two petals adherent to their margin. Stamens inserted with the petals, generally double the number of the latter, rarely triple or quadrupled or fewer; altogether free, or the filaments variously connected, being monadelphous, with the tube entire or cleft above, or diadelphous nine and one, or five and five, very rarely triadelphous; anthers two-celled. Carpel generally one, the others being abortive; or two to five. Ovary oblong or ovate, sessile or stipitate, free, or, very rarely, adnate by the stipe to the calyx. Style one, filiform, arising from the upper suture: stigma terminal or lateral. Legumes two-valved, membranous; coriaceous, rarely fleshy or drupaceous, dehiscent or indehiscent, one-celled; or by the folding in of one of the sutures, longi-
Physiological Effects.—The fruit is not eatable in its natural state. Stewed in pies or tarts, along with apples, it is much esteemed. The expressed juice (succus cydoniae) is said to be cooling and salutary. An excellent marmalade (mica cydoniae) and syrup are prepared from the quince by the confectioner. The mucilage of the seed is nutritive, demulcent, and emollient. The whole plant taken in large quantity, would, perhaps, act like bitter alembic (p. 1537), as they are said to yield hydrocyanic acid.

Uses.—Quince seeds are employed in medicine only on account of the mucilage which they yield.

Decoctum Cydoniae, L. Mucilage of Quince Seed. (Quinca, 31j.; Distilled Water, Oj. Boil with a gentle heat for ten minutes and strain).—Never used internally. Employed externally as an emollient and sheathing application to cracked lips and the inflamed conjunctiva; to the skin when affected with scabies; to painful hemorrhoidal tumours, &c. Hair-dressing as a cement, for dressing the hair in braids.

Other Medicinal Rosaceae.

1. Cherry Tree Gum.—From the stems of the Cherry (Cerasus avium (Prunus domestica), and some other rosaceous trees, there exudes a mucilaginous liquor, which concretes into tears, forming the gummi nostras, cherry gum (gummi cerasi), plum tree gum (gummi pruni), &c. It may be employed as a substitute for tragacanth gum. It consists of two gummy substances, one called arabine (see gum Arabie), soluble in cold water; the other prunin or cerasin, insoluble in cold, but soluble in hot water.

2. Alchemilla arvensis, Field Ladies' Mantle, or Parsley Piert, indigenous, herbaceous plant, with green flowers. It belongs to Monongynia, in the sexual system. It is astringent (owing to tannin) and, perhaps, slightly mucilaginous. It was formerly eaten raw or powdered; thought serviceable in cases of gravel or stone: hence it was called gravel-root. Praetorius regards it as a diuretic, and as producing, in particular states of the system, a large secretion of lithic acid. A strong infusion of it, frequently, sometimes gives great relief, he says, in the less severe cases of phosphatic or earthy deposit, where the source of irritation is chiefly in the urinary organs, and where the constitution is sound, and the stone remarkably reduced.

3. Bedeguar.—On various species of Rosa, perhaps most frequently rubiginosus, the Sweet Briar or Églantine, is found a remarkable gall, or Sweet Briar Sponge (Bedeguar seu Fungus Rosarum). Pliny termst, in
a little ball (pilula); in another a sponglet (spongila). It is produced by the puncture of several insect species; viz. Cynips Roseae and Brambilii (both of which are elaborately described by Ratzeburg *), and a species of Mesoleptus. Other species (as those of Diplolepis and Pteromalus) are also found in these galls; but they are probably parasites, and not the true inhabitants. The Bedeguar is usually rounded, but of variable size, sometimes being an inch, or an inch and a half, or more, in diameter. Externally it looks shaggy, or like a ball of moss, being covered with moss-like branching fibres, which are at first green, but become afterwards purple. The nucleus is composed principally of cellular tissue, with woody fibre; and where the fibres are attached, bundles of spiral vessels.

Internally there are numerous cells, in each of which is the larva; if opened about August or September, maggots (larvae) are usually is inodorous, or nearly so; its taste is slightly astringent, and it saliva brownish. It has not been analyzed, but is suspected to contain gallic acid. Dried and powdered, it was formerly given in from ten to forty grains, as a diuretic and lithotrity. More recently recommended as an anthelmintic, and as a remedy against toothache. The ashes mixed with honey were used as a liniment for baldness.

place he speaks of the fungus being mixed with bear's grease, for the

XI. LEGUMINOSÆ, Jussieu.—THE BEAN TRIBE.

**Fabaceae, Lindley.**

**Character.**—Calyx of five (rarely of four) sepals, more or less united, and, therefore, five-toothed, five-cleft, or five-partite; sepals unattached; in some cases almost equally coherent, in others concreted into two lips; or consisting of two sepals, which are either free at the apex or united; or of three sepals generally distinct at the apex. Petals five, or, by four, three, two, one, or none; generally unequal, inserted usually on the edge of the calyx, rarely on the torus; in general variously imbricate, almost always free, sometimes united into a gamopetalous corolla. In the sub-order Papilionaceae, the petals form a butterfly-shaped or papilionaceous corolla, composed of a large upper petal called vexillum or standard, two lateral ones termed ala or wings, and an inferior keel-shaped one denominated corona or keel, and which is, in fact, composed of two petals adherent to their margin. Stamens inserted with the petals, generally double the number of the latter, rarely triple or quadruple or fewer; altogether free, or the filaments variously connected, being monadelphous, with the tube entire or cleft above, or diadelphous nine and one, or five and five, very rarely triadelphous: anthers two-celled. Carpels generally one, the others being abortive; or two to five. Ovary oblong or ovate, sessile or stipitate, free, or, very rarely, adnate by the stipe to the calyx. Style one, filiform, arising from the upper suture: stigma terminal or lateral. Legumes two-valved, membranous; coriaceous, rarely fleshy or drupaceous, dehiscent or indehiscent, one-celled, or by the folding in of one of the sutures, longitu-
Finally two-celled; or by isthmi or articulations, transversely many-seeded alternately into each whorl; solitary, affixed to the upper sessile, rarely expanded into an: testa smooth, frequently very small and stony: endosperms often tunnelling albumen. Embryo straight [rectembris], or curved [briori], the radicle being inflexed commissure of the lobes (homo pleurokhisus); in either case the first cotyledon germinating within the seed, under ground.—Trees, shrubs, with alternate, bipinnate or pinnately-compounded leaves, from De Candolle, with: within the square brackets).

Properties.—Exceedingly variable organs of different, closely-allied, species are found to elaborate most dissimilar principles; and, of course, the medicinal, or poisonous properties in a corresponding manner. For details, consult Dierbach, *Abhandlung von der Pflanze*; and De Candolle, *Essai sur les Propr. Méd.*

Sub-Order I.—PAPILOMACEAE.

1. MYROSPER'MUM PERUIF'ERUM, De Candolle, E.—THE QUINO.

Myroxylon perueiferum, Linn. L. D.

*Sex. Syst.* Decandria, Monogynia.

(Balsamum liquidum, L.—Fluid balsamic exudation, E.—Balsamum, R.)

History.—This balsam was first mentioned by Nicholas M under the name of *balsamum*. No accurate notions of the treyit were entertained until 1781, when Mutis sent some bran it to the younger Linnæus*

Ruiz afterwards described it.

Botany. Gen. Char.—Calyx campylar, five-toothed, pet Perals five, the upper one largest. Stamens ten, free. Ovar tate, oblong, membranous, with two to six ovules; style towa apex filiform, lateral. Legume, with stalk naked at the base winged inferiorly, samaroidal [legumen samaroides] De Cand elhisc, one-celled, one or two-seeded, laterally pointed style. Seed besmeared with balsamic juice: cotyledons thick, (De Caud.)
QUINQUINO.

Char.—Leaves coriaceous, persistent, smooth as well as the
Drupe. Wing of the legume very thick, not veined. Style deci-

tis. (De Cand.)

branching, elegant tree. Bark thick, very resinous. Leaves
Drupe, alternate; leaflets two to five pairs, alternate ovate-lanceo-

Racemes axillary. Petals white. Legume somewhat corias,

straw-coloured, about four inches long including the stalk.

reniform.

Peru, New Grenada, Columbia, and Mexico. Grows in

warm, and sunny situations.—Flowers from August to October.

Collection.—Monardes¹ says, that there are two modes of pro-

lating the balsam; viz. incision into the bark of the tree, and coct

cu of the branches and trunk in water. The first method yields a

t liquid balsam, the second a blackish red liquid. Ruiz² states,

the white liquid balsam is preserved for years in bottles, in the

state; but when deposited in mats or calabashes, which is com-

monly done in Carthagena, and in the mountains of Tolu, it, after

time, condenses and hardens into resin, and is then denominated

white balsam, or balsam of Tolu; while the extract made by boil-

ing the bark in water is blackish, remains liquid, and is known by

name of black Peruvian balsam. There is, however, obviously

confusion in this statement; and several reasons have led phar-

macologists to doubt whether the black balsam of the shops is obtained

action. Ruiz does not speak from his own observation, but on

authority of Valmont de Bomare. Lastly, Hernandez³ says, the

balsam obtained by incision is yellowish-black (c fulvo in nigrum).

Guibourt has received, from M. Bazire, balsam of Peru, in

which he obtained in great abundance on the coast of Son Sonaté,

the state of San-Salvador (the republic of Guatimala) by im-

mersing in the stem of a Myospermum, whose fruit is very diffe-

to that of M. peruliferum⁴. Th. Martius⁵ suggests, that the

balsam of Peru is procured by a kind of destillatio per descen-

sio; but the absence of pyrogenous products in the balsam seems to

be opposed to this opinion.

Commerce.—Balsam of Peru is imported in pear-shaped earthen

pots and in tin canisters, from Valparaiso, Islay, Lima, Truxillo,

to, Iquique, Belize, &c. The duty (1s. per lb), paid on it during

last six years, is as follows⁶:

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantity</th>
<th>Weight</th>
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<tbody>
<tr>
<td>1834</td>
<td>1692 lbs.</td>
<td></td>
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<tr>
<td>1835</td>
<td>243</td>
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<tr>
<td>1836</td>
<td>880</td>
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<td>1837</td>
<td>1331 lbs.</td>
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<td>1838</td>
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</tr>
<tr>
<td>1839</td>
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Description.—Balsam of Peru (balsamum peruvianum) called also

or liquid balsam of Peru (balsamum peruvianum nigrum) is a

parent, deep, reddish-brown or black liquid, which has the con-

⁴ Hist. des Drog. ii. 590, 3d ed.
⁵ Pharmakoop.
⁶ Trade List.
sistence of treacle, a powerful but agreeable odour, somewhat similar to that of vanilla and benzoin, and which is increased by doping the balsam on a red-hot coal, and a warm, acrid, bitter taste. It is inflammable, and burns with a fuliginous flame. It is soluble in alcohol; the solution, however, is not clear, but lets fall after some time a deposit. To boiling water it yields its acid, usually stated to be the benzoic, but according to Fremy and others, it appears to be the cinnamonic acid. Its sp. gr. is 1.150 to 1.160.

I have received from Professor Guibourt another balsamic substance under the name of balsam of Peru in cocoa-nut shells (le buis du Pérou en cocos). The shell has the size and shape of a lemon. The contained balsam is a deep brown, and has an odor very similar to that of balsam of Tolu. Guibourt says, "it appears to be formed of two kinds of matter: one more fluid, another solid, smoky, and as it were crystalline. Its taste is mild and sweetish. It has a strong agreeable odour, between that of Tolu and soft liquidambar, but distinct from both."

The white balsam of Peru (balsamum peruvianum album) of M. and other pharmacologists, is said, by Guibourt, to be the balsam of liquidambar already described (p. 1070).

ADULTERATION.—Balsam of Peru is said to be subject to adulteration; and the formulæ given by Gray for making as well reducing (i.e. adulterating) it, lend support to this opinion. Demand for the balsam being small, the supply quite equal even exceeding the demand, and the price being moderate, circumstances which appear to remove all motive for adulteration which I do not think is at present practised in this country. Characters to be attended to in judging of its genuineness are purity of its odour, its complete solubility in, or miscibility with alcohol (by which the absence of fixed oil is shown), and its going no diminution of volume when mixed with water, (by the absence of alcohol is proved). A sign of its purity is, that parts of it should saturate 75 parts of pure crystallised carbon potash.

COMPOSITION.—Balsam of Peru has been elaborately investigated by several chemists, and the results obtained are somewhat as follows:

In 1806 it was examined by Lichtenberg. Stoltze, in 1825, published an analysis of it. Richter, Plantamour, and Fremy, since examined the nature of its constituents.

<table>
<thead>
<tr>
<th>Stoltze's Analysis</th>
<th>Fremy's Analysis</th>
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<tbody>
<tr>
<td>Brown slightly soluble resin</td>
<td>24</td>
</tr>
<tr>
<td>Brown resin</td>
<td>30.7</td>
</tr>
<tr>
<td>Oil of balsam of Peru (cinnamome)</td>
<td>69.6</td>
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<tr>
<td>Benzoic (cinnamome) acid</td>
<td>64</td>
</tr>
<tr>
<td>Extractive</td>
<td>0.6</td>
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<tr>
<td>Loss and moisture</td>
<td>0.5</td>
</tr>
<tr>
<td>Balsam of Peru</td>
<td>100.0</td>
</tr>
</tbody>
</table>

1. An oily matter (cinnamome), frequently, in solution, a crystalline (metacinnamome; hydrate of cinnamome) 2. Cinnamonic acid. 3. One or more resins (hydrates of cinnamome).
THE QUININO.

BALEAM OF PERU. Cinnaméine of Fremy.—If an alcoholic solution be added to an alcoholic solution of balm of Peru, a compound of potash (resinate of potash) is precipitated, while cinnamomate of potash is left in solution. On the addition of water the latter separates on the surface. It is to be purified by solution in petroleum, and is a reddish-brown, acid, odourless, oily fluid, heavier than water, alcohol and ether, insoluble in water, and inflammable. Its composition, according to Fremy, is (taking the average of five experiments), carbon 62.26, oxygen 14:74. His formula for it, which, however, scarcely agrees with this statement, is C₁₈₈ H₃₈ O₈ [C₁₄₄ H₃₅ O₃₀ Liebig]. Caustic potash changes it into an analogous to saponification, and converts it into two compounds of cinnamonic acid (equal to C₉₈ H₁₄ O₆) and a light oily fluid, which is neperumine, whose composition is, carbon 79.6, hydrogen 9.3, oxygen 11:1. This is C₁₈₅ H₃₂ O₂ [C₉₈ H₃₅ O₄ Liebig]. Cinnaméine frequently (but not always) contains in solution a crystalline substance, termed metacinnaméine, position is, carbon 81.9, hydrogen 6.0, oxygen 12:1; its formula being H₃₉₂ O₈. It is known to be isomeric with hydruret of cinnamyl. Fremy asserts that oil of balm of Peru is composed of two distinct oils; the redder one, termed merospermine, which is soluble in alcohol; the other, termed insoluble in alcohol. What relation these oils bear to cinnaméine is not yet been made out.

AMMONIC ACID. Cinnamic Acid (see p. 1144).—This constituent has been mistaken for benzoic acid. It is obviously formed in the balsam of gum the hydruret of cinnamyl, just as hydruret of benzole is formed into benzoic acid (see p. 1535). In those balsams of Peru which contain cinnaméine, this principle has been entirely converted into..............................................................................................................................

OF BALSAM OF PERU. Hydroate of Cinnaméine.—The quantity of resin of Peru augments daily. It is formed by the union of cinnaméine with water; for its composition is, carbon 71.82, hydrogen 6.78, oxygen 21.39, or C₅₄ H₄₀ O₁₂. So that this resin consists of one equivalent of resin, and four equivalents of water. It is not, however, formed at once, but by undergoing different degrees of viscosity. Soft resin differs from hard resin in its elements of water. Sulphuric acid converts cinnaméine into cinnamic acid.

The general results of Fremy's analysis show the correctness of some of his statements; but the correctness of some may be fairly called in question. His formulae do not always agree with experimental results (see Cinnaméine). Plantamour denies the accuracy of Fremy's statements.

Pharmacological Effects.—Stimulant, slightly tonic, expectorant, and emollient. Its action is similar to other balsamics (see p. 183), and is closely allied to that of storax and toin QCOMPARE. Topically it operates as a stimulant and mild astringent and when applied to foul indolent ulcers, often cleanses and promotes their cicatization. Taken internally, in full doses, it creates thirst, and quickens the pulse. Its stimulant influence is exerted on the secreting organs, especially the bronchial mucous membrane. It is devoid of the powerful influence over the urinary organs possessed by copaiva and the turpentines, and its tonic powers are equal to those of myrrh.

Its supposed efficacy in curing external ulcers and healing ulcers has led to its use in internal diseases, formerly apprehended on ulceration, as in pulmonary affections supposed to be, really were, phthisis. But the observations of Dr. Fothergill led to the discontinuance of the indiscriminate use of balm of Peru.
of balsams and other heating substances in these cases proves serviceable in some old asthmatic cases, chronic catarrhs, winter coughs, &c. It seems to be principally an old standing chronic affections of the mucous membranes (the bronchial mucous membrane), particularly in persons and torpid habit. Its stimulant influence is calculated only to acute cases.

Many other uses of balsam of Peru are now obsolete: ployment in lead colic, as recommended by Sydenham; ing and leucorrhea, by Hoffman; in convulsions from reparation: by Kirkland, and externally and internally in tetanus, by Dr. Kollock. It is said to be now and the chronic rheumatism. The beneficial effects ascribed by and Pidoux to the balsams in chronic laryngitis have been (p. 183) referred to.

As a topical remedy, balsam of Peru is occasionally emploped either alone, or in the form of ointment, to in conditined ulcers; it cleanses them, promotes healthy g and assists cicatization. I have used it in some obstinate about the nose. Dr. Ainslie speaks very highly of its arresting the progress of phlegmous and phagedenic affections common and destructive in India. He recommends lint, the balsam, to be applied night and morning. In off charges from the ear it is now and then dropped in after It is a constituent of some lip-salves. It was formerly est vulnerary against wounds of the tendons and nerves. It perfumers for scenting, and in the manufacture of fumigati

**ADMINISTRATION.**—Dose, 5ss. to 5j. It may be take or made into pills with some absorbent powder, or diffused water by means of sugar, honey, gum, or yolk of egg.

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2. **MYROSPERMUM TOLUIFERUM, Richard, E.—THE B. TOLU-TREE.**

**Toluifera** Balsamum, Miller, D.

Sex. Syst. Decandria, Monogynia.

(Concrete balsamic exudation, L.—Resina, D.)

**HISTORY.**—The earliest notice of balsam of Tolu is in nardes. He tells us that the balsam had been recently i

**BOTANY.** Gen. Char.—See Myrospermum peruiferum.

Sp. Char.—Branches and leaves smooth. Leaflets oblongate, equilateral, rounded at the base (De Cand.)

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* Treat. on Chilbed Fever, p. 31, 1774.
* Thacker’s Dispensatory.
* Med. Ind. i. 65 and 406.
* Quainia, Med. 324.
BALSAM OF TOLU-TREE.

The tree which yields the balsam of Tolu was formerly called *Toluifera Bal-
sa*. But Richarcl having carefully investigated the characters of the genus
sstra, found that, with the exception of those of the fruit, which Miller
 imperfectly described, they were identical with those of the genus now
 Myrosernum; and as Ruiz states that the balsams of Peru and Tolu are
obtained from one tree, the *Myrosernum periferum* has been adopted by
writers, and by the London College, as the source of both balsams.

Chard found specimens of the trees yielding these balsams in Humboldt's
Cordillera; and though he at first mistook them for the same species, he has
subsequently recognized them to be different. He therefore made a distinct
list of the tree yielding the balsam of Tolu, and it is now called *Myrosernum
permum*. It differs from *M. periferum* in its having thin, membranous,
leaves, which are lengthened and acuminate at their summits. More-
the terminal leaflet is larger than the lateral ones.

Mountains of Tolu, Turbaco, and on the banks of the Mag-
na, between Garapatas and Monpox.

PROCEDURE.—Balsam of Tolu is procured by making incisions
in the bark of the tree, and receiving the liquid balsam in vessels
of a black wax. It is afterwards transferred into proper vessels.
y exudes from the tree during the heat of the day.

COMMERCIAL.—Balsam of Tolu is sometimes brought direct from
southern, Santa Martha, and Savanilla; more commonly, how-
it comes by way of New York or Jamaica. It is usually im-
port in cylindrical tin canisters; now and then in earthen pots or
still more rarely in small calabashes.

OBSERVATIONS.—Balsam of Tolu (*balsamum tolutanum* vel *de Tolu*),
first brought over, is generally soft and tenacious, but by age
stresses hard and brittle, somewhat similar to resin, and has a granu-
lar, somewhat crystalline appearance. Formerly it was imported
in a hardened state, but is now usually met with in the soft state.
translucent, has a reddish or yellowish-brown colour, a most
intense odour, though less powerful than that of storax or Peruvian
*Vanilla*, and a pleasant sweetish taste. It softens under the teeth;
beaten, it readily melts, takes fire, and burns with an agreeable
smell. It is very soluble in alcohol and ether, and gives out its
odor in water. The soft balsam contains more oil but less acid than
the hard, the acid and the resin being formed at the expense of
the oil. Balsam of Tolu hardens or resinsifies with much more facility
than balsam of Peru.

The balsam of Tolu in calabashes (*balsamum tolutanum in cucurbittia par-
ele*) occurs in calabashes (the fruit of *Crescentia cujete*, accord-
with Sloane’s) about the size of an orange; the large aperture by
the balsam has been introduced being closed with the rachis
fruit of *Zea Mays*.

OBSERVATIONS.—According to Fremy, the composition of balsam
is similar to that of balsam of Peru, its constituents being

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cinnaméine, cinnamonic acid, and resin. They differ, according to the
same chemist, from those of balsam of Peru by the greater facility with
which they become resinified.

Resin of Balsam of Tolu.—Is essentially the same as that of balsam of Peru,
and, like it, also forms a fine red colour with sulphuric acid; but it is less
 fusible than the resin of the last-mentioned balsam. It consists of carbon 70.8,
hydrogen 6.1, and oxygen 23.1; so that it contains a larger proportion of the
elements of water.

Physiological Effects and Uses.—The effects of balsam of Tolu are similar to those of balsam of Peru (see p. 1561), and to
other balsamic substances (p. 188). It is employed as a stimulating
expectorant in chronic bronchial affections, unaccompanied with in
flammatory action. It is, however, more frequently used as an
agreeable flavouring adjunct to pectoral mixtures. The vapour of
the ethereal solution of the balsam has been inhaled in chronic affec-
tions with benefit. Tolu lozenges form a popular and pleasant reme-
d for appeasing troublesome cough. The balsam is sometimes em-
ployed by confectioners to flavour sweetmeats, as marmalade.
It is also used in perfumery; and is a constituent of some funghi-
pastiles already described.

Administration.—The dose of the balsam is from gns. x. to 3x.
It may be taken in the form of an emulsion, made with gum or sugar.
It is a constituent of the compound tincture of benzoin, L. D. been
described.

1. Tinctura Balsami Tolutani, L. D. Tinctura Tolutana, T
Tincture of Tolu. (Balsam of Tolu, 8j. [5j. D.; 8ijss. in com-
pound, E.]; Rectified Spirit, Oij. [Oij. wine measure, D.]; Dissolved
with a gentle heat, E., in a close vessel, D.] until the balsam
[dissolved and filter, L. D.].—A stimulating expectorant, prin-
cipally used as a flavouring adjunct to other pectorals. Its use is, of
considerable employment in inflammatory cases. Dose, f2ss. to f3ij.
When mixed with water the resin is precipitated; hence it should be rub-
bed with mucilage, or some viscid liquor, before adding the water, to
the resinous precipitate in suspension.

2. Syrupus Tolutan us, E. E. Syrupus Balsami Tolutani,
Syrup of Tolu. Balsamic Syrup. (Balsam of Tolu, 3x.; Boil
Water, Oj.; Sugar, lbs. ijss. Boil the Balsam in the Water for
an hour in a vessel lightly covered, frequently stirring, and strain:
cooled liquor; then add the Sugar, and dissolve it, L.—Simple Sy-
lbij. [ijss. D.]; Tincture of Tolu, sj. When the syrup has been
recently prepared, and has not altogether cooled, add the tincture
of Tolu by degrees, agitating briskly, E. D.)—Employed as an agree-
able flavouring adjunct to pectoral mixtures.—Dose, f5j. to f5iv.
COMMON BROOM.

US SCOPÁRIUS, De Candolle, L. E.—COMMON BROOM.

Spartium scopárium, Linn. D.


(Cacumina recentia, L.—Tops, E.—Cacumina, D.)

—It is uncertain who first mentioned this plant. The Dioscorides y is Spartium junceum or Spanish Broom w. of Pliny x was probably the same plant, though the rian was himself doubtful whether this plant was identi- of the Greeks. Sprengel y considers that Theophrastus edly acquainted with Common Broom.

Gen. Char.—Calyx two-lipped; the upper lip generally over one somewhat three-toothed. Vexillum ovate, large; nse, enclosing the stamens and pistils. Stamens monopegume plano-compressed, many-seeded, without glands. Leaves trifoliate (De Cand.)

Branches angular, smoothish. Leaves trifoliate, stalked.

Leaflets oblong. Flowers axillary, stalked, solitary. at the margin (De Cand.)
hree to six feet high. Branches long, straight, and es deciduous; upper ones generally simple. Flowers yellow; keel broad; vexillum and ale much spreading. e, dark-brown, containing fifteen or sixteen seeds.
genous; growing on dry hills and bushy places. Flowers

ON.—Broom-tops (scoparium; cacumina scoparii) have a ous taste, and, if fresh, a remarkable odour when bruised.

ON.—The flowers of broom contain, according to Cadet t², concrete volatile oil, fatty matter, wax, chlorophyll, ring matter, tannin, a sweet substance, mucilage, ozma-
m, and woody fibre. The ashes amounted to 57.5 per ontained 29 per cent. of carbonate of potash, besides 
stassium, sulphate of potash, chloride of calcium, nitrate, nd sulphate of lime, carbonates of lime, magnesia, and 
a.—Salt of broom, or sal genista, is obtained by burn-
le plant. It contains a large portion of carbonate of ² says, that a pound of the green twigs, with the leaves yields a drachm and a half of this salt.

Pharmacological Effects. a. On Animals generally.—In some brome is employed as winter food for sheep; and
Withering says that it prevents the disease called rot, and increase dropsy, to which sheep are liable. According to Loudon, it is a produce disease of the urinary organs, to prevent which the use of water is recommended.

β. On Man.—In large doses broom-tops are an emetic and purgative. In small doses they are diuretic and mildly laxative. Diuretic they have been celebrated by Mead and Cullen.—"The very little in use," says Dr. Cullen, "I have inserted this catalogue from my own experience of it. I found it first among our common people; but I have since prescribed it to some of my patients in the manner following:—I order half an ounce of fresh broom-tops to be boiled in a pound of water till one-half is consumed, and of this decoction I give two tablespoonfuls; till it operates by stool and urine; and by repeating this operation every day, some dropsies have been cured." Having frequently employed broom in dropsies, I can add my testimony of powerful effects as a diuretic. I cannot call to mind a single case in which it has failed to act on the kidneys. In some cases it produced a most marked and beneficial effect on the dropsical effect. According to my experience, it is more certain than any other means in dropsies. Dr. Pearson terms broom a tonic-diuretic; as it improves the appetite, and invigorates the whole system.

Uses.—It has been principally or solely employed in dropsies, as already mentioned, sometimes with great benefit. Of course the chance of cure depends on the nature of the cause of the disease and is, to inflammatory cases, as well as in diseased effusion. In acute inflammatory cases, as well as in diseases of its use might be objectionable. It is said also not to be adapted to thoracic dropsy, especially when combined with pulmonary affection, or any degree of inflammatory affection of the chest.

Administration.—Broom-tops are usually given in the infusion or decoction. The seeds, which keep much better than the tops, and on that account have an advantage over the latter, may be used in the form of powder, in doses of grs. x. to grs. xv. of water or cold ginger tea; or in the form of tincture (see Sp. junceum). To promote the operation of broom, diluents should be freely used.

4. Infusum Scopariae, L.; Infusion of Broom; Broom Tea. parium, 5j.; Boiling Distilled Water, 2ij. Macerate for four hours in a lightly covered vessel, and strain. — A decoction is to be added to the infusion.—Dose, as a diuretic in dropsy, f3ij. to f5ij.

2. Decoctum Scopariae Compositum, L.; Decoction of Broom. (Scoparium, Juniper fruit, Dandelion, of each 5ss.; Distilled Water, 2ij. Boil down to a pint, and strain. Broom-tops, and Juniper-tops, of each 3ss.; Bitartrate of

* Observ. on Broom-seed, 1835.
COMMON LIQUORICE.

Water, Oiss. Boil them down together to a pint, and then E.—Diuretic and laxative.—Dose, fʒ. to fʒij.

TRACTUM SPARTII SCOPARII, D.; Extract of Broom. (Pre-
vy the evaporation of the decoction of the tops.)—Diuretic and
V. Employed only as a diuretic in dropsy.—Dose, 3ss. to 3ʒ.
used.

CYRIRHI'ZA GLA'BRA, Linn. L. E. D.—COMMON LIQUORICE.

Sex. Syst. Diadelpia, Decandria.

(Radix recens, L.—Root. Extract of the Root, E.—Radix, D.)

ory.—The γλυκρίζα of Hippocrates, and that of Dioscorides,4
less identical; the latter is supposed by Sprengel5 and others
Glycyrrhiza glabra; by Dierbach6 to be G. glandulifera.
Dr. Sibthorp7 it is said to be the G. echinata, which is now
in Greece γλυκρίζα. Glycyrrhiza glabra is called, in the
money Greece, γλυκρίζα.

öw, Gen. Char.—Calyx naked, tubular, five-cleft, two-lipped;
e two upper lobes united more than the others. Vexillum
necolute, straight; keel two-parted or two-petalous, straight,
Stamens diadelpous. Style filiform. Legume ovate or
compressed, one-celled, one- to four-seeded.—Perennial herbs
scremely sweet roots. Leaves unequally-pinnated. Racemes
Flowers blue, violet, or white (De Cand.)
ax.—Leaflets ovate, slightly retuse, viscid beneath. Stipules
Spikes pedunculated [i.e. racemes], shorter than the leaves.
distant. Legumes smooth, three- or four-seeded (De Cand.)
erect, smooth, four or five feet high. Leaflets yellowish-
Flowers papilionaceous, bluish or purplish.

South of Europe. Cultivated at Mitcham in Surrey, and at
aces, for medicinal use.

ription.—The underground stem is denominated liquorice-
dix glycyrrhiza seu liquiritia vel liquorice) or stick liquorice.
ong cylindrical pieces, about the thickness of the finger.
ly it is grayish brown, internally yellow. Its odour is rather
ad earthy: its taste remarkably sweet.

osition.—Liquorice root (G. glabra) was analyzed by Robi-
1809a. Trommsdorffb analyzed the root of G. echinata.
stituents of the fresh root of G. glabra are, according to Robi-
gyrrhizin, starch, asparagin, resinous oil, albumen, woody
s salts (phosphate and malate of lime and magnesia).

4 Lib. iii. cap. 7.
5 Hist. Rei Herb. i.
6 Arzneim. d. Hippocrates.
7 Prod. Fl. Graece, ii. 77.
8 Ann. de Chirn, lxxii. 143.
9 Gmelin, Handb. d. Chem. ii. 1251.
1. **Glycyrrhizin** (*Glycin or Liquorice Sugar*).—Belongs to the *aerated* sugars which are not susceptible of vinous fermentation (see p. 48). It is characterized by its affinity or acids, with which it unites to form compounds which are very slightly soluble only in water. It is yellow and transparent; the sweet taste of the root. It is soluble in both water and alcohol. Acidification is formed from its solution. It combines also with bases, as well as with many metallic solutions.

2. **Resinous Oil.**—To this constituent, liquorice root owes the slight acidity which it possesses.

**Physiological Effects.**—Liquorice root and its extracts are emollient, demulcent, and nutritive.

**Uses.**—Employed as an emollient and demulcent in affections of the mucous membranes. It is also used as a flux adjunct to other medicines. Its powder is employed in the preparation of pills, either to give them a proper consistence, or to prevent their adhesion.

**Administration.**—For medicinal use the root should be *crushed*, as the epidermis possesses a slight degree of acidity.

1. **Decoctum Glycyrrhizae, D.; Decoction of Liquorice.**
   - Liquorice Root, bruised, 3 times; Water, 2 oz. [wine measure]. Boil ten minutes, and strain. —An agreeable demulcent: used as a base for other medicines.

2. **Extractum Glycyrrhizae, L. E. D.; Extract of Liquorice.**
   - Prepared as Extract of Gentian, L. D.—Cut liquorice-root into small chips, dry it thoroughly with a gentle heat, reduce it to a powder, and proceed as for the extract of Gentian. Extract of liquorice is extensively imported under the name *liquorice juice*, or, according to the countries from where it is brought, *Spanish* or *Italian juice*. *Solazzi juice* is most esteemed. Spanish extract is prepared in Catalonia from *G. glabra*; while Italian extract is obtained in Calabria from *G. echinata*. In 1811, there were imported 4059 cwts. of foreign extract of liquorice, subject duty on which is £3. 15s. per cwt. It comes in cylindrical tubes, ten inches long, and about one inch in diameter, and enveloped in bay leaves. When pure it is black and dry; glossy fracture and a sweetish taste; and is completely soluble in water. As met with in commerce, however, it is rarely pure. New York obtained 460 parts of watery extract from 480 of Spanish liquorice. It contains the soluble principles of the root, with some extraneous matter. Scraped off the boiler by the spatula employed to stir the extract during its preparation. Fée says, that four ounces of this extract yield two drachms and a half of metallic copper; but I suspect the number given must be some great mistake in this statement. If the foreign extract is dissolved in water, and the solution filtered and inspissated, we have a refined liquorice. But I am informed that the *pipe refined loop* of the shops is a very adulterated article. The *Poncifrot loop*...
affectations of the mucous membranes. It is also used as an adjunct to other medicines. Its powder is employed in the preparation of pills, either to give them a proper consistence, or to increase their adhesion.

ADMINISTRATION.—For medicinal use the root is bruised, as the epidermis possesses a slight degree of astringency.

1. DECOCTUM GLYCyrRHIZAE, D.; Decoction of liquorice Root, bruised, 5iss.; Water, Oj. [wine may be used for ten minutes, and strain].—An agreeable demulcent: used for other medicines.

2. EXTRACTUM GLYCyrRHIZAE, L. E. D.; Extract of liquorice (Prepared as Extract of Gentian, L. D.—Cut liquorice into small chips, dry it thoroughly with a gentle heat, then process it into a moderately fine powder, and proceed as for extract of gentian). Extract of liquorice is extensively imported under the name of liquorice juice, or, according to the countries from which it is imported, Spanish or Italian juice. Solazzi juice is most used. Spanish extract is prepared in Catalonia from Glycyrrhiza lucida; Italian extract is obtained in Calabria from G. echinata. In 1827 there were imported 4059 cwt. of foreign extract, on which the duty is £3. 15s. per cwt. It comes in coiled or uncoiled rolls of five or six inches long, and about one inch in diameter, and is enclosed in bay leaves. When pure it is black or dark brown in color, with a glossy fracture and a sweetish taste; and is composed of glycyrrhizin and water. As met with in commerce, however, it is rarely pure, but obtained 460 parts of watery extract from 480 of Spanish extract. It contains the soluble principles of the root, which are scraped off the boiler by the spatula employed to agitate the liquid during its preparation. Fée says that four ounces
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Milk Vetch.

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3. **A. creticus.**—*Flowers* axillary, sessile, clustered. *Calyx* partite, with feathery, setaceous rather longer than the corolla. 5-7 five to eight pairs, oblong, acuminate (De Cand.)—Mount I Crete, where it yields Tragacanth according to Tournefort.

4. **A. strobilifera.** Lin’ *Flowers* capitate in an ovate, axillary strobile.—*Bracts* imbricate, pinnately, tomentose. *Calyx* 5-7 five-cleft. Segments of the equal. *Leaflets* three-paired, oval, awned at the apex, in the base (Lindley).—Koord

This plant was sent by Mr. Brant as the "shrub from which or inferior species of gum tragacanth is produced".

**Production**—Tragacanth is a natural exudation from the before-mentioned plants. The cause of the exudation as of other gums, is thus explained by De Candolle. The matter resides in the bark and albumen; it is the nutritive the plant; and its escape, therefore, is analogous to hemolymph animals: hence plants in whom it spontaneously occurs are in a sickly state. The mechanical cause of the expulsor juice is dependent on the unequal hygrometric properties of different parts of the stem. The wood absorbs more moisture than bark, and hence it swells more. In consequence of largeness, it distends the bark, which, by the internal pressure wood, gives way, and the gummy matter escapes. This exp is quite in conformity with facts mentioned by La Billardière: tragacanth flows only in abundance during the night, and after sunrise. A cloudy night, or a heavy dew, is, he thinks, sary for its production; for the shepherds of Lebanon on search of this substance when the mountain has been cover the night with thick clouds.

**Description.**—Tragacanth (*gummi tragacanth*) is f called in the shops gum drag. It is white, yellowish, or y brown, hard, tough, odourless, tasteless, swelling consid water, and forming a thick, tenacious mucilage. Two ki are known.

1. **Flaky Tragacanth:** Smyrna Tragacanth (Martius): *Traga the Astragalus versus*?—This is the tragacanth usually in English commerce. It occurs in moderately large, broad, thic marked with arched or concentric elevations.

2. **Vermiform Tragacanth:** — Morea Tragacanth (Martius)
of the Astragalus creticus?—This variety is rarely met with in this country, but is common on the continent. It occurs in small, filiform, spiral pieces. There is more starch in it than in any other variety.

Commerce.—Tragacanth is imported in cases and chests from Smyrna and other ports of the Levant. In 1836, duty (6s. per cwt.) was paid on 87 cwt.

Composition.—The ultimate analysis of tragacanth has been made by Hermann and by Guerin-Varry.

<table>
<thead>
<tr>
<th>Hermann's Analysis</th>
<th>Guerin-Varry's Analysis</th>
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<tr>
<td><strong>Atoms.</strong></td>
<td><strong>Soluble part:</strong></td>
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<tr>
<td>Carbon</td>
<td>10</td>
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<td>Oxygen</td>
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<tr>
<td>Nitrogen</td>
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<tr>
<td>Tragacanth gum</td>
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In 1805, Vauquelin made an examination of the proximate contents of tragacanth. In 1815, Bucholz, and in 1831 Guerin-Varry, published proximate analyses of this gum.

<table>
<thead>
<tr>
<th>Bucholz's Analysis</th>
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<tr>
<td>Common gum</td>
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<td>Bassoria</td>
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<th>Guerin-Varry's Analysis</th>
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<tr>
<td>Arabin</td>
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<tr>
<td>Bassorin and starch</td>
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<tr>
<td>Water</td>
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<td>Ashes</td>
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Tragacanthin.—Artragantin. Soluble gum or Arabia of Tragacanth.—The soluble gum of tragacanth is usually regarded as similar to gum Arabic, and so is called arabin; but is distinguished by silicate of potash and peroxide of iron producing no change in it, and by a peculiar appearance of the precipitate produced with alcohol (the precipitate is flocculent, and collects in a de opaque and mucous mass).—In common with arabin it produces precipitates with disacetate of lead, protocloride of tin, and protoclorate of mercury. Date of ammonia detects it as a calcareous salt.

Bassorin. Insoluble gum of Tragacanth.—The insoluble part of gum tragacanth is similar to that of gum Bassora, and hence is called Bassorin. It swells in water.

Starch.—Starch globules may be detected in the bassorin (when swollen in water) both by the microscope and by iodine.

According to Guibourt tragacanth contains neither arabin nor bassorin, but is essentially formed by an organized gelatiniform matter, very different to a Arabic both in its physical and its chemical properties, and which swells in water, so as in part to pass through a filter. The insoluble part of tragacanth is, according to the same authority, a mixture of starch and gum, which has nothing in common with bassorin. De Candolle suggests that the insolubility and swelling of tragacanth in water may arise from the clay matter being contained in cells.

Physiological Effects.—Like other gums, tragacanth is emollient, demulcent, and nutritive; but difficult of digestion.

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* Hist. des Droog. ii. 477.
USES.—Tragacanth, in powder, is used rather as a vehicle for active and heavy medicines (as calomel), than on account of proper effects. It is occasionally, however, taken as a sedative demulcent agent in irritation of the mucous membranes.

ADMINISTRATION.—Dose of the powder, 5 ss. to 5 ij.

1. PULVIS TRAGACANTILE COMPOSITUS, L. E. Compound of Tragacanth. — (Tragacanth, bruised; Gum Arabic, 5 s.; Starch, of each, 5 ss.; Pure Sugar, 3 ij. Rub the Starch and Starch together to powder, then having added the Tragacanth and Arabic, mix them together.)—Employed as a vehicle for the administration of active and heavy powders to children.—Dose for 5 ss. to 5 ij.

2. MUCILAGO TRAGACANTHÆ, E. Mucilago Gummi Tragacanthæ. D. Mucilage of Tragacanth.—(Tragacanth, 5 ij.; Boiling Water, 3 ss. Macerate for twenty-four hours, then triturate to dissolve and express through linen or calico, E.—The Dublin College. The powdered gum to be used, and employs 13 viij. of water solution is to be effected in a close vessel, until the gum is dissolved and the mucilage then strained.)—Employed in making lozenges; also to suspend heavy powders, as the metal burns.

6. MUCUNA PRURIENS, De Candolle, L. E.—COMMON COW-ITCH.


Sect. Syst. Dindelphi, Decandria.

(Leguminosae Pulches, L.—Hairs from the Pod, E.—Pulchæ Leguminas, D.)

HISTORY.—One of the earliest writers who mention the plant is Ray. It was long confounded with the M. prurita, Hook.

BOTANY. Gen. Char. — Calyx campylaneate, two-lipped; corolla trilobed, with acute segments, the middle one the longest; stamens diadelphous; anthers ten, of which five are oblong and five ovate, hispulate. Legume oblong, knotted, two-valved, cellular partitions. Seeds roundish, surrounded by a circular hilum.—Twining herbs or shrubs. Leaves pinnately trifoliate. Legs usually axillary. Legs usually hispided and stinging, by the brittle very brittle hairs which readily penetrate the skin (De Candolle).

Sp. Char. — Flowers in racemes. Legumes stinging, with keeled valves. Leaves hairy beneath, acuminate; the

* Hist. Plant. vol. i. p. 387.
COMMON COW-ITCH.

Root—ennial. Stem herbaceous. Flowers with a disagreeable alliaceous odor; vexillum flesh-coloured; ala purple or violet; keel greenish-white.

Lab.—West Indies.

*Uracmia purpurea,* Hooker *x.*—A native of the East Indies; has been usually confused with the American *M. pruriens*; but it is distinguished by its smaller leaves, its more obtuse (not acuminate) leaflets, the middle one being more rhomboidal; its flowers more constantly in threes, and by its legumes being slightly broader, compressed, free from any raised line on the back of the valve; last in the American *M. pruriens* the pods are much narrower, terete, and keeled on the valves.

Description.—*Cowhage* or *Cow-itch* (*silicula hirsuta*) is the legume of the *Mucuna pruriens* (*legumen mucuna, stizolobii, vel dolichos pruriens*). It is of a brownish colour, is shaped like the letter *f*, about one or five inches long, contains from four to six seeds, and is clothed with strong, brown, bristly, stinging hairs (*pubes leguminis; setae lance hirsuta*), which, examined by the microscope, appear like quinces' quills, but are slightly notched or serrated towards the point.

Composition.—The hairs contain tannin*.

Physiological Effects.—A decoction of the root or of the grains is said to be diuretic, and was formerly used in dropsy*.

The setae applied to the skin produce intolerable itching, and, in some cases, pain, redness, swelling, and even an eruption. These effects, which are increased by rubbing, but diminished by the application of oil, are referrible to the mechanical properties of the setae.

Uses.—The setae have been celebrated for their anthelmintic properties. Their action is supposed to be mechanical; that is, they are supposed to pierce and torment intestinal worms, and thereby to force them to let go their hold. In support of this explanation, Mr. Chamberlaine* tells us he sprinkled some of the hairs in a calabash full of very large round worms (*Ascaris lumbricoides*), and that in a little time the animals began to writhe and twist about, evincing thereby extreme torture. On examining them with a magnifying glass, the hairs were found sticking loosely in various parts of their bodies. Their usual want of action on the internal coat of the intestines is ascribed to the mucous secretion which defends the subjacent membrane from injury. In one case diarrhea followed the use of a large dose of the elyctuary, and in another instance enteritis came after taking this preparation once; but it is not certain that these were the consequences of the operation of the hairs*.

Cowhage has been principally celebrated for expelling the large and small worm (*Ascaris lumbricoides*), and the small thread-worm (*A.
vermicularis). It has not proved equally serviceable against the worm (Taenia Solium).

Administration.—The best mode of exhibiting the scent treacle, syrup, or honey. The quantity of hairs should be set to give the syrup, or treacle, the consistence of honey, or of syrup; and of this mixture a tea-spoonful may be given to children and a table-spoonful to adults: this dose should be taken twice—namely, at going to bed, and in the morning an hour before breakfast. Chamberlaine says it usually operates more effectually a gentle emetic has been promised. After continuing the elixir for three or four days, a brisk purgative of jalap, or senna, should be taken, which will in general bring away the worms.

7. PTEROCARPUS SANTALINUS, Linn. L. E. D.—THREE-LEAFED PTEROCARPUS.

Sax. Syst. Diadelphus, Decandria.

(Lignum, L. D.—Wood, E.)

History.—Avicenna a mentions red sandal wood (sandalum Garciás b thinks the term sandal is a corruption of chand name by which the wood is known in Timor.

Botany. Gen. Char.—Sepals five, cohering to form a five-calyx. Petals five, forming a papilionaceous corolla. Stamens the filaments variously combined. Legume indehiscent, somewhat orbicular, surrounded by a wing, often variscose, on Cotyledons thick, incurved; radicle somewhat inflexed at the embryo.—Unarmed trees or shrubs. Leaves unequally (De Cand.)

Sp. Char.—Arborescent. Leaflets three (rarely four or five), retuse, glabrous. Racemes axillary, simple or branched, long-clawed, all waved or curled on the margins. Stamens bined into a sheath, split down to the base on the upper half-way down on the lower. Legume long-stalked, surrounding, broad, membranous wing, obtuse at the base, one- or rarely seeded (Wight and Arnot).

A lofty tree. Flowers yellow with red veins,

Hab.—Mountains of Coromandel and Ceylon.

Description.—Red Sandal or red Sander's wood (lignum rubri; lignum santalinum rubrum) is imported in roundish what angular billets, which are blackish externally, but of red internally. It is compact, heavy, of a fibrous texture capable of taking a fine polish; almost tasteless, and innocuous except when rubbed, when it emits a feeble smell. It scarcely nicates colour to water. Alcohol, as well as alkaline solution, extract the colouring matter. The alkaline solution is violet.

a Conon. lib. ii. tract. ii. cap. 556.

b Clatus, Eccl. 172.
as a precipitate (santalin) on the addition of acids. The alcoholic solution produces precipitates with several metallic solutions: thus, with solutions of lead, scarlet with bichloride of mercury, and violet with sulphate of iron.

**Composition.**—Red sandal wood was analysed by Pelletier, who found in it a peculiar colouring matter, which he called santalin (0.1673 per cent.), extractive, gallic acid, and woody fibre.

Santalin is dark red, with a resinous appearance; almost insoluble in water, soluble in alcohol, alkaline solutions, ether, acetic acid, and slightly so in the volatile oils (as the oils of lavender and rosemary). The effects produced on its alcoholic and alkaline solutions by salts, &c. are similar to those mentioned on the tincture of the wood. The composition of santalin is, carbon 75.03, hydrogen 6.37, oxygen 18.6; or C_{16}H_{18}O_{3}.

**Uses.**—It is employed in medicine as a colouring agent. (See Tinctura Lavandulae composita.)

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**PTEROCARPUS ERINACEUS, Lamarck, L. E.—THE HEDGEHOG PTEROCARPUS.**

**Sec. Syet.** Diadelphus, Decandria.

Kino.—Concrete exudation of this and other undetermined genera and species, E.—Kino (plant yielding it unnamed), D.

**History.**—In 1757 Dr. Fothergill described an astringent gum, which he supposed (though on very loose evidence) to have been brought from the river Gambia; and hence he termed it gummi astringens gambiense. In 1774 it was introduced into the Edinburgh Pharmacopoeia as gummi kino; and in 1787 into the London Pharmacopoeia as resina kino. It was described under this signification in the 3rd edition of Lewis's *Exp. Hist. of the Mat. Med.* Dr. Aikin, in 1784. In 1794 Schenck published an inaugural dissertation on it. I have not been able to ascertain why it was called kino; nor can the precise nature of the substance referred to now be ascertained. Several years since I accidentally met with, in a warehouse of an old drug firm in London, a substance marked *gummi rubrum astringens*, which I was told had formerly fetched a very high price. It has subsequently proved to be *Butea gum*. I was at first inclined to believe that it was the original astringent gum of Fothergill, and it has been described by Professor Guibourt as *gummi astringente de Gambie*. But a more attentive perusal of Fothergill’s paper has led me to doubt their identity (see *Butea gum*). It is somewhat remarkable, however, that the Hindu name for *Butea* is *kueni* or *kuenee*. Is this the source of the European term?

**Botany.** Gen. Char.—See *Pterocarpus santalinus.*

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* Jour. Phys. lxix, 258.
* Collected med. Marburg, t. v.
Sp. Char.—Leaflets alternate, elliptical, obtuse, smooth
fons-pubescent beneath. Fruit with a very short, lateral
point (De Cand.)
Middling-sized tree. Leaves deciduous. Flowers pap
numerous, yellow.

Hab.—Woods of the Gambia; Senegal.

Extraction of the Juice of Pterocarpus erinaceus
an incision is made in the trunk and branches of the
juice flows out, at first of an extremely pale-red colour, an
liquid state; but it soon coagulates, becoming of a deep
hue, and so remarkably brittle, that its collection is at
some difficulty."

Commerce of Kino.—Two substances are met with
commerce under the name of kino,—one called Botany
which is the inspissated juice of the Eucalyptus resin;
described), the other, apparently an extract, imported fr
and Tellicherry, and which may be termed East Indian.
latter is presumed to be the substance referred to in the E
macropoulos, as it is always regarded in commerce as §
kino. It is imported in boxes.

In my museum I have several other substances, apparently ext
have received as kino, mostly from Professor Guibourt, who has des
of them in his Hist. des Drog. ii. 428. One of these is, perhaps,
A second I received as Colombian kino. A third I believe to be,
of rhatany. I have never met them in English commerce, and it
it needless to describe them.

Description.—East Indian kino (kino indicum seu
sometimes called Amboyna kinetic (kino amboinense), and us
in the shops as gum kino (kino, Ph. L. E. D.) occurs in sm
glistening fragments, the larger of which appear almost
smaller being reddish. When entire they are opaque,
laminae are transparent and ruby-red. They are brittle
fingers, soften in the mouth, stick to the teeth, and color
red. They are inodorous, but have a very astringent t
water and alcohol acquire, by digestion on kino; a
colour. The aqueous decoction becomes turbid on co
mineral acids and solutions of gelatine, emetic tartar, ace
sesquichloride of iron, nitrate of silver, &c. produce preci
the watery infusion.

The tree yielding East Indian kino is as yet unascert
probably a native of the Malabar coast, for all the imp
East Indian kino which I can trace were from Bont
cherry; and an experienced East India broker assures
produce of the Malabar coast. As Pterocarpus erin
known to grow in India, there is no ground for ascribing
kino to that species. Is it the produce of Pterocarpus

* Gray, Trav. in Western Africa, in Stevenson and Churchill's Med. B
which Dr. Roxburgh says yields an astringent inspissated juice exceedingly like Butea gum. I am indebted to Mr. Edward Solly for sample of extract of Pterocarpus marsupium, which he received from Dr. Gibson. It is a dark red, tenacious, acidulous, moderately astringent substance. It differs, therefore, from the gummy resin which Dr. Roxburgh describes as being the product of this tree. As accurate naturalist describes it as being very brittle, and having strong, but simply astringent taste; characters which apply to East Indian kino.

COMPOSITION.—East Indian kino was analyzed by Vanquelin, who and its constituents to be as follows:—tannin and peculiar extract, 75, red gum 24, insoluble matter 1. A. W. Buchner has subsequently shown that catechine is a constituent of kino. To this stance, which has been before noticed, kino owes its power of masticating a green colour to the salts of iron.

PHYSIOLOGICAL EFFECTS.—Astringent (see p. 188). Less effective, less readily dissolved in the alimentary juices, than catechu, which in its operation it is otherwise closely allied.

USES.—Employed in medicine as an astringent only; principally to stigmatize chronic diarrhoea. In this disease it is usually given in conjunction with chalk, and frequently with opium. In pyrosis the powder of kino (i.e. opium and kino) has been found serviceable. Dr. Pemberton ascribes to kino a power of restraining discharge of the mucous glands of the intestinal canal when they secreting too much, and of contracting vessels already too much xed, without exerting any such power over the glands and vessels as they are acting naturally. It has been administered as an astringent in leucorrhoea and sanguineous exhalations, and as a tonic to intermittent fevers. As a topical astringent it has been applied to sphyrs, and used as a gargle, injection, and wash.

ADMINISTRATION.—The dose of the powder is grs. x. to 5ss.

TINCTURA KINO, L. E. D.; Tincture of Kino. (Kino, bruised, s. [3ijj. D.]; Rectified Spirit, Oij. [Proof Spirit, Oij. wine-meas. D.].) Digest for seven days ( fourteen, L.), and strain. "This tincture cannot be conveniently prepared by the process of percolation," E.—Astringent. Used in diarrhoea and hemorrhages, generally in adjunct to the chalk mixture.—Dose, f3j. to f3ij. It is said by keeping this tincture has in some instances become gelatinous, and lost its astringency. Where this occurred probably the dry Bay kino (inspissated juice of the Eucalyptus resinifera) had been employed.

PULVIS KINO COMPOSITUS, L. D.; Compound Powder of Kino. 10, 5xv. ; Cinnamon, 3ss. ; Hard Opium, 3j. Rub them separately very fine powder; then mix them.—Twenty grains of this pow-
Historically, the Similis tree, whose wood is in parts of the Old Testament, is supposed to have been the A. vera or A. horrida.

Hippocrates speaks of the Acacia, which he says is an Egyptian Acacia, at other times the White Acacia, supposed to refer to Acacia vera; but Dierbach is Senegal is meant, which, he observes, is distinguished by its bark, white wood, and white flowers, and therefore could apply to it only. Furthermore, the white flower was probably prepared from the flowers of the A. vera, whose flowers would yield a yellow ointment with an agreeable smell as those of the former species. Pallas also mentions gum (κόμυμ), which he used in medicine, and considers the "Acacia deserts" (Thirsty Thorn) of Theophrastus as Acacia Seyal, which Pliny calls Spina siliens.

Botany. Gen. Char.—Flowers polygamous. Calyx toothed. Petals four to five, either free or cohering to five-cleft corolla. Stamens varying in number, to ten. Legume continuous, juiceless, two-valved.—Shrubs, usually stipular, scattered, or none. Flowers yellow, white, capitate or spiked (De Cand.)

Species. I. A. vera, Willdenow, L. D. Miens. Egyptian Thorn.—Spines in pairs. Branches aching. Pinnae two pairs; leaflets eight to ten pairs, oblong between the pinnae. Flowers in globose heads, together, stalked, axillary. Legume moniliform, drooping-sized tree. Flower-heads bright yellow.—A shrub of Africa from Senegal to Egypt. Its fruit...
gal bablah (bablah d’Egypte et du Sénégal, Guibourt), has
ployed in tanning and dyeing. The succus acaciae verae is
saed juice of the unripe fruit, and was formerly used as an
Acacia vera yields gum Arabic, and also a portion of
Gumiphora, Willdenow.—Arabia; Africa, near Mogadore.
Forskål to yield a gum, which is collected by the Arabs.
furnishes, in part at least, Barbary gum.
Seyal, Delile.—Egypt and Senegambia. Yields a gum
and part of gum Senegal. The tears are white, hard, vitreous,
form.
Fortilis, Forskål, Nees and Ebermaier.—Arabia. Its gum
ed by the Bedouins of the desert.
Ehrenbergii, Hayne, Nees and Ebermaier.—Arabia. Its
collected by the Bedouins of the desert.
Senegal, Willdenow; A. Verek, Adanson.—Arabia and
om Senegal to the Cape of Good Hope. Abundant in the
Sahel, near Senegal. Yields gum Senegal in vermiciform,
or spheroidal tears, which are wrinkled externally, but are
nt internally.
ction of Gum.—The gum of the Acacia trees flows, in the
ite, from the trunk and branches, and hardens by exposure.
It usually exudes spontaneously (see some remarks on
e of the exudation of gum, p. 1570). In some instances,
the discharge is facilitated by incisions. In Barbary the
antity of gum is procured during the hot and parching
July and August. “The more sickly the tree appears, the
it yields; and the hotter the weather, the more prolific it
winter and a cool or mild summer are unfavourable to the

* Pl. Egypt. Arab. cxxiv.
Duty was paid in 1839:

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gum from the East Indies</td>
<td></td>
</tr>
<tr>
<td>Senegal Gum</td>
<td></td>
</tr>
<tr>
<td>Other sorts of Gum</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
</tr>
</tbody>
</table>

DESCRIPTION.—Acacia gum (*gummi acaciae*) occur in small, oval, or orbicular, yellow or yellowish-white, sweetish and slightly acrid taste, and a greater or less degree of transparency or opaqueness. Berg asserts that the characters of gum of the same kind are liable to considerable variation. Thus the same gum may be transparent or opaque, or more or less of a light or dark color. The following are the most important varieties of Acacia gum:

1. **Turkey or Arabic Gum** (*Gummi turicum seu a gummi*):

   *Mimosa verum*, Martius; *Gomme arabeque vera*, is imported from Leghorn, Malta, Trieste, Gibraltar, Beyrout, Constantinople, &c. It is the purest of all, and probably of other species, especially *A. arborescens*, in roundish tears, or amorphous or angular pieces from a pea to that of a walnut, or even larger than these. The pieces are transparent, others more or less opaque, and have numerous cracks extending through them. It has a white, yellow, or wine-yellow, and has no odour or taste. Its specific gravity varies from 1.316 to 1.340. It is readily broken into small fragments. It is entirely soluble, the solution having the property of reddening little or not at all. The latter property is said, perhaps owing to a small quantity of insoluble nitrogenous matter, to be the basis of its value. The white pieces constitute the *gummi electum* or *gummi turicum*. On the continent they are called *gum Turic* (*gommierous*).
Barry or Morocco Gum (Gummi Barbaricum).—This is imported
from Barbary and Mazagan. In 1830, there were imported from
Barbary, and Morocco, 2063 cwts. of gum. Barbary gum is
the produce of Acacia gummosa. Jackson says, it is obtained
from a high thorny tree, called Attaleh. The best kind is
from the trees of Morocco, Ras-el-wed, in the province of
Bled-hummer, in the province of Abda:—the second
are the produce of Shedma, Duguella, and other provinces.
No varieties of Barbary gum: one (the Gomme de Barbarie
barut) is in roundish or irregular tears, mixed with many im-
perfectly transparent, and of a dull yellowish colour, with
int of green.—It is imperfectly soluble in water, and has
alogy to Senegal gum. The other kind (called Mogadore
in small, angular, broken, mostly yellow, pieces, which re-
framents of Turkey gum.

Senegal (Gummi Senegalense).—This gum is imported from
St. Mary's, the river Gambia, Senegal, and Bathurst. In
ity (6s. per cwt.) was paid on 24,698 cwt. Gum Senegal is
obtained from several species of Acacia; but especially
A. vera, A. Seyal, and A. Adansoni, are said to pro-
duce gum. It occurs in larger tears than those of Turkey or
gum. On breaking them we frequently find large air-cavities
centres. Occasionally we meet with whitish pieces, but for
part they are yellow, reddish yellow, or brownish red.
difficulty is experienced in breaking or pulverizing this gum
in Arabic, and its fracture is more conchoidal. The taste of
is similar to that of the last.

Barbary distinguishes two varieties of this gum, one of which he
gome du Bas du Fleuve, or gum Senegal, properly so called;
the Gomme du Haut du Fleuve, or Gomme de Galam. The
ably the produce of Acacia Senegal, while the second is
from A. Vera. There is but little difference between them;
Galam has a greater resemblance to Turkey gum than
gum has; the pieces are more broken, and therefore more
than those of gum Senegal, properly so called.

pieces of gum which have on some part of them a yellow-
que skin or pellicle, constitute the Gomme pelliculée of Gui-
The Marrons de Gomme, or Gomme lignirode, of the same
ologist, is also found in the Senegal gum of commerce: it
of yellowish or dark brownish pieces, which are difficult to
paque and rough. Treated with water it partially dissolves,
says Guibourt, a residue of gnawed wood (bois rongé).
states, that in most of the marrons he has found a large ovoid
ich had been the habitation of the larvae of some insect;
from whence he concludes that this substance is the work of an insect.

4. East India Gum (Gummi indicum ostindicum).—This variety is imported principally from Bombay. In 1839, duty (9s. per cwt.) was paid on 7,860 cwt. It is probably the produce of various species. Many pieces agree in their physical and chemical characters with Turkey and Arabic gum, and are probably the produce of Acacia arabica, or some allied species (yellow E. I. Gum). Others, however, are larger, red or brown, and more difficult to pulvis by than Turkey or Arabic gum (brown E. I. gum). Are these the produce of Feronia Elephantum?

I have received from Bombay three varieties of gum: one under Maculla best gum Arabic, very similar to gum Galam; a second, marked Mocha and Barbary gum, in large reddish coloured, round tears; and a third, denominated Surat inferior gum Arabic, smaller dark-coloured tears.

5. Cape Gum. (Gummi Capense.)—This is imported from the Cape of Good Hope. In 1829 there was exported from the Cape 16,184 lbs. and two cases of gum. In 1830 the quantity imported into the United Kingdom was only 1 cwt. 3 qrs. 14 lbs. * But since then importation has greatly increased. Mr. Burchell,† says, Cape gum is obtained from a species of Acacia (which he has figured in vol. 189 and 325) closely resembling A. vera, and which he calls capensis (T. Karoo, Hayne?). It is most abundant on the banks of the Gariep, and between the Cape and the Gariep. Notwithstanding that he asserts the quality of Cape gum as in no way inferior to that of A. vera, it is considered by our dealers as a very inferior kind. It is pale yellow; and its appearance resembles Mogador gum (p. 1581), or small fragments of Turkey gum. It is collected by the Kafris.

Besides the preceding gums, there are several others described by contain pharmacologists, but which are almost unknown in English commerce. The following are the following:

a. Gum Bassora. Gummi Toridonnense.—This gum occurs in variable pieces, which are whitish or yellowish, and opaque. When put into water it swells up, but dissolves only in part. The insoluble portion has been called bassorin. Its origin is unknown. Virey thinks that it is produced by a plant of the family Bryanthemum; Desvaux and Damart, by a Cactus.

b. Gum Kuteera.—Considered by Guibourt as identical with the preceding, but the sample given me by Professor Royle is very distinct. It has considerable resemblance to the flaky tragacanth (p. 1570), for which it has been apt to be substituted at. It is, probably, the produce of Sterculia urens, a plant belonging to the family Bittubriacee.

Under the name of Hag Gum I have met with, in commerce, an unusual gum, which greatly resembles a sample sent me by Professor Guibourt, as pseudo-adraganthe, or gomme de Sassa. It is in reddish yellow, somewhat transparent, many of which are twisted like a snail's shell or an annus.

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* McCulloch, Diet. of Com.
† Part. Ret.
‡ Travels in the Inter. of South Africa, 11-14.
§ Nichollett’s Journal, vi. 301.
‖ Roxburgh, Fl. Indica, iii. 146.
¶ See his Hist. des Drog. ii. 477, 3rd ed.
ACACIA.

Rhus Metopium yields a substance called Hog gum\(^1\), but I know neither it be identical with the gum above referred to.

ADULTERATION.—The inferior and cheaper kinds of gum (as the Bary, East Indian, and Senegal gums) are not unfrequently substituted for the Turkey or Arabic gum, especially in the form of powder. Flour (or starch) is sometimes mixed with powdered gum; adulteration is readily recognized by the blue colour produced on the addition of a solution of iodine to the cold mucilage of suspecting gum.

COMPOSITION.—Several ultimate analyses of gum have been made; the most important are those of Berzelius\(^1\), Prout\(^2\), Guerin\(^3\), and Mulder\(^4\).

<table>
<thead>
<tr>
<th>Gum Arabic</th>
<th>Gum Senegal</th>
<th>Soluble pt. of Gum Bassore</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEREZELIUS</td>
<td>PROUT</td>
<td>MULDER</td>
</tr>
<tr>
<td>H</td>
<td>41:4</td>
<td>5:5</td>
</tr>
<tr>
<td>O</td>
<td>42:10</td>
<td>6:10</td>
</tr>
<tr>
<td>Trace</td>
<td>Trace</td>
<td>Trace</td>
</tr>
<tr>
<td>Total</td>
<td>100:00</td>
<td>100:00</td>
</tr>
</tbody>
</table>

The formula C\(^{13}\)H\(^{13}\)O\(^{12}\) agrees with the analyses of Berzelius and Prout. Mulder gives, as the formula for gum Arabic, C\(^{12}\)H\(^{10}\)O\(^{11}\) according to the first formula the atomic weight will be = 186; according to the second, = 162.

The proximate analysis of gum has been made by Guerin\(^5\):—

<table>
<thead>
<tr>
<th>Gum Arabic</th>
<th>Gum Senegal</th>
<th>Gum Bassora</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soluble gum (Arabin)</td>
<td>79:40</td>
<td>81:10</td>
</tr>
<tr>
<td>Insoluble gum (Bassorin)</td>
<td>0:00</td>
<td>0:00</td>
</tr>
<tr>
<td>Water</td>
<td>17:60</td>
<td>16:10</td>
</tr>
<tr>
<td>Ashes</td>
<td>3:00</td>
<td>2:80</td>
</tr>
<tr>
<td>Total</td>
<td>100:00</td>
<td>100:00</td>
</tr>
</tbody>
</table>

SOLUBLE GUM OR ARABIN.—Is a colourless, inodorous, insipid, uncrystallizable solid, soluble in both hot and cold water, but insoluble in alcohol, ether, and oils. It combines with alcalis. Sulphuric acid converts it into a liquid substance. 100 parts of arabin treated with 400 parts of nitric acid yielded Guerin 16:88 of mucic acid, with a little oxalic acid. From cerasin or mucic, it is distinguished by its solubility in cold water. The characters by which it is distinguished from trigonacanthin, carrageenin, and cydonin, have been already pointed out. According to Guerin, arabin consists of carbon 43:81, hydrogen 6:20, oxygen 49:85, and nitrogen 0:14.

INSOLUBLE GUM OR BASSORIN.—Is distinguished by its insolubility in water in hot and cold. It absorbs water, and swells up. It is insoluble in alcohol; 100 parts treated by 1000 of nitric acid furnished 22:61 of mucic acid, with

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\(^1\) See Brown’s *Nat. Hist. of Jamaica*, p. 177.
\(^2\) *Ann. de Chim. xcv. 77.*
\(^3\) *Phil. Trans.* for 1837.
\(^5\) *Pharum. Central-Blatt* für 1839, S. 137.
\(^6\) Op. supra cii.
little oxalic acid. It consists, according to Guerin, of carbon 37.28, kar 55.07, oxygen 6.85.

3. SALTs.—The ashes of gums Arabic and Senegal consist of carbonate of potash and lime, with minute portions of chloride of potassium, oxide of alumina, silica, and magnesia. The carbonate of lime is formed by the position of the malate of lime contained in the gum, while the carbonate results from the decomposition of acetate of potash.

**Chemical Characteristics.**—Gum Arabic is soluble both in hot and cold water, forming mucilage. Alcohol precipitates it from its solution. Diacette of lead causes a white precipitate (malt of lead) with the solution. A solution of silicate of potash prepared by fusing three parts of carbonate of potash with one part of silver sand causes a white flaky precipitate. Oxalate of lead gives a white precipitate (oxalate of lime). When a conc solution of sesquichloride of iron is dropped into strong nitric acid the whole becomes, after some hours, a brown semi-transparent Nitrate of mercury produces a precipitate with a solution of gum.

**Physiological Effects. a. On Animals generally.**—The use of injecting solutions of gum into the veins of animals (horses and dogs) have been examined by Viborg, Scheele, and Herodot. From their experiments it appears that small quantities only are thrown into the circulation with impunity. From half a drachm or two drachms of gum, dissolved in one or two ounces of water, are the order the respiration and circulation of horses; while four drachms of gum give rise to an affection of the nervous system, manifested by stupor and paralysis, or convulsions. Some effects (namely those on the pulmonary and vascular systems) arise from the non-miscibility of mucilage with the blood, consequent mechanical influence in obstructing the capillary circulation of the lungs. The effects of a diet of gum on animals has already pointed out (see p. 49).

b. On Man. Regnandot injected three drachms of gum, dissolved in three ounces of water, into the veins of a man aged twenty years. In half an hour the patient was very chilly, his pulse was very quick, and he had three liquid stools. The chilliness was caused by great heat, and after fifteen hours an eruption appeared on the skin.

The local action of a solution of gum is that of an emollient (by its sheathing properties) demulcent. It is not known to have any action over remote parts, though some have supposed it to have the power of diminishing irritation in the urinary organs.

The dietetical properties of gum have been before noticed (p. 49).

**Uses.**—Gum is employed in medicine as an emollient, but more frequently as a vehicle for the exhibition of medicines. It is sometimes slowly dissolved in the mouth,

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2 Ibid. op. supra cit. S. 6.
diminish irritation of the fauces, by dilating and sheathing the parts from the action of some affections of the intestinal tube, as dyspepsia, &c.; gum is used as an adstringent substance, a solution of gum, consisting of 8 parts of gum and 2 of water, is of course its efficacy at a temperature applied to the mucous membrane is increased; a solution of gum, consisting of 4 parts of gum and 1 of water, is used as a counter-irritant, whenever it is necessary to effect a more violent action. In the case of anti-inflammatory medicines, it is employed either in a solution; the former is used to cement, &c., the latter is employed to suspend, &c., in water, or to pass through aqueous fluids; and to this of course, the adhesive qualities of gum are mainly useful for various other pharmaceutical purposes.

A dose of powdered gum is from 3ss. to 5j.

**Mistura Acaciae, L.; Mucilago Gummi Arabici, D.; Water, powdered, 3x.; Boiling Water, Oj.** Rub the gum into Boiling Water, gradually poured in, and dissolve it, L.—The College uses only 3v. of gum to Oj. of Cold Water, and requires the gum to be dissolved without heat, but with occasional rubbing of the vessel, and the solution to be strained through linen or calico.—The College employs 3v. of coarsely-powdered Gum to 3v. of water, and directs the mucilage to be strained through linen. — No allowance of the Edinburgh College is to be preferred, as being much stronger, and made without heat (which causes gum to be somewhat acid, and thereby renders it somewhat acrid). The process yields a mucilage too thick to be strained. By keeping the gum cool, the mucilage readily becomes sour by the development of acetic acid. The pharmaceutical uses of mucilage have been above referred to, and render different substances miscible with aqueous vehicles, and of proportions of mucilage are required. "Oils will require three-fourths of their weight, balsams and spermaceti equal in parts, and musk five times its weight."

**Tura Acacieae, E.; Acacia Mixture.**—(Mucilage, 3j.; Sweet Water, 3j. and 3j.; Pure Sugar, 3v.; Water, Oj. Steep the gum in hot water, and peel them; beat them to a smooth pulp in the mortar; or marble mortar, first with the sugar, and then with water; add the water gradually, stirring constantly; then pass it through linen or calico.)—Demineral and emollient. Apply to the same purposes as Mistura Amygdale, already mentioned. 3 to 3j.
silver sand) causes a white flaky precipitate. Oxides of iron, gives a white precipitate (oxalate of lime). When solution of sesquichloride of iron is dropped into the whole becomes, after some hours, a brown semi-solid. Nitrates of mercury produce a precipitate with a slight change.

**Physiological Effects.**

α. *On Animals generally.* The effects of injecting solutions of gum into the veins of animals (such as dogs) have been examined by Viborg, Scheele, and others. From their experiments it appears that small quantities of gum are thrown into the circulation with impunity. From 1 to 2 drachms of gum, dissolved in one or two ounces of water, may be injected without producing any apparent disorder of the respiration and circulation of horses; but larger doses may cause a condition of the lungs. The effects of a diet of gum on animals have been already pointed out (see p. 49).

β. *On Man.* Regnandot injected three drachms of gum in three ounces of water, into the veins of a man and a woman. In half an hour the patient was very chilly, his pulse quickened, and he had three liquid stools. The chilling was caused by great heat, and after fifteen hours an eruption appeared on the skin.

The local action of a solution of gum is that of a (by its sheathing properties) demulcent. It is not the local action of a solution of gum, but the power of diminishing irritation in the urinary or digestive system.
blesome cough, and to diminish irritation of the fauces, by diluting the acrid secretions, and sheathing the parts from the action of atmosphere. In inflammatory affections of the intestinal tube, as of the respiratory and urinary organs, gum is used as an astringent and demulcent. As a sheathing substance, a solution of gum may be employed in acrid poisoning; but of course its efficacy is mechanical merely. Powdered gum is occasionally applied to check hemorrhage from leech bites.

As a vehicle for the exhibition of other medicines, it is employed in the form either of powder or mucilage. The former is used to bulk to active and heavy powders; as calomel, emetic tartar, &c., in the preparation of lozenges. The latter is employed to suspend insoluble powders (as oxide of zinc, musk, &c.) in water, or to give oily and resinous substances through aqueous fluids, and to form and tenacity to pills. Furthermore, the adhesive qualities of mucilage renders it exceedingly useful for various other pharmaceutical purposes.

ADMINISTRATION.—The dose of powdered gum is from 3ss. to 3j., ad libitum.


Mucilage.—(Acacia, powdered, 3x.; Boiling Water, Oj. Rub the acacia with the water gradually poured in, and dissolve it, L.—The Edinburgh College uses only 3ix. of gum to Oij. of Cold Water, and gets the gum to be dissolved without heat, but with occasional stirring, and the solution to be strained through linen or calico.—The blin College employs 5iv. of coarsely-powdered Gum to f3iv. of Water, and directs the mucilage to be strained through linen).—

A process of the Edinburgh College is to be preferred, as being sufficiently strong, and made without heat (which causes gum to become somewhat acid, and thereby renders it somewhat acrid). The blin process yields a mucilage too thick to be strained. By keeping the mucilage readily becomes sour by the development of acetic acid. The pharmaceutical uses of mucilage have been above referred to. To render different substances miscible with aqueous vehicles, certain proportions of mucilage are required. "Oils will require at three-fourths of their weight, balsams and spermaceti equal parts, and musk five times its weight."

MISTURA ACACLE, E.; Acacia Mixture.—(Mucilage, f3iij.; Sweet monks, 3j. and 5ij.; Pure Sugar, 3v.; Water, Oij. Steam the monks in hot water, and peel them; beat them to a smooth pulp in earthenware or marble mortar, first with the sugar, and then with mucilage; add the water gradually, stirring constantly; then strain through linen or calico.—Demulcent and emollient. Applies to the same purposes as Mistura Amygdale, already mentioned.


Montgomery, Observ. on the Dublin Pharm.
HISTORY.—It is somewhat uncertain who first discovered Garcias ab Orto⁹ was of opinion that it was Dioscorides⁹; but Dr. Royle⁹, in a very elaborate account on this subject, has apparently proved that the produce by the latter author is the produce of Berberis Lyrata.

BOTANY. Gen. Char.—See Acacia (p. 1578).

Sp. Char.—Arborescent. Branches armed with stigmas, occasionally unarmed. Young shoots, petioles, and stipules or less pubescent. Leaves bipinnate; pinnae ten to fifteen leaves thirty to fifty pairs; petiole sometimes armed, with a row of prickles, with one large gland at the base of the leaf, one pair of pinnae, and between the extreme one to four together, shorter than the leaf. Stipules united. Stamine flowers numerosus. Petals united. Stamens distinct, numerous, thin, straight, linear, glabrous, four- to eight-see (Arnott).

Tree from fifteen to twenty feet high. Bark brown, Wood hard and heavy; the interior (duramen) brown, blackish; the exterior (alburnum) white, one or two. Flowers whitish or pale yellow.

Hab.—Various parts of the East Indies; now cultivated.

MANUFACTURE OF CATECHU.—The manufacture of the Acacia Catechu, as practised in Canara and described by Mr. Kerr⁹ and Dr. F. Buchanan Hamilton⁹, and by Dr. Royle⁹ has explained the process followed in North America according to the last-mentioned gentleman, “the K" move to different parts of the country in different temporary huts in the jungles, and selecting trees fit
CATECHU ACACIA.

Catechu: after a considerable portion has boiled away, the clear nor is strained into one of the neighbouring pots, and a fresh sup- of material is put into the first, and the operation repeated until extract in the general receiver is of sufficient consistence to be into clay moulds, which, in the Kheroo Pass and Doon, where have seen the process, are generally of a quadrangular form. This catechu is usually of a pale-red colour, and is considered there to of the best quality. By the manufacturers it is conveyed to Harupore and Moradabad, whence it follows the course of con- down the Ganges, and meets that from Nepal, so that both may exported from Calcutta.”

DESCRIPTION.—The term Catechu (from cate a tree, and chu juice) applied to various astringent extracts (sixteen of which I have in collection) imported from India and the neighbouring countries. few years ago the terms Catechu, Terra japonica, and Cutch, were dozed synonymously; they are now, however, for the most part, in trade somewhat distinctively, though not uniformly in the sense. In the Edinburgh Pharmacopoeia catechu is correctly be the “extract of the wood of Acacia Catechu, of the kernel of Areca Catechu, and of the leaves of Uncaria Gambir; pro- too, from other plants.”

A 1837 I attempted to classify the varieties of catechu which I met with, according to the plants from which they were pro- as far, at least, as I could ascertain this. But in the first ion of this work I did not adopt this classification, in consequence some doubts which I entertained respecting its accuracy. Having, ever, obtained further information on the subject, I shall now adopt with some modifications.

Gambir Catechu; Catechu from Uncaria Gambir.—The method preparing Gambir, and the properties of the different commercial ables of this extract, have been already described (see pp. 1438-

I may further observe, however, that the origin of these varie- of catechu I consider to be satisfactorily made out. They are orted under the name of Gambir from Singapore (where the Un- Gambir is cultivated, and an extract prepared from it), they e with the published descriptions of gambir, and lastly, I find a to be identical with the gambir brought by Mr. Bennett from rapore, and deposited in the Museum of the Medico-Botanical Iety.

Betel-nut Catechu; Catechu of the Areca Catechu.—The mode preparing Betel-nut Catechu, as described by Heyne, has been rdy stated (see p. 937). Two kinds of astringent extract are said him to be prepared from these seeds: one called Kassu, which is k and mixed with paddy-husks; the other termed Cowry, which allowish brown, has an earthy fracture, and is free from the ature of foreign bodies. I have been able to identify Kassu

among the extracts of commerce; but have not satisfactorily been identified.

KASSU; Dark-brown Catechu in circular flat cakes; Colombo or Ceylon or Cutch (Cachou brun, orbiculaire et plat, Guibourt). Imported from Cakes round, flat, covered on one side with paddy husks (glumes of two to three inches in diameter, scarcely one inch thick, and weighing two to three ounces. Internally they are dark, blackish brown and closely resembling Pegu Catechu. Examined by the microscope it is found to contain numerous large crystals. Common. Quality excellent.—After this catechu becomes turbid on cooling, and frequently produces a line with a solution of iodine, owing to the presence of the rice starch.

That this extract is Kassu, and is obtained from Areca Catechu, is two facts:

a. It agrees with the Kassu of Heyne in its dark colour, and is mixed with paddy husks.

b. It is imported from Ceylon, in which island catechu is obtained. Areca Catechu. For this information I am indebted to a letter (unaddressed by Mr. Lear) acting superintendent of the Garden in Ceylon, to my late friend Mr. F. Saner, assistant-surgeon of Majesty's 61st regiment, then stationed at Colombo. The letter November 17, 1838, and contains the following passage: "Of gambir I am quite unacquainted, and also of the trees which produce it. I should be glad of any information on the subject. An extract of Areca Catechu (specimens of which I will procure you) has been by the Terra Japonica of the shops; but it is generally supposed to be from Areca Catechu, a plant not in Ceylon."

3. Cutch; Catechu of the Acacia Catechu.—It is probable a considerable number of the astringent extracts brought from Cutch are the produce of the Acacia Catechu. However, a small number only have been positively identified.

a. Pale, dull Catechu in Square Cakes; Cachou terne et part. Guibourt; Cachou en manière de corce d'arbre, A. Jussieu. This per Bengal Catechu of Davy.

It occurs in square cakes, usually about two inches long, two inches wide, and one inch in thickness. Usually these cakes are irregularly broken, so as to be difficult to trace their angular character. They are heavier than externally their colour is dark brown or blackish; internally we observe darker layers, disposed in a schistose manner, like the bark of a tree, darker layers being brown and somewhat shiny, the lighter ones a cream white. Examined by the microscope it is found to consist principally of crystals. A decoction of one part of this catechu and twelve parts of water, on cooling, a copious whitish precipitate of catechin.

I find this kind of catechu to be identical with the specimens brought by Royle from India, and which he saw prepared from Acacia Catechu (description of the process at p. 1586). Moreover it probably is the kind, facture of which Mr. Kerr described; for he says it is in square sections, finest being whitish. So that it is manufactured in Bahar, as well as in northern parts of India.

b. Dark shiny Pegu massive Catechu; Pegu Catechu; Cutch; Cachou masse, Cachou lucide, Cachou du Buteu frondosu, Guibourt. It is imported from Pegu in large masses weighing sometimes a cet. each. These masses are composed of prismatic pieces, each from six to ten inches long, and two or three inches broad and deep. Each piece is enveloped in the scale of Nanclia Brunnonis, a native of Tavoy, Wallach. Cat. (not of Butea frondosa, formerly supposed). When fractured, these pieces present a dark black or shiny surface, free from all impurities; some of the pieces, however, more reddish tint than the others. Their taste is bitter and astringent.
though I know not on what authority, that this variety contains 57 per cent of tannic acid. Pegu catechu is largely employed, I am informed, for dyeing. The greater part of that brought to this country is exported for medicinal purposes.

According to Herbert de Jager, the catechu of Pegu is obtained from the Acazia catechu, and, he adds, that it is celebrated throughout India.

**Dark Catechu in balls.**—I have two varieties of dark-coloured catechu balls:

- **Enveloped in leaves.**—This agrees in its appearance with the Pegu Catechu above mentioned, and like the latter is enveloped in leaves, apparently of *Nuxella Brunonis*. The balls are round and about the size of small oranges (as Cutch in balls?).

- **Covered with Paddy Husks.**—Balls more or less flattened, not exceeding 2 cm in diameter, and covered with paddy husks (glumes of rice). In other respects identical with the preceding. It agrees with the kind referred to by B. Hamilton, as being procured from *Acacia Catechu*. When the extract is made, it acquires the thickness of tar, it is allowed to harden for two or three days and then placed on the husks or on leaves.

**Catechu of unknown origin.**—The origin of the larger proportion of the catechus which I have met with, I have not been able to determine.

**Brown Catechu in conical masses from Siam.**—This variety has only been imported from Siam in bags. It is in masses shaped like a betel nut rather than that of a mulberry or truncated olive, each weighing about a pound and a half. The flattened base is marked with the impression of the leaf of *Lea Brunonis*. Internally this catechu is shiny and liver-coloured, strongly resembling aloe. In its other qualities it agrees with Pegu Catechu.

**Catechu in flat cakes.**—Under the name of Cutch I have received a few in flat cakes like the Colombo catechu but unmixed with rice glumes. Cakes have a rusty appearance externally.

**Black mucilaginous Catechu.** *Cachou noir et mucilagineux*, Guibourt. Parallelopipeds of eighteen lines on the side, and an inch high. Internally dark and shiny, somewhat similar to extract of liquorice. Quality bad.

**Dark-Brown Siliceous Catechu in flattened, circular, or quadrangular cakes.** *Cachou brun siliceux*, Guibourt. Formerly called by druggists *taip*, *japonica*. Perhaps the Bombay Catechu of Sir H. Davy. It is in round or oval masses, varying in weight from two or three ounces to several pounds; externally it is of a dull dark-brown or rusty colour, internally being shiny and dish brown. It is very heavy, and contains a large quantity of fine sand. Court says, 100 parts of this catechu yield 16 parts of earthy matter, some of the specimens contain a much less portion of earthy matter. Quality good.

**Dull reddish Catechu in balls.** *Cachou en boules, terreux et rogeâtre*, Court. In the collection of the Medico-Botanical Society of London, it is noted American Catechu. Balls flattened, weighing three or four ounces, coated on one side with glumes of rice. Its fracture is dull, reddish, wavy, and marbled. Quality good.

**Pale or whitish Catechu in irregular lumps.** *Cachou blanc*, Guibourt. Received this from Bombay, under the name of *Katha syphioid* (i.e. pale or white catechu). It is in lumps, which vary in size from that of a walnut to that of an apple. The general form is rounded or oval, and somewhat flattened, the surface being very uneven, and of a dark or blackish brown colour. Internally

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*b Miscellanea curiosa Dec. ii. Ann. iii. p.9.*
this variety is dull, and of a very pale colour. Guibourt says, it is almost but it has a pale-yellowish or brownish-red tint. Its taste is bitter, acid and sweetish, with a smoky flavour. Hence, perhaps, the dark colour naturally is derived from the masses being dried, or exposed to the smoke of

Composition.—Two kinds of Catechu were analyzed by Davy. In 1833, Buchner discovered in catechu a peculiar substance which has been denominated Catechine.

Davy's Analyses.

<table>
<thead>
<tr>
<th></th>
<th>Bombay</th>
<th>Bengal</th>
</tr>
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<tbody>
<tr>
<td>Tannin</td>
<td>54°5</td>
<td>50°</td>
</tr>
<tr>
<td>Peculiar extractive</td>
<td>34°</td>
<td>36°5</td>
</tr>
<tr>
<td>Macilage</td>
<td>6°5</td>
<td>8°</td>
</tr>
<tr>
<td>Insoluble matter (chiefly sand and lime)</td>
<td>5°9</td>
<td>7°</td>
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</tbody>
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Catechu

100° 100°

1. Catechine.—This has been already noticed (see Uncaria Gambiri).

2. Tannic Acid.—The general properties of this acid have also been described (see p. 1050). It is this substance which renders catechu so to the tanner. The peculiarities of the tannic acid of catechu have been by Berzelius, but in consequence of the subsequent discovery of a acid they require re-examination. The tannic acid of catechu is easily in water and alcohol, but very slightly so in ether. The aqueous solutions coloured by exposure to the air. Its combinations with acids soluble. Alkalis do not precipitate it.

Chemical Characteristics.—The brown, filtered decoction of catechu reddens litmus, yields a blackish-green colour and pate (catechuate and tannate of iron) with the ferruginous and a brownish-white one with acetate of lead. A solution of tannine renders the cooled decoction turbid (tannate of gelatine, kalis deepen the colour of the decoction, but cause no precipitation.

Sulphuric acid renders the decoction slightly turbid.

The filtered decoction of several kinds of catechu (especially catechu in broken square cakes) deposits, on cooling, catechine.

The decoction of dark-brown catechu, in circular flat cakes cold becomes blue (iodide of starch) on the addition of a stone of iodine.

Purity.—The Edinburgh College states that “the finest quality of catechu yield to sulphuric ether 58, and the lowest quality over 28°.” This proceeding, however, may be relied on as a test of the astringency of catechu, which only be determined in the usual way by gelatine. This College in supposing that the ethereal extract is necessarily either water in great part tannin; for catechuic acid, which constitutes a portion of some kinds of catechu, is soluble in ether.

Physiological Effects.—Catechu produces the local and general effects of the astringents before described (see p. 188). With good quality it is more powerful than kino. In its operation closely allied to rhatany root (Krameria triandra).

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Phil. Trans. for 1865, p. 233.
Pharm. Central-Blatt, für 1839, 629.
Tratté de Chim., t. v, 568.
- Employed as an astringent in the following cases:

  In affections of the mouth and throat. — In various affections of mouth and throat I have frequently employed catechu, and found convenient and efficacious astringent. Thus, in relaxed uvula, in that slight chronic inflammatory affection of the throat usually maintained the relaxed sore throat, and which is especially obvied in delicate females, catechu, chewed or sucked, is a most use remedy. The purer kinds of catechu should be selected, especially avoiding those that are gritty. Or catechu lozenges may be advised. The pale kinds of catechu (as gambir, before described,) usually sweeter and more agreeable than the dark varieties. Public speakers or singers also it is a useful remedy; it prevents diminishes hoarseness consequent on frequent use of the vocal is. In slight ulcerations of the mouth also it is useful.

As a stomachic in dyspeptic complaints. — I have known catechu ed with advantage in dyspeptic complaints. It should be used before taking food: it promotes the appetite, and assists digestion.

As an astringent it may be employed in old-standing diar rhea and dysenteries, when there are no inflammatory symptoms. It is often conjoined with the chalk mixture, and not only with opiates.

As an astringent in hemorrhages of an astatic character. A ute of catechu, with grs. xij. of confection of opium, and a su tient quantity of aromatic confection to make a bolus, was a rite prescription of Dr. Babington, sen. in inconsiderable flow of es.

In lead colic it was recommended by Grashius.

In mucous discharges, as gleets, fluor albus, chronic old-standing rhœa, &c.

As a topical application to ulcers. — “An ointment composed of catechu, 3ix. of alum, 7iv. of white resin, and 13x. of olive with a sufficient quantity of water, is in great repute in India as application to ulcers.”

Administrations. — Dose, grs. x. to 5j. It may be administered in form of bolus, or of mixture with sugar and gum Arabic. For solution in the mouth, I have found a lump of the purer of commercial catechu more agreeable than catechu lozenges, and I requested a manufacturer of lozenges to prepare for me.

Infusum Catechu Compositum, L. D. Infusum Catechu, E.; Ointment of Catechu. Catechu, powdered, 5vj. [3iiis. D.]; Cinnamon, bruised, 3j. [3ss. D.]; Syrup, 3½j. E.; Boiling [distilled, L.]; Oj. [3½vj. E.; Oss. wine-measure, D.]. Macerate the Catechu and Cinnamon in the Water, in a lightly-covered vessel, for an hour and a half, E., then strain [through linen or calico, and add syrup, E.]. — Astringent. Adapted to diarrhoea. Dose, 3½ij. or 3j. or three or four times a day. Frequently given in conjunction with opiates. Sometimes used in the form of enema.

Ainslie, Mat. Ind. i. 590.
De Cola: Ptolemaeus. Amsterd. 1722.
Thomson, London Dispens.
2. **Tinctura Catechu, L. E. D. Tincture of Catechu.** [in moderately fine powder, E.], 3ijss. [3ij. D.]; Cinnamon [in fine powder, E.], 3ijss. [3ij. D.]; Proof Spirit, Oij. *Measure*, D.] Macerate for fourteen [seven, E. D.] days [and strongly express the residuum; filter the liquors, tincture may be also prepared by the process of per mixed powders being put into the percolator without being moistened with the spirit, E.].—Astringent. Usually as an adjunct to chalk mixture in chronic diarrhoeas and occasionally to Port wine, with some aromatic [nutmeg or —Dose, f3j. to f5j.]

3. **Electuarium Catechu, E. Electuarium Catechu.** D. (Catechu, 3iv.; Kino, 3iv. [3ij. D.]; Cinnamon, [Nutmeg, 5. E.]; Opium, diffused in a little Sherry, of Red Roses [Syrup of Ginger, D.], boiled to the conc honey, Ojss. [lb. 1ij. 1/2. D.] Pulverize the solids; mix the Syrup, then the powders, and beat them thoroughly into mass).—Astringent. Employed in chronic diarrhoeas, dysentery, hemorrhages. Dose, 5j. to 7j. One ounce of this prepared according to the Dublin Pharmacopoeia, contains a half of opium.

11. **Andira Inermis, Kunth.—The Cabbage-bar.**

*Geoffroy* inermis, *Swartz, D.*

*Sex. Syst.* Diadelphia, Decandria.

*Cortex, D.*

**History.**—The medicinal properties of the bark of this tree first pointed out by Mr. Duguid 1. The first botanical description of the tree was published by Dr. Wright 2.

**Botany. Gen. Char.**—*Calyx* turbinate-campanulate, five teeth almost equal, acute, erect. *Corolla* papilionaceous, ovate, roundish, emarginate, larger than the keel. Stam- phous (nine and one). *Ovary* containing three ovules, stalked, somewhat orbicular, rather hard, one-celled, when ripe divisible into two valves, according to Swartz.

**Sp. Char.**—Leaflets thirteen to fifteen, ovate-lanceolate, smooth on both sides. Flowers paniculate, with very short *Calyx* urceolate, ferruginous-pubescent (De Cand.)

**Tree** of considerable height. Leaves pinnate. Flowers lilac.

**Hab.**—West Indies.

**Description.**—Cabbage bark or Worm bark (cortex and *Geoffroya jamaicensis*) occurs in long, thick, fibrous pieces.
nish-ash colour, a resinous fracture, a disagreeable smell, and a muciaginous, bitter taste.

**AM BARK** (cortex Geoffroyae Surinamensis) is the bark of *Andira retusa*, *surinamensis*, De Candolle. Huttenschmidt found in it a white crystalline, which he called *Surinamin*. Surinam bark has been used as a drug, but I am totally unacquainted with it.

**Position.**—Cabbage-bark was analysed in 1824 by Huttenschmidt, who found in it the following substances: *Jamaica cinna*, etc., with a yellow precipitate. Two grains of the acetate of *Jamaica cinna*, a yellow precipitate, caused restlessness and trembling, and in half an hour purging.

**Chemical Effects.**—Cathartic, emetic, and narcotic. In thirty or forty grains the powder of this bark purges like jalap. In larger quantities it causes vomiting, fever, and fatal accidents are said to have resulted from its imputation.

Formerly employed as an anthelmintic, especially against round worm (*Ascaris lumbricoides*), but its use is now prohibited.

**Dosage.**—Dose of the powder, 3 drops. As an anthelmintic bark is usually given in the form of decoction.

**Decoction of Cabbage-tree Bark.** Take a pint, and to the strained liquor add 3 j of Syrup of Peel).—Cathartic and narcotic. Employed as an anthelmintic. Dose, 3 j to 6 j for an adult.

**Notes.**—In the event of an overdose, wash out the stomach, or vegetable acids, and evacuate with castor oil.
12. Hæmatoxy'lon Campechia'num, L. E. D.—The C
Logwood.

Sex. Syet. Decandria, Monogyinia.
(Lignum, L. D.—Wood, E.)

History.—Monardes\(^6\) calls the wood of this plant
renum affectiones et urinae incommoda. Hernandez\(^{7}\) terms
lignum nefriticum; and describes the plant under the
corallis.

Botany. Gen. Char.—Sepals five, united at the base into
what persistent tube; the lobes deciduous, oblong-obtuse;
five, scarcely longer than the sepals. Stamens ten; filaments
at the base; anthers without glands. Style capillary,
compressed, flat, lanceolate, acuminate at both ends, one-
seeded; the sutures indehiscent; the valves bursting in the
longitudinally. Seeds transversely oblong; cotyledons two.
Tree, with branches unarmed or spinous below the leaves.
racemose, hermaphrodite (De Candolle).

Sp. Char.—The only species.

Tree forty or fifty feet high. Leaves pinnate or somewhat
by the conversion of the lowest pair of leaflets into two
pinnae; leaflets obovate or obcordate. Flowers yellow.

Hab.—Campeachy. Introduced into Jamaica, where it
is in great abundance, wild.

Commerce.—The stems of the Logwood-trees are cut in
junks of about three feet long, the bark and white sap (alb
which are chipped off, and the red part or heart (duramen)
England\(^8\). It is imported from Campeachy, Honduras, and
In 1839 duty (3s. if from British possessions, 4s. 6d. if from
places) was paid on 15,867 tons\(^9\).

Description.—Logwood (lignum hæmatoxyllii seu camp"e
as imported, consists only of the heartwood or duramen.
are externally of a dark colour; internally they are red.
is dense, has a sp. gr. of 1.057; admits of a fine piqu
sweetish taste and a pleasant odour. Large crystals of ha
sometimes found in the wood\(^a\).

Composition.—Logwood was analyzed in 1811 by (C
who found its constituents to be volatile oil, hæmatin, fatty
matter, brown substance containing tannin, glutinous wax
acid, woody fibre, various salts (phosphate, sulphate, and

\(^8\) Wright, Med. Plants of Jamaica.
\(^9\) Trade List.
\(^a\) Thomson, Org. Chem. 407.
\(^b\) Ann. Chim. lixxi. 128.
COMMON LOGWOOD.

- acetate of potash, and chloride of potassium) and the oxides of aluminum, silicium, manganese, and iron.

Lematin or Hematoxylin is a red crystalline substance, of a slightly bitter, &c., and astringent taste. It is soluble in alcohol and ether, and slightly so in water. Acids render the solution yellowish or red; alkalis give it a purple or violet colour. Alum causes a violet precipitate, and several metallic solutions (of tin and lead) a blue one. Gelatine produces a flocculent reddish precipitate.

Chemical Characteristics.—The decoction of logwood is deep purple, or violet-blue colour. Acetate of lead causes a blue, not a violet, precipitate. The salts of iron make it dark violet. Gelatine forms a reddish precipitate with it.

Physiological Effects.—Logwood is a mild astringent (see the arts of astringents, p. 188). It does not constipate nor so readily render the digestive organs as some other astringents, and hence its may be continued for a longer period. Its colouring matter being absorbed, and may be detected in the urine. Dr. Percival's, that under the use of extract of logwood the urine of a suddenly acquired a purplish-red colour, which was deepened by sulphate of iron. After some hours the secretion returned to its natural colour. The stools sometimes acquire a purplish-red or from the use of logwood.

Uses.—In medicine logwood is employed as an astringent in old sores and dysenteries, in hemorrhages (from the uterus, lungs, bowels), and leucorrhoea. It is well adapted to the diarrheas of children. Dr. Percival employed it to restrain profuse sweating.

Decoction of Logwood (Log-wood, in chips, 3 j.; Water, Oj. [Oij. wine-measure, D.] ; Cinnamon, in powder, 3 j. Boil the logwood in the water down to fuidounces [Oij. wine-measure, D.], adding the cinnamon towards the end, and strain.)—Employed as an astringent in diarrhoea.—Dose, tmons, f5j. to f5j.; for children, f5j. to f3ss.

Extract of Logwood.—Wood, powdered [in chips, E.; raspings, D.], lb. ijss. [lb. j. E.]; Water, Cong. ij. [a gallon, E.]. Macerate for twenty-four hours, then boil down to a gallon, and strain while hot; finally, evaporate [in the vapour-bath, E.] to a paste of consistance.—"For preparing this extract the logwood should not be powdered, but rasped, and it should be so far evaporated as to become brittle and pulverulent when cold. One cwt. of wood yields about twenty lbs. of extract."—Astringent. Employed in old diarrheas, dysenteries, &c. Dose, grs. x. to 3ss. By ing, extract of logwood becomes exceedingly hard, and pills


Dundie, Mea. of Pharn.
writings. We are indebted for its introduction to the Arabians, who probably derived their knowledge of it from the Persians. Avicenna, and Serapion, are the earliest writers, as far as we know, who mention it, and its name is said to have derived its name from Tamar (which signifies dates or fruit), and Indus, in reference to its indigenous habitat.

**Botany. Gen. Char.** — Calyx tubular at the base, reflexed; upper lip three-partite; lower lip three, alternating with the segments of the calyx; two of them ovate, the middle one cucullate or ten; seven very short and sterile, the others (five) monadelphia, bearing anthers. **Style** subulate or linear, more or less curved, slightly compressed, twelve-seeded, the sarcocarp pulpy. **Seeds** compound, angular, obliquely truncated at the hilum. — **Tree** pinnate; **leaflets** many pair. **Flowers** racemose; **fruits** minute, red.

**Sp. Char.** — The only species. — **Tree**, thirty to forty feet high. **Branches** spreading. **Leaves** alternate; **leaflet** pair, small, oblong, obtuse, entire, smooth. **Petiole** veined with red.

There are two varieties, which are considered by Gaertner and Candolle, as distinct species. The only difference between them is in the length of the **petiole**, the elongated, six or more times longer than broad, six- to ten-toothed; **b. Orientalis**, T. indica, de Candolle. **East Indies**. The usual form of the **petiole** is elongated, six to ten-toothed; **b. Occidentalis**, T. occidentalis, de Candolle. **West Indies**.

**Hab.** — East and West Indies.

**Preservation of the Fruit.** — The usual practice of preserving tamarinds in the West Indies is, to remove the skin, or to the end of the shell, to preserve the fruit, and to dry it in the sun.
SENNA.

To seven pairs, lanceolate, acute.
on both sides, somewhat bent on the
subrub, about two feet high. Leaves
Petioles. Flowers yellow, in axillary
Petals obovate. Legumes
Pinched in each legume.

Northwest and east of Assouan.

Specimens thus

Stem

Two to eight

Smooth above,

Leaflets; stipules softly

Petioles with

Leaflet margins

Vesicles yellow. Of the

Two next large, curved,

Ovary recurved style. Legumes pen-

An inch and half long, and five-

Terminating abruptly to the base, and

Many-seeded."—Grows in India,

Yields Tinnevelly and Mecca Senna,

C. ovata, Mérat; Séné de Nubie;

Senna, Stevenson and Churchill.

Leaflets; petioles with a gland at their

each pair of leaflets; leaflets oval,

Flat, smooth, not reniform, rounded,

In three to five seeds.—About

From seven to nine lines long, and

Sufficiently elongated and less acute

Legumes from eleven to

Fawn colour.—Nubia, Fezzan, to the

to Ethiopia. Yields Tripoli Senna.

Lindley.—Dr. Lindley, who met with the

Plants made by Dr. S. Fischer, says, "the

1. vii. 315.

2d ed. ii. 219.

vol. iii. 311.

vide Kupfer. 1. ii.

30.

4, 91.
senna (sene), but they refer to the fruit, and not to the leaves.
In speaking of the decoction of senna, quotes Galen, and from
well as from other circumstances, it has been imagined that I
des and Galen, and probably even Theophrastus, were act
with senna; but their known writings do not warrant this,
and hence the quotation is presumed to be erroneous. The
Greek writer, in whose works senna is mentioned, is Actur
he, like the Arabians, referred to the fruit.

BOTANY. Gen. Char. — Sepals five, scarcely united at the base
or less unequal. Petals five, unequal. Stamens ten, free,
the three lower ones longer, the four middle ones short and
the three upper ones with abortive anthers. Anthers dehisc
apex. Ovary stalked, frequently arched. Legume various
shrubs, or herbs. Leaves simply and abruptly pinnate,
frequently glanduiferous. Leaflets opposite.

Species.—Some confusion still exists as to the species yield
senna leaves of commerce. Linnaeus made but one species,
termed Cassia Senna, and considered the acute and obtuse
plants as mere varieties. This error has been adopted by the
College. The usually-accurate Woodville has published
representing the leaflets of the acute-leaved Cassia, and th
the blunt-leaved species. The following perhaps are distinct
but their specific characters are not in all cases accurately as

1. C. obovata, Colladon b. C. Senna var. S. Linn. C
Roxb. c Sena belledy (Wild Senna) Egyptians and Nubias
de la Thébaide; Cassia Sena, Nectoux d.—Leaflets six to se
obovate, obtuse; petiole glandless. Legumes plano-co
curved, tumid by the crests on the middle of each valve. —P
—Perennial herb, one or two feet high. Leaves smooth
mucronate, unequal at the base. Stipules lanceolate, linea
ing. Flowers yellow in racemes. Legumes oblong, falcate
rounded at each end, with an equally interrupted ridge
middle of each valve. —Egypt (Bassâ-Tine at the catar
valley of Egaremont, two leagues from Cairo; Karnak; Th
the eastern bank of the Nile opposite Hermouthis; Esneh
Darou; Assouan) Nubia; Desert of Suez; Syria; Indi
vated in Italy, Spain, Jamaica, &c.—Its leaflets form Aleppo
and Italic Senna, and one of the constituents of Alexandria.

Nees and Ebermaier e follow Hayne in admitting two species of bl
vin. C. obovata, Hayne, with obovate, very shortly pointed leaflets, and
Hayne, with more remote, obovate, truncated-emarginate leaflets. It Th
Th. Martius f, that the latter are merely older leaflets than the former.

2. C. acutipolia, Delile g.—Stem suffruticoso. Leaves
glandless; leaflets five to seven pairs, lanceolate, acute.

A flat, elliptical, naked on both sides, somewhat bent on the
margin (Delile).—An undershrub, about two feet high. Leaves
young slightly silky or pubescent. Flowers yellow, in axillary
buds, at the top of the branches. Petals obovate. Legumes
flattened by the seeds. Seeds six or seven in each legume.

In the valleys of the desert to the south and east of Assouan,
acted by the Arabs, and sold by them to merchants who convey
iro.

ELONGATA, Lemaire-Lisancourt; Féé; C. lanceolata Royte.

Identical with the preceding species. Dr. Royte’s specimens
used from seeds picked out of Mecca Senna. Dr. Lindley thus
the plant. “An annual, but, with care, it may be made to
ough the year, and to assume a suffruticose habit. Stem
smooth. Leaves narrow, equal pinnated; leaflets four to eight
lanceolate, nearly sessile, slightly mucronulate, smooth above,
rown beneath, with the veins turning inwards, and forming a
in marginal line; petioles without glands; stipules softly
ent, seminastate, spreading, minute. Racemes axillary and
, erect, stalked, rather longer than the leaves; pedicels with-
cts. Sepals linear, obtuse. Petals bright yellow. Of the
five lowest sterile and small, the two next large, curved,
fect, the three uppermost minute and gland like. Ovary
owny, falcate, with a smooth recurved style. Legumes pen-
oblong, membranous, about an inch and half long; five-
broad, quite straight, tapering abruptly to the base, and
at the apex, deep-brown, many-seeded.”—Grows in India,
ably only naturalized.—Yields Tinnevelly and Mecca Senna.
ETHIOPICA, Guibourk; C. ovata, Mérat; Séné de Nubie;
eco, Nectarum; C. Senna, Stevenson and Churchill.—
of three to five pair of leaflets; petioles with a gland at their
and another between each pair of leaflets; leaflets oval-
ate, pubescent. Legumes flat, smooth, not reniform, rounded,
on both sides, containing from three to five seeds.—About
inches high. Leaflets from seven to nine lines long, and
ree to four broad, consequently less elongated and less acute
ose of the two preceding species. Legumes from eleven to
tines long, of a pale or fawn colour.—Nubia, Fezzan, to the
f Tripoli, and probably to Ethiopia. Yields Tripoli Senna.
I have detected the leaflets in Alexandrian Senna.

LANCEOLATA, Forskål; Lindley.—Dr. Lindley, who met with this
in a collection of Arabian plants made by Dr. S. Fischer, says, “th
LEAFETS are in four or five pairs, never more; oblong, and either acute or not at all ovate or lanceolate, and perfectly free from downiness even young; the petioles have constantly a small round brown gland a little above the base. The pods are erect, oblong, tapering to the base, obtuse, turbid, most rather falcate, especially when young, at which time they are sparingly with coarse scattered hairs."—This species is therefore distinct from \textit{Cassia acutifolia}, Delile, and \textit{C. elongata}, Lemaire. Forskål says it grows about the Red, or Aburish; and that it is the true \textit{Mecca Senna}.

6. \textit{C. Mariandica}, Linn.—\textit{Leaflets} eight to nine pairs, ovate-oblong, equal, with an ovate gland at the base of the petiole. \textit{Racemes} many-flowered, shorter than the leaves. \textit{Leguminos} compressed, linear, subsequently smoothish (Decand.)—From three to six feet high. \textit{Flowers} yellow.—United States; common in all parts south of New York.—\textit{Yue American Senna}.

COMMERC.—Senna is imported from the Mediterranean directly from Egypt, or at second hand from Italy), and from the Indies (Madras and Bombay), usually in bales. The duty is $1.50$ lb. The quantities on which duty was paid, during the two years, are as follows:

\begin{tabular}{l|c|c}
\textbf{From East Indies} & \textbf{1838} & \textbf{1839} \\
\hline
 & 72,576 lbs. & 110,809 lbs. \\
\textbf{From other places} & 69,055 lbs. & 68,765 lbs. \\
\hline
\textbf{Total imported} & 141,631 lbs. & 179,574 lbs. \\
\end{tabular}

DESCRIPTION.—Senna (\textit{Folia sennea}) has a peculiar, agr tea-like odour, and a nauseous, bitter taste. Its colour is bright and fresh. If largely mixed with extraneous matter, it much broken or very dusty it should be rejected. Boiling extracts about a third of its weight. Proof spirit yields a bit alcohol or ether a green tincture.

1. \textit{Alexandrian Senna}. \textit{Senna Alexandrina; Folia Sena drinae}.—Called by the French \textit{Séné de la Palthe} (i.e. Tribute) because it is obliged to be sold to the Egyptian government, wh it to Europeans. It is imported in bales from Alexandria and Mediterranean ports. It consists of the leaflets of two or more sp \textit{Cassia} (\textit{C. acutifolia}, \textit{C. obovata}, and, I think, sometimes \textit{C. ell}) mixed always with the leaves of \textit{Cynanchum Argel} (see p. 160), sometimes with those of \textit{Tephrosia Apollinea}. The flowers an of these plants are usually present in greater or less quantity. andrian senna is collected in Nubia and Upper Egypt, and veyed down the Nile to the great dépôt at Boulak.

For the following particulars I am indebted to the writings of Delill\textsuperscript{e}, Nectoux\textsuperscript{a}, and Burckhardt\textsuperscript{a}.

Senna is collected by the Arabs of the tribe of ABDABB. They are crops annually. —The most productive one is that after the rain in Aug September; the second takes place about the middle of March. When plants are spread out on the rocks, and dried in the sun (Nectoux).

\textsuperscript{a} \textit{Mém. sur l'Egypte}, vol. iii. p. 315, 1799, and \textit{It. Egypt}.
\textsuperscript{a} \textit{Ann. Chim} lxi. 161.
\textsuperscript{a} \textit{Phil. Mag.} xv. 55, and \textit{Voyage dans le Haute Egypte}, 1508.
\textsuperscript{a} Traces in Nubia, pp. 22 and 49, 2nd ed.
is the first entrepôt for senna. It receives all that is gathered in the
good. Esneh is another entrepôt. It receives the acute-leaved senna
africa, Nubia, and Senmaar, from whence it arrives by the caravans
by negroes to Egypt, and blunt-leaved senna, gathered in Upper
it is at Bouak, the port of Cairo. Here the monopoly of
out by Mahomed Ali to Rosetti, an Italian, for about £3,500
(Burckhardt). The senna arrives at Bouak from Assouan, not only
orse by the way of Cossier, the Red Sea, and Suez. As, how-
trader is a more expensive route, it is not so frequently followed (Nec-
ly, some senna is carried to Bouak by the caravans from Mount
the following are said by Rouillure to be the quantities brought from

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<tr>
<td></td>
<td>1,000 to 5,000</td>
<td>500 to 600</td>
<td>500 to 600</td>
<td>2,000 to 2,400</td>
</tr>
<tr>
<td>Mount Sinai</td>
<td>1,200 to 1,500</td>
<td>2,000</td>
<td>2,000</td>
<td>2,000 to 2,400</td>
</tr>
<tr>
<td>each kind.</td>
<td>7,000 to 8,000</td>
<td>3,500 to 3,900</td>
<td>2,000</td>
<td>2,000 to 2,400</td>
</tr>
</tbody>
</table>

total amount of all kinds is, according to this statement, 13,500 to

nature of the different leaves takes place at the entrepôts. Nectoux
those of Kénch, Esneh, Darnou, Assouan, where it is effected. Rouillure
Bouak, 500 parts of acute leaves are mixed with 300 of obtuse
200 of Argel leaves.

ulak the senna is sent to Alexandria, and from thence is shipped to

dian senna has a greyish-green colour, an odour which
resembles that of tea, and a viscid taste. It presents a
pearance, and on examination is found to consist of the
owers, and fruits of the above-mentioned plants mixed with
aneous matters (as seeds, date-stones, rabbit-dung, stones,
 latter are in great part separated by hand-picking, sifting, etc.
e the senna is fitted for use. It then constitutes picked
 dien senna (fjlia senna alexandrinse electae).

LEAFLETS, FLOWERS, AND LEGUMES.—The leaflets of Cassia are readily
distinguished from those of other genera
found in senna, by
being unequal-sided;
that is, by two sides
of the leaflet being
unequal in size,
shape, or length, and
by the veins or nerves
of their under sur-
face being very con-
spicuous. The acute-
leaved are very rea-
dily distinguished
from the blunt-leaved
species, by their
shape. The dried
flowers of Cassia may
be easily detected;
they are dull yellow.
I have not been able
leaves are in four or five pairs, never more; oblong, and not at all ovate or lanceolate, and perfectly free from young; the petioles have constantly a small round brown base. The pods are erect, oblong, tapering to the base, with coarse scattered hairs.” —This species is therefore

6. C. marilana dica, Linn.—Leaves eight to nine, equate, with an obtuse gland at the base of the many-flowered, shorter than the leaves. Legume subsequently smoothish (De Cand.)—From three yellow.—United States; common in all parts.

American Senna.

Comm. —Senna is imported directly from Egypt, or at second hand by Indies (Madras and Bombay), usual 1st lb. The quantities on which the years, are as follows:

<table>
<thead>
<tr>
<th>From East Indies</th>
<th>From other places</th>
<th>Total imported</th>
</tr>
</thead>
<tbody>
<tr>
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</table>

Description. — Senna is a tea-like odor, and a nice, bright and fresh. If broken or very extracts about a third alcohol or ether a glass.

1. Alexandrian Senna drina.—Called by because it is oblig it to Europeans.

Mediterranean. — It is carried to Cassia (C. acutifolia) sources Alexandrian senna, mixed always broken, smaller, less. Sometimes with a caraway. Alexandrian senna, this of these plants. Milled Alexandrian senna, the andrian senna no odor. They are the product conveyed down with any other species. But no illuring is said to agree with that of Tripoli.

Senegal Senna.—Consists of the leaflets of Senna Senegalensis.—In crops are more Senegal Senna. Senna Senegalensis.—In September, a rougher and more glaucous appearance plant. Some years since a small amount of S. obvata. Some years since a small amount of S. obvata. Some years since a small amount of S. obvata.
SENNAA.

similar to Tripoli senna, but some of the
leaved Alexandrian senna.

Senna; Superior or Second East Indian
Séné de la Pique, or Pike Senna; Suna
Engled from India. It is the pro-
to the interior of India by the
the result of the
intermixed:
from seven to
in this senna
senna
senna

A; Séné de l'Inde,
several at Tinnevelly, in
India, by Mr. G.
a very fine unmixed senna,
ensively employed, and fetches
ence. It consists of large, thin,
leaflets, of a fine green colour,
e one to two inches, or more, long, and
sometimes half an inch broad at their
widest part. When exposed to a damp
atmosphere they are very apt to change
colour, and to become yellow or even
blackish.

8. American Senna. Senna Americana.—
Is the produce of Cassia Marilandica, but
never reaches this country as an article of
commerce. That which I have received
was prepared by the Shakers of the United
States, and has been compressed into an
oblong cake. The leaflets are oblong,
lanceolate, from one and a half to two
quarter to half an inch broad, thin, pliable,
our. They have a feeble odour and a nau-
ter sennas.

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our. They have a feeble odour and a nau-
ter sennas.
to make out their species. The legumes of the obovate and acut-e-les are also found; they are distinguished by the botanical character described.

8. Arge leaves, flowers, and fruit.—The Arge plants are the Arabs, in the valleys north to the east and south (Delile). The leaves found in Alexandrian senna are distinct from the senna leaflets by being equal-sided, —by the abnormal perfect development of nerves, —by their parallel edges and more cuneiform, —by a yellowish exudate found on them, rally, though not invariably greater length. Under heavy senna I have met leaves, which were sold price than ordinary ser leaves were left in the fanning process, by which the real senna separated. By careful picking the flowers may be detected; they are in small corymbbs. In some recently-imported bales, argel flowers nearly a fourth part. The fruit, as found in Alexandrian senna, sold in size that of a good-sized orange-pip. It is an ovoid follicle, tap root, brown, shrivelled, and contains several seeds.

7. Tephrosia leaflets and legumes.—The Tephrosia Apollinea (Tephrosia Apollinea, Delile, pl. 53) grows in cultivated fields near Hermonthis, at Edfou, and in the Elephantine Island Assouan. The leaflets have a silky or silvery sheen; they are obvate-oblong, somewhat cuneiform, equal-sided, tapering towards the base; the parallel, regular, and oblique to the midrib. They are usually found folded longitudinally, and are be overlooked. The legume is from an inch to a half long, not exceeding two lines broad, linear-elliptic, and contains six or seven brownish seeds.

2. Tripoli Senna. Senna Tripolitana; its Tripolitanae.—It is carried to Tripoli in which go from Fezzan. In general app it resembles Alexandrian senna; but the leaves more broken, smaller, less acute than the leaves of Alexandrian senna, thinner, greener, a less herbaceous odour. They are the produce of C. a usually unmixed with any other species. But I have a sample which contains also the leaflets of C. obovata and argel leaves.

Tripoli senna agrees with that of Tripoli.

3. Aleppo Senna. Senna Tripolitanae.—Consists of the leaflets of C. obovata.

4. Senegal Senna. Senegalensis.—Is a blunt-leafed species, having a rougher and more glaucous appearance than that of C. obovata. Some years since a small bale of it was a French Ministe de la Marine to M. Henry for examination, indebted to the kindness of Professor Guibourt for a sample
Senna.—Very similar to Tripoli senna, but some of the resemble the acute-leaved Alexandrian senna.

Senna. Senna Meccensis: Inferior or Second East Indian Séné Moka, Guibourt; Séné de la Pique, or Pike Senna; Suna. Royle.—Imported into England from India. It is the pro-Arabia, and finds its way into the interior of India by the Surat and Bombay. Dr. Royle was informed that it was somewhere in the Agra and Muttra district, but was never able the fact. It occurs in long narrow leaflets, of from one an inch and a half long, narrower than those of Timnevelly and of a yellowish colour; some of the leaflets being brownish, blackish. This change of colour is probably the result of the a moist atmosphere. Legumes are occasionally intermixed: from one and a half to three inches long, and from seven to es broad; slightly curved, greenish in their circumference, in their centre, with a smooth surface. Recently this senna condition has been imported from Turkey in casks. It to be fresh and fine, and approximates to Timnevelly senna in but contains stalks and dust, with a few stones.

Timnevelly Senna. Finest East Indian Senna; Séné de l’Inde, Guibourt.—Cultivated at Timnevelly, in the southern part of India, by Mr. G. Hughes. It is a very fine unmixed senna, which is extensively employed, and fetches a good price. It consists of large, thin, unbroken leaflets, of a fine green colour, from one to two inches, or more, long, and sometimes half an inch broad at their widest part. When exposed to a damp atmosphere they are very apt to change colour, and to become yellow or even blackish.

8. American Senna. Senna Americana.—Is the produce of Cassia Marilandica, but never reaches this country as an article of commerce. That which I have received was prepared by the Shakers of the United States, and has been compressed into an oblong cake. The leaflets are oblong, lanceolate, from one and a half to two long, and from a quarter to half an inch broad, thin, pliable, a pale green colour. They have a feeble odour and a nauseate, like the other sennas.

ALTERATION.—Senna is not, to the best of my belief, adulterated country. The leaflets of Colutea arborescens or Bladder Senna on the continent, been occasionally intermixed. They are il, regular, and obtuse. Their regularity at the base would at distinguish them from the leaflets of Cassia obovata.
Argel leaves, mixed with a few leaflets of C. acutifolia, I’ve known to be recently sold as picked or heavy senna at a higher price. It was done rather from ignorance than fraud.

A serious adulteration has been sometimes practised on the continent, by the substitution of the leaves of Coriaria myrtifolia for those of senna. They are ovate-lanceolate, grayish-green with a tinge, three-nerved, with a strongly marked midrib, and the two lateral nerves disappear towards the base of the leaves. Chemically these leaves are distinguished by their infusion yielding, with gelatin, a whitish precipitate (tannate of gelatin); and with sulphate of iron, a very abundant blue precipitate (tannate of iron). Furthermore, it forms precipitate with bichloride of mercury, emetic tartar, and barium.

**COMPOSITION.**—Three analyses of senna have been made; viz., one in 1797, by Bouillon La Grange; a second by Braconnet; and a third, in 1821, by Lassaigne and Fenuelle.

### Senna Leaves

<table>
<thead>
<tr>
<th>Braconnet</th>
<th>Lassaigne and Fenuelle</th>
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<tbody>
<tr>
<td>Bitter matter of senna</td>
<td>Cathartic.</td>
</tr>
<tr>
<td>Matter similar to mucus, precipitable by acids.</td>
<td>Yellow colouring matter.</td>
</tr>
<tr>
<td>Acetate of lime</td>
<td>Volatile oil.</td>
</tr>
<tr>
<td>Malate or some other vegetable salt of lime</td>
<td>Fixed oil.</td>
</tr>
<tr>
<td>Acetate of potash</td>
<td>Albumen.</td>
</tr>
<tr>
<td>Chloride of sodium</td>
<td>Mucus.</td>
</tr>
<tr>
<td>Watery extract of Alexandrian senna</td>
<td>Malic acid.</td>
</tr>
<tr>
<td>101.2</td>
<td>Malate and tartrate of lime.</td>
</tr>
<tr>
<td></td>
<td>Acetate of potash.</td>
</tr>
<tr>
<td></td>
<td>Mineral salts.</td>
</tr>
<tr>
<td></td>
<td>[Insoluble matter (lignin, &amp;c.)]</td>
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### Senna Pod

<table>
<thead>
<tr>
<th>Senna Pod</th>
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<tbody>
<tr>
<td>Cathartic.</td>
</tr>
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<tr>
<td>Gum.</td>
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<tr>
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<tr>
<td>Malates of potash.</td>
</tr>
<tr>
<td>Mineral salts.</td>
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<tr>
<td>Silicate of potash.</td>
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<tr>
<td>Lignin.</td>
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1. **Odorous Principle; Volatile Oil of Senna.**—Obtained by submitting the leaves, with water, to distillation. It has a nauseous odour and taste, and distills to water, which contains some oil in solution, acts as a purgative only.

2. **Cathartic Principle of Senna.**—Yellowish red, uncrystallizable, with a peculiar odour, and a bitter, nauseous taste; soluble in water and alcohol, but insoluble in ether; it attracts water from the aqueous solution is precipitated by infusion of galls and diacetate of lead, sesquisulphate of iron and alkalis deepen the colour of the infusion; it decolorizes it; iodine, acetate of lead, gelatine, and emetic tartar, cause it to precipitate with it. It appears to consist of carbon, hydrogen, and oxygen. Three grains caused nausea, griping, and purging.

**Chemical Characteristics.**—By boiling senna in water, the exposure of infusion of senna to the air, as well as by the effect of the mineral acids and of chlorine on the infusion,—a preci
occurred. Bouillon La Grange regarded this as a species of resin, aged by the union of oxygen with a peculiar kind of extractive and in senna. This extractive, he says, is inert, but becomes active when converted into resin; and hence, the cold infusion, accord- ing to this chemist, causes colic, but rarely purges. The carbonated alis, lime water, nitrate of silver, the acetates of lead, sulphate of u, &c. form precipitates with the infusion of senna.

**Physiological Effects. a. On Animals.**—In doses of five or six times it purges horses. Courten threw an infusion into the veins of dog; it quickened the respiration, and caused vomiting. The animal appeared weak, was dull, and had no inclination to eat.

b. On Man.—Regnandot injected half a spoonful of weak lukewarm infusion of senna into the left median vein of a young man affected with an herpetic eruption. The only effect produced was slight temporary headache. Some days afterwards a spoonful was injected in half an hour violent shivering and vomiting came on, which were followed by heat and purging. The febrile symptoms diminished for several hours. Taken by the stomach senna acts as a gentle and safe purgative. Its ill effects are nausea, griping, flatul- ence, and, at first, depression, afterwards excitement of the pulse. It bears to stimulate the abdominal and pelvic vessels, thereby having tenancy to promote the hemorrhoidal and menstrual discharges. It is one of the mildest of the drastic purgatives. Unlike senmony, aboge, jalap, and most other drastic, it does not rank among sons, even when given in large doses. It is distinguished from saline purgatives by its stronger and more irritant operation, by heat, gripings, and increased frequency of pulse, which attend purgative action. From rhubarb it differs in being more powerful irritant in its operation, in being nearly or quite devoid of any tincture. It acts more speedily and powerfully than aloe, in a less marked manner on the large intestines. In its opera- tion it appears to rank between jalap and aloe.

The petioles and stalks possess similar properties to the leaflets. The griping quality of senna was ascribed to the stalks, but Bergius and Schwilgué have proved the error of this notion. The legumes are much milder in their operation than the leaflets.

Good East Indian Senna is almost, if not quite, as active as the Alexandrian. Mr. Twining, after extensively trying it, declared it equal to the best he had ever seen. The obovate senna appears to be milder in the acute-leaved. The Senegal senna, before referred to, was found to possess less activity than ordinary senna. Part of the acrid griping qualities of Alexandrian senna are referrible to the argelles, which, according to the observations of Rouillure, Delile, Laroux, and Pugnet (quoted by Delile), possess greater activity.

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* Ibid. intro supra cit.
* Med. Med. i. 334.
* T. de Mat. Med. ii. 410.
Senna. cum Tamara, 3 j.; Tamarind Sugar, 3 j.

Occasional strain, made with a vessel not
in contact with the syrups should
be a noxious im-
Sydenham's potio
the senna is agree-
This preparation is
as a cathartic in febrile

Cathartic Enema.—(Olive Oil, 5 j.;
Sugar, 5 j.; Senna, 3 ss.; Boiling Water,
an hour in the water, then dissolve the
and mix them by agitation, E. The
of Manna, 3 j.; dissolve it in \text{fx}. of com-
omile, and add Olive Oil, 5 j.; Sulphate of
ed as a laxative. It is a constituent of the

COMPOSITA, L. E. D.; Tincture of Senna,
ijss.; Caraway, bruised, iiijs.; Carda-
[stoned], iv.; Proof Spirit, Oij. Macerate
L.—Senna, lb. j.; Caraway, bruised, iiijs.;
iiijs.; Proof Spirit, Cong. j. (wine measure).

s, and filter, D.—Sugar, iiijs.; Coriander,
oderately-fine powder, iii j.; Senna, iii v.;
om seeds, bruised, of each iii v.; Raisins,
it, Oij. Digest for seven days, strin-
ly the liquor, and filter the liquids. This
veniently and expeditiously prepared by
the compound tincture of cardamom
Senna be used for this preparation, it must
[Argel] leaves by picking, E.)—Carmina-
and purgative. Usually employed as an
senna. If given alone as a purgative, the
than the true senna leaves. Rouillure says they purge and are used by the Arabs of Upper Egypt, without the adding of senna. These effects might be expected from the known properties of the Apocynaceae (before referred to). "American senna is one of the most strong and safe cathartics, closely resembling the imported senna in action, and capable of being substituted for it in all cases in which latter is employed."

If infusion of senna be given to the nurse, the nursing infant becomes purged,—a satisfactory proof that the cathartic principle of senna becomes absorbed, and is thrown out of the system by the excretory organs. Furthermore, as purging results from the injection of senna into the veins, this cathartic would appear to exercise a specific influence over the bowels, independent of action on these when it is swallowed.

Uses.—Senna is well adapted for those cases which require a purgative, with a moderate stimulus to the intestinal and pelvic viscera. Thus, in constipation and inactivity of the alimentary canal, requiring the continued or frequent use of cathartics; in worms; in determination of blood to the head, and in other cases which readily suggest themselves, senna answers well. The circumstances contra-indicating its use are,—an inflammatory condition of the alimentary canal, a tendency to hemorrhage or menorrhagia, threatening abortion, prolapse of the rectum, &c. The objections to its use were,—the large dose required, the nauseous and disgusting flavour, the tendency to griping, and stimulant operation. Thus, in inflammation of the mucous membrane of the bowels, the irritant action of senna renders it an objectionable purgative; while its tendency to increase the frequency of the pulse renders it less fit for exhibition in order than the saline purgatives. It is a very safe purgative may be given to children, females, and elderly persons, with safety. Though it is not the most appropriate purgative to be employed after delivery, and operations about the abdomen (such as nephritis and lithotomy), yet I have repeatedly seen it used, and with very unpleasant consequences.

Administration.—Powder of senna may be given in doses of 5s. to 3ij. for adults. There are two objections to the great bulk of the necessary dose, and the uncertainty of the result, arising from its liability to decompose by keeping. The unpleasant flavour of senna, Dr. Paris recommends the addition of bohea (black) tea; coffee has been advised by others. An infusion of coriander and ginger) are frequently added to the tea, and to improve the flavour.

1. Infusum Sennae, E.; Infusium Senae compositum, L. Division of Senna; Senna Tea.—(Senna, 5xv. [3iss. E., 5. D.]);
SENASA.

[3j. D.]; Boiling [distilled, L.] Water, Oij. [wine measure.] Macerate for an hour in a vessel lightly covered, and through linen or calico, E.).—An ordinarily used purgative, ed frequently in the maladies of children as well as of adults. purgative (sulphate of magnesia or of soda, or potash-tar- soda, or tartrate of potash) is usually given in conjunction manna and tincture of senna being frequently added. A kind of this kind is called the *black draught*.—The dose of 1 of senna is from f3ij. to f3iv. for adults.

**Infusum Sennæ Compositum, E.; Infusum Sennæ cum Tamarindo.**—(Senna, 3j.; Tamarind, Coriander, bruised, 3j.; Muscovado, 3ss. [Brown Sugar, 3j. boiling Water, f3vij.]. Infuse for four hours, with occasional in a covered vessel, not glazed with lead; and then strain linen or calico. This infusion may be likewise made with thrice the prescribed quantity of senna, E.)—A vessel not with lead is directed, lest the acid of the tamarinds should the metal of the glazing, and thereby give a noxious im- ion. This cathartic somewhat resembles Sydenham's *potio ca lenitiva.* The unpleasant flavour of the senna is agree- vered by the tamarinds and sugar. This preparation is c and refrigerant. It is employed as a cathartic in febrile s.—Dose, f3ij. to f3iv.

**Enema Catharticum, E. D. Cathartic Enema.—(Olive Oil, 3j.; e of Magnesia, 3ss.; Sugar, 3j.; Senna, 3ss.; Boiling Water, Infuse the senna for an hour in the water, then dissolve the sugar; add the oil, and mix them by agitation, E. The College employs, of Manna, 3j.; dissolve it in f3x. of con- coction of Chamomile, and add Olive Oil, 3j.; Sulphate of iron, 3ss.)—Employed as a laxative. It is a constituent of the stern.

**Tinctura Sennæ Composita, L. E. D.; Tincture of Senna. Salutis.—(Senna, 3xijss.; Caraway, bruised, 3xijss.; Carda- bruised, 3j.; Raisins [stoned], 3v.; Proof Spirit, Oij. Macerate een days, and strain, L.—Senna, lb. j.; Caraway, bruised, 3xss.; om seeds, bruised, 3ss.; Proof Spirit, Cong. j. (wine measure). for fourteen days, and filter, D.—Sugar, 3xijss.; Coriander, 3j.; Jalap, in moderately-fine powder, 3vj.; Senna, 3iv.; r, bruised; Cardamom seeds, bruised, of each 3v.; Raisins, 3iv.; Proof Spirit, Oij. Digest for seven days, strain or, express strongly the liquor, and filter the liquids. This may be more conveniently and expeditiously prepared by ion, as directed for the compound tincture of cardamom — If Alexandrian Senna be used for this preparation, it must from Cynanchum [Argel] leaves by picking, E.)—Carminative, stomachic, and purgative. Usually employed as an p the infusion of senna. If given alone as a purgative, the
dose should be $\frac{3}{5}$ss. to $\frac{3}{5}$j. It is useful in costiveness attended with flatulence.

5. SYRUPUS SENNAE, L. E. Syrup of Senna.—(Senna, $\frac{3}{5}$j. of the Manna, bruised, 3x.; Manna, $\frac{3}{5}$ii.; Sugar, $\frac{3}{5}$v.; Boiling Water, 5. Macerate the Senna and Fennel in the Water, with a gentle heat, an hour. Mix the Manna and Sugar with the strained liquor from the Senna and Fennel, and boil down to a proper consistence, L.—Senna, $\frac{3}{5}$v.; Fennel, $\frac{3}{5}$v.; Oj. and $\frac{3}{5}$iv. Treacle, $\frac{3}{5}$xviij. Infuse the senna in the water, and strain it, and express strongly through calico, to obtain a pint and two fluidounces at least of liquid. Cook the treacle in the vapour-bath as far as possible, or till a little comes near concrete on cooling; and, when the liquor is still hot, add the infusion, stirring carefully, and being sure that the vessel from the vapour-bath as soon as the mixture is cooled. If Alexandrian Senna be used for this preparation, it must be fully freed of Cynanchum [Argel] leaves by picking it, E.)—tis. Given to children in doses of $\frac{3}{5}$j. to $\frac{3}{5}$ij.

6. CONFECTIO SENNAE, L.; Electuarium Senna, E. D. Elephantis Senna; Confection of Senna; Lentivae Elettaria.—(Senna, 3. Figs, lb. j.; Tamarind pulp; Cassia pulp; Prune pulp, of each, 3i.; Coriander, $\frac{3}{5}$iv.; Liquorice, $\frac{3}{5}$ij.; Sugar, lb. jss.; Water, Of the Senna with the Coriander, and by a sieve separate the mixed powder. Then boil down the water, with the Liquorice added, to half. Evaporate the strained liquor in the bath, until of the whole twenty-four fluidounces remain; and the sugar being added, let a syrup be made. Lastly, gradually add Pulps with the Syrup, and having thrown in the sifted powders of all, L.—The Edinburgh College omits the Tamarind and Figs, but employs lb. j. of Prune pulp, and $\frac{3}{5}$j. of Water. Dublin College employs Senna leaves, in a very fine powder, $\frac{3}{5}$v. Prunes, lb. j.; Pulp of Tamarinds, $\frac{3}{5}$j.; Treacle, Oiss. [wine]. Essential Oil of Caraway, $\frac{3}{5}$j. Boil the pulps in the syrup, and when the thickness of honey, then add the powder, and when the mixture is grown cold, add the oil; lastly, mix them all together, D.)—paration of this compound being troublesome and expensive, the virtues of it not being readily detectable, it is repre- pared, in commerce, as directed by the London and Edinburgh Colleges. Jalap is frequently substituted, partially or wholly; senna and cassia pulp. Dr. Paris mentions walnut liquor as being a surving ingredient in use; and adds, that a considerable quantity of this confection is made in Staffordshire, in which unsound apples enter as a principal ingredient. When properly prepared, it is a pleasant, mild, and very effectual purgative, and is frequently employed by pregnant women, persons afflicted with hemor- hoids, and diseases of the rectum. When given alone in a full dose it gives.—Dose, $\frac{3}{5}$j. to $\frac{3}{5}$v. It is frequently employed as a ve the exhibition of other cathartics; for example, bitartrate of
CASSIA FISTULA, Linn. L. E. D. — THE PUDDING-PIPE TREE OR
PURGING CASSIA.

Cathartocarpus Fistula, Persoon.

Sex. Syg. Decandra, Monogynia.

(Leguminosae Pulpa, L. — Pulp of the Pods, E. — Pulpa Leguminis, D.)

HISTORY.—The earliest writers in whose works we find the fruit of
Asia Fistula mentioned, are the Arabians, Mesue, Serapion, and
Isenna. The first Greek writer who notices it is Aetnarius, who
uses it κασσα μελανα, or black cassia¹.

BOTANY. Gen. Char.—See Cassia (p. 1598).

Sp. Char.—Leaves four to six pairs, ovate, somewhat acuminate,
both; petioles glandless. Racemes lax, without bracts. Legumes
te, straight, somewhat obtuse, smooth (De Cand.)

Tree from twenty to thirty feet high. Leaves alternate, pinnate,
a twelve to eighteen inches long; leaflets from two to six inches
long, and from one and a half to three inches broad. Stipules minute.
Racemes one to two feet long. Flowers large, bright-yellow, fragrant,
long, footstalks. Legume cylindrical, ligneous, one to two feet
long, externally blackish-brown; with three longitudinal bands or
streaks extending the whole length, two of which by their contiguity,
are to form a single one, the third being on the opposite side of
legume; internally divided into numerous cells by thin transverse
veins or phragmata, formed by the distension of the placenta, and
before called spurious dissepiments. Seed one in each cell, sur-
rounded by a soft blackish pulp, which appears to be a secretion of
endocarp or inner coat of the pod.

tab.—East Indies, Egypt. Introduced into the West Indies.

DESCRIPTION.—The pods of Cassia Fistula (cassia fistula; legumen
nec fistula) are imported from the East Indies (Madras and
Bombay), from the West Indies (Barbadoes), and from South America
(Porto) and Savanilla). Their botanical description has been
most accurate. Their pulp (pulpa cassiae fistulae; pulpa leguminis cassiae
fistulae) is reddish-black, with a sweetish taste. By exposure to the
air becomes acid, in consequence of undergoing the acetous fer-
mentation. Those pods yield the most pulp which are heavy, and
not rattle when shaken.

Cassia pulp is directed by the London College to be prepared as
follows:—“Pour boiling water upon the bruised Pods of Cassia, that
pulp may be washed out, which press through a coarse sieve, and
rewards through a hair one; then evaporate the water in a water-
hot, until the pulp acquire a proper consistence.”

AMERICAN CASSIA FISTULA. Petite Cassie d'Amérique, Guibourt.—Pods
eighteen inches long, and six lines in diameter, pointed at the extre-

¹ Lib. iv.
mities. *Pericarp* thinner than the ordinary Cassia fistula. Pulp reddish aercb, astringent, sweet. Is this pod the fruit of *Cathartocarpus sidarous* of the Caribean Islands, depicted in Jacquin’s *Fragm. Bot.* Tab. 85? The pulp of *Cassia brasiliensis* has been employed in America. The from 18 to 24 inches long, ligneous, and rough, with very prominent strut

**Composition.**—Vauquelin\(^1\) and N. E. Henry\(^2\) have analyzed Cassia pulp.

<table>
<thead>
<tr>
<th>Vauquelin’s Analysis</th>
<th>N. E. Henry’s Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pericarp</strong></td>
<td>33(^{1/2})</td>
</tr>
<tr>
<td><strong>Phragmata</strong></td>
<td>7(^{1/2})</td>
</tr>
<tr>
<td><strong>Seeds</strong></td>
<td>13(^{1/2})</td>
</tr>
<tr>
<td><strong>Extractive</strong></td>
<td>0(^{1/2})</td>
</tr>
<tr>
<td><strong>Vegetable jelly</strong></td>
<td>0(^{1/2})</td>
</tr>
<tr>
<td><strong>Glutinous matter</strong></td>
<td>0(^{1/2})</td>
</tr>
<tr>
<td><strong>Woody fibre</strong></td>
<td>2(^{1/2})</td>
</tr>
<tr>
<td><strong>Water</strong></td>
<td>21(^{1/2})</td>
</tr>
<tr>
<td><strong>Cassia pods</strong></td>
<td>97(^{1/2})</td>
</tr>
</tbody>
</table>

**Physiological Effects.**—Cassia pulp in small doses is a laxative, in larger ones a purgative; but it is apt to occasion flatulence, and griping. Manna is said singularly to exalt the purgative effect of Cassia pulp\(^3\). Thus Valinsieri states, that the drachms of this pulp are about equivalent in purgative strength to four ounces of manna; but that if we give eight drachms of Cassia pulp, in combination with four drachms of manna, we obtain the effect! But the correctness of such an incredible statement is not to be admitted on any evidence yet adduced in support of it.

**Uses.**—It is rarely or never given alone; but the cases for which it is well adapted are febrile and inflammatory affections. Besides, from the count of its pleasant taste it would be a convenient purgative for children.

**Administration.**—Dose, for an adult, of the pulp, as a purgative, $\frac{3}{3}$ to $\frac{5}{5}$; as a purgative, $\frac{3}{3}$ to $\frac{5}{5}$.

**Confectio Cassiae, L.; Confection of Cassia; Electuary Cassiae, D.**—(Cassia pulp [recently expressed, D.] lb. ss.; Manna, Tamarind pulp, $\frac{3}{3}$; Syrup of Rose, $\frac{3}{3}$viij. [Syrup of Orange, lb. ss. D.]) Bruise the Manna, then dissolve it in the Syrup, and afterwards mix in the Cassia and Tamarind pulps, and evaporate moisture until a proper consistence is attained. —Laxative. Occasionally used for children, as a vehicle for some more active sub. —Dose, $\frac{3}{3}$ij. to $\frac{3}{3}$j. for adults.

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\(^{1}\) *Ann. Chim.* vi. 275.


16. COPAIFA'ERA, Linn.—VARIOUS SPECIES, E.

Copaifera Langsdorffii, De Candolle, L.—Copaifera officinalis, Linn. D.

Sex. Syst. Decandria, Monogynia.

(Roeina liquida, L. D.—Fluid resinous exudation, E.)

1. C. MULTITJU'GA, Hayne.—Leaflets six to ten pairs, ovate, acuminate, mucronate, with pellucid dots. Petiole slightly—In the province of Para the greatest quantity of the balsam shed by this species (Hayne).

2. LANGSDOR'FII, Desf. L.—Leaflets three to five pairs, ovate or

3. CORI'ACEA, Mart.—Leaflets two to three pairs, elliptical, ridged, emarginate, coriaceous, not dotted, reticulated, smooth sides, somewhat glaucous beneath. Petioles and peduncles—Bahia. It yields balsam of copaiva in Santa

4. OFFICINALIS, Linn. D.; C. Jacquini, Desf.—Leaflets two to

5. C. BERYRCHI, Hayne.—Mandioeca, in the Brazils.


7. C. MARTI, Hayne.—Para.

8. C. BEJUGA, Willd.—Brazils.

9. C. JUSSEIU, Hayne.—Brazils.

10. C. NITIDA, Mart.—Brazil (Minas Geraes).

11. C. LAXA, Hayne.—Brazil.

12. C. CORDIFOLIA, Hayne.—Brazil.

13. C. SELLOHII, Hayne.—Brazil.

14. C. OBLONGIFOLIA, Mart.—Brazil (Minas Geraes).

Fraction of the Balsam.—The balsam is obtained by making incisions into the stems of the trees. It exudes so abundantly that, proper season, twelve pounds are sometimes obtained in the

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* Duncan, Suppl. to the Edinb. New Disp. p. 45.
in the human arm."

COMMERCIAL.—Balsam of Copaiva is principally procured in Para and Maranhao. This probably is yielded by C. multijuga. Carthagena, Maracaibo, and some. Is this from C. officinalis? Occasionally, Rio Janeiro, and is there probably procured from Coriacea. Now and then some comes from Peru; considerable quantity is imported, at second hand. It is usually brought over in casks holding one or two cwt. In 1839 duty (4s. per cwt.) was paid on.

DESCRIPTION.—Balsam of Copaiva (balsam pavia) is a clear, transparent liquid, having for its constituent of olive oil. It has a pale yellowish colour, disagreeable odour, and a bitter somewhat acrid taste. Its sp. gr. is less than that of water, but is not easily determined. According to Schönberg, while Stoltze says it is marginally denser than water, but is completely soluble in alcohol, ether, and fixed and volatile. When acted on by alkali, it forms soap, which is insoluble in water.

Considerable variation exists in the colour, consistence, as in the relative quantities of volatile and resin in Copaiva. Even the odour and taste vary somewhat. The oil is produced in great part upon the balsam being procured from smaller species, which grow in the interior of the Brazilian Minas, yield, as we are told, less balsam, but it is more C. officinalis and Copaiva is thin, clear, and pale-coloured. We have procured probably by C. officinalis) is thick, golden-yellow in appearance, and has a less agreeable smell, which is somewhat like that of Copaiva.

ADULTERATION.—There is no reason to suppose Copaiva is adulterated in this country now, though
COPAIWA.

Gray has published formulæ for making a balsamum copaiba reductum, as well as copaiba factitia. The Edinburgh College gives the following characters of its purity:

Translucent; free of turpentine odour when heated; soluble in two parts of alcohol; it dissolves a fourth of its weight of carbonate of magnesia, with the smell of a gentle heat, and continues translucent.

The turpentine odour may be recognized by dropping the suspected balsam on a heated iron (as a spatula). The mixture of magnesia and copaiva here referred to, acquires, in several hours, the translucency, aspect, and consistency of very thick mucilage of gum arabic. This test was proposed by Blondeau. If one or two drops of suspected balsam be placed on unsized paper, and carefully heated over lamp to expel the volatile oil, an homogeneous translucent spot is left if the balsam be pure, but if it has been mixed with castor oil, the spot of resin is surrounded by an oily areola. Planche has recommended ammonia as a test. If pure balsam be shaken with tinct. ammoniæ (sp. gr. 0.965) it becomes clear and transparent in a few instants; not so when castor oil is present. Ebulition with water (to expel the volatile oil and obtain the hard resin); and the addition of potash, and of sulphuric acid, have also been proposed as tests.

Composition.—F. Hoffmann submitted copaiva to a chemical examination. Afterwards Schönberg analysed it. In 1826, Soltz and, in 1829, Gerber submitted it to analysis.

**Stoltze's Analysis.**

<table>
<thead>
<tr>
<th></th>
<th>Fresh Balsam</th>
<th>Old Balsam</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Volatile oil</strong></td>
<td>38.60</td>
<td>31.70</td>
</tr>
<tr>
<td><strong>Yellow dard resin</strong> (copaibic acid)</td>
<td>32.75</td>
<td>53.68</td>
</tr>
<tr>
<td><strong>Brown soft resin</strong></td>
<td>1.46</td>
<td>11.15</td>
</tr>
<tr>
<td><strong>Water and loss</strong></td>
<td>7.99</td>
<td>4.10</td>
</tr>
<tr>
<td><strong>Balsam of Copaiva</strong></td>
<td>100.00</td>
<td>100.73</td>
</tr>
</tbody>
</table>

1. Volatile Oil (see p. 1619).

2. Resin of Copaiva (Resina Copaiva).—After the balsam has been deprived of its volatile oil by distillation, a brownish resinous mass is left behind. This, on gently heated to expel the residual water, is sold as resin of copaiva. It melts in two resins—one called copaibic acid, the other the viscid resin of copaiva. They are separated by rectified spirit, which dissolves the acid resin, but does not the viscid one.

3. Copaibic Acid: Yellow Brittle Resin of Copaiva.—One hundred parts of balsam yield, on an average, fifty parts of this acid. Copaibic acid is an amber-brown, brittle, crystallizable resin, soluble in alcohol, rectified spirit, ether, and the volatile and fixed oils. It is decomposed by sulphuric and nitric acids, and properties are proved by its alcoholic solution reddening litmus, and by definite compounds (coparates) which it forms with bases. Thus, if an alcoholic solution of nitrate of silver be dropped into the alcoholic solution of a resin, we obtain, on the addition of a little ammonia, a white crystalline pre-
cipitate (copaivate of silver), slightly soluble in alcohol, and composed of one atom copaivic acid, and one atom oxide of silver. In the same way were the analogous copaivates of lead and lime. The copaivates of potash and a soluble, and have a bitter taste and a disagreeable odour; they are easily posed by acids. The copaivates of ammonia is soluble in ether and alcohol, but not in water. The copaivate of magnesia is prepared by adding copaivate of potash to sulphate of magnesia.

Copaivic acid is isomeric with picinic acid (see p. 1058); that is, its com

8. Viscid Resin of Copaiva; Brown Soft Resin of Copaiva.—When a alcoholic solution of copaiva cools, it retains in solution the acid resin described, but deposits a brown viscid substance, which is termed the viscid resin of copaiva. As it is more abundant in old than in recent balsam, Gerber produces it as produced by some alteration of the acid resin. It is soluble in alcohol and ether, and in the volatile and fixed oils. It has very little acid properties. One hundred parts of balsam contain from 1 to 5 cent. of this resin.

Physiological Effects.—Copaiva produces the general effects produced by the topical stimulant effects of the oleo-resins, already described (p. 182). Taken in moderate doses it creates a sensation of warmth in the stomach, gives rise to eructations having the odour of balsam, and not unfrequently occasions nausea, or even actual vomiting. The continued use of it often impairs the appetite, and discourages the digestive functions. These may be regarded as the local effects on the stomach. The constitutional effects, or those which result from the absorption of the balsam, or of its active constituent, are chiefly those of a stimulant whose influence is principally directed to the secreting organs, more especially to the mucous membranes of the urinary-genital apparatus. The oil passes out of the stomach by the lungs, and the odour of its vapour is readily detected by the breath of persons taking it. The urine is increased in quantity and altered in quality: thus its colour is heightened, its odour becomes balsamic, and its taste bitter; moreover, not unfrequently it becomes turbid, as if containing mucus. The influence of copaiva is exerted on the mucous membrane lining the urethra, is shown, even in the state, by the warm and tickling sometimes experienced in it both before and after evacuating the urine, as observed by medical student, in his experiments with this medicine; by the marked influence which the balsam has in mucous discharge from this membrane—an influence familiar to every tyro in medicine. Furthermore, it is said occasionally to have produced an irritation of the testicles, though I have never observed this effect. It acts as a stimulant, but in a less marked manner, to other mucous membranes; namely, the bronchial and gastro-intestinal membranes. The greater influence of copaiva over the urethral than over the mucous membranes is by some explained thus:—Besides the difference which this receives in common with the other membranes of the same class, by the general circulation, it is exposed to the action of copaiva contained in the urine as this fluid is expelled from the bladder. If this hypothesis were correct, the influence of copaiva would be more intense than is actually the case.
Copaiva over the mucous lining of the bladder would be greater than over the urethral membrane. Not unfrequently it gives rise to eruption, usually of a scarlet colour, referrible to either urticaria erythema, though some describe it as being miliary. Vesicular eruptions are also spoken of, but I have never seen them. Mr. Judd\(^2\) depicted two eruptions caused by the balsam:—one he calls all puniceous patch eruptions; the other was a papular eruption. Neurasthenia has also been ascribed to the use of the balsam\(^3\).

Large doses of copaiva irritate the gastro-intestinal canal, and occasion a sensation of heat at the pit of the stomach, nausea, vomiting, loss of appetite, and purging, with, not unfrequently, griping pains of the bowels. The whole system becomes powerfully stimulated, the pulse is fuller and more frequent, the skin hotter, and fist and headache are produced. Occasionally, hæmaturia and urgent ischuria are brought on. “I saw,” says Kraus\(^4\), “a very dangerous case, of thirty-six hours’ standing, almost instantaneously relieved by the application of a warm poultice (made of four ounces of the Hyoscyamus plant) over the genital organs.” The same author also says that the repeated use of large doses occasions, in young marriageable subjects, a measles-like eruption over the ole body, which I have many times seen treated by pretended at diagnosticoners (Diagnostikern) as true measles.”

In one case pain at the stomach, general uneasiness, and epileptic convulsions, followed, and were ascribed to, the use of copaiva. But correctness of ascribing the convulsions to the use of the copaiva seems very doubtful.

When we compare the operation of copaiva with that of other gums possessing powers of a somewhat similar kind, we observe that it is more powerful than the gums properly so called (that is, the native oleo-resins which contain benzoic acid), while its operation on the urino-genital organs is much more marked (see pp. 182 and 1330). It forms an intermediate stance between the balsams and the turpentines, being less powerful, but more aromatic, than the latter. Yet, observes Ribes\(^5\), the turpentines are less successful in gonorrhœa. The same author considers it to be less powerful than balsam of Mecca, but more so than balsam Canada.

Uses.—The principal employment of copaiva is in mucous discharges from the urino-genital organs, more especially in gonorrhœa. There are two methods of treating this disease by copaiva: one is, to exhibit the balsam until the inflammatory symptoms have subsided; the other is to give it at the very outset, in order to cut short the disease.

The first method is that followed by the best English and German practitioners. It consists in employing, during the violence of the inflammatory stage, antiphlogistic and soothing measures; and when the inflammation has quite or nearly subsided, or is of a very mild

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\(^{2}\) Heilmittelkreb. 621. 201. 1831.


\(^{4}\) Quoted by Bayle, Bibl. Therap. i. 363.
character, giving copaiva with the view of diminishing or stopping the discharge. This is the plan recommended by Hunter; and the same practice is recommended in the published lectures of Sir Astley Cooper and Mr. Lawrence. It is undoubtedly the safest method of treatment; for although copaiva may sometimes, or even frequently, be exhibited during the acute or inflammatory stage of gonorrhœa, not only with impunity, but even with advantage, there is no denying the fact that it has, occasionally at least, exasperated the symptoms. This, indeed, is admitted by Ansiaux, one of the principal supporters of the other plan of treatment. Many practitioners judge of the propriety of exhibiting the balsam by the quality of the discharge and refrain from administering this medicine until the discharge acquired what is called a gleety character. I believe most practising surgeons consider the existence of much pain or scalding in the water, an irritable condition of bladder, or violent chordee, contra-indicating the use of copaiva; while the absence of these symptoms may be regarded as permitting or indicating it.

The second method of treating gonorrhœa by copaiva consists of exhibiting this medicine in large doses at the commencement of the disease; that is, in its acute stage, usually without adopting any preliminary antiphlogistic or soothing measures. In America the practice is not new; but in Europe it has been recommended or adopted to any extent only since the commencement of the present century and principally by the recommendations of Ansiaux, Ribes, and Delpech.

Ansiaux candidly admits that in some cases the practice has been injurious; in one instance he saw it produce acute pain, irritable bladder, and discharge of blood by the urethra. The second of the writers seems to regard copaiva as a specific for gonorrhœa and its consequences, including swelled testicle, dysuria, ischury, cystitis, &c. Delpech speaks of its use in a much more guarded manner: he employs leeches and the usual antiphlogistic measures when the inflammatory symptoms are very severe; but when the inflammation is not excessive, he commences at once with the balsam. In fact, his practice approximates very much with that usually acted on in this country and Germany. The partisans of this second method of treating gonorrhœa say, that both copaiva and cubeb are more easily and promptly, and with less chance of relapse, the more they are exhibited after the commencement of the disease; in other words, old claps are less readily cured by them than recent ones.

It has been stated by Delpech and Ricord, and I believe the experience of most practitioners bears out their statement, that copaiva is less successful in the gonorrhœa of females than in that of males. Trousseau and Pidoux have endeavoured to account for this by saying, that, in the female, gonorrhœa is not confined to the mucosa.
Copaiva.

... of the urethra (on which the influence of copaiva is principally exercised), but extends to that of the vagina.

Velpeau employs lavements of the balsam in gonorrhoea. By this mode of exhibition the nausea and vomiting which copaiva is apt to produce, when taken by the mouth, are entirely obviated. Velpeau asserts that by this mode of administration, blennorrhagic discharges both in males and females are almost always diminished, and frequently completely stopped. He found the same practice useful in venereal purpuriform discharges from other mucous membranes.

... chronic inflammation of the bladder (commonly termed cystitis, or catarrh vesica) copaiva has at times been found beneficial. Delpech relates a case of acute vesical catarrh cured by it. Catarrhus vesicae is for the most accompanied with considerable irritation, which is in general greatly increased by stimulants like copaiva.

Leucorrhoea copaiva has been employed with some advantage. Observable reports of this practice have been published by Cuttett and Oombe, Armstrong, and others.

A chronic pulmonary catarrh its employment has been spoken of. Armstrong, Hallé, Bretonneau, and La Roche (quoted by Bayle), have borne testimony to its good effects. It is adapted for chronic, old-standing cases, and for torpid habits. Stimulant influence is calculated to be very injurious where there is inflammation or febrile disorder. Dr. Fothergill has very properly reprobated the practice of administering it in pulmonary conception, as recommended by Fuller and others.

A chronic inflammation of the mucous membrane of the bowels, especially of the colon and rectum, copaiva has been used. Dr. Len spoke favourably of its use in hemorrhoids. "I have learned an empirical practitioner," he says, "that it gives relief in hemorrhoidal affections; and I have frequently employed it with success. For this purpose it is to be given [in doses of] from 20 to 40 drops, properly mixed with powdered sugar, once or twice a day."

It was formerly employed as a topical application to wounds and ulcers.

Administration.—Dose, from gtt. xx. to fij., or even more. It is sometimes taken on sugar, and this is said to be the most efficacious mode of giving it, in affections of the urinary organs; but its seous taste is a great objection to its employment in this way. We take it swimming on half a wine-glassful of water, to which a few drops of some bitter tincture have been added. Many persons

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9 Rech. sur l'Emploi du Balsam de Copauba.
16 Bayle, op. supra cit.
17 Med. Obs. and Jour. iv. 231.
18 Mut. Med.
employ it in the form of emulsion (made with mucilage, yolk of egg, or alkalis). If mucilage be employed, it should not be very otherwise it will not mix well. Spirit of nitric ether is freely added to cover the unpleasant flavour. Opium is sometimes joined to counteract purging, and acids (especially the sulphuric) check nausea. Syrup of Copaiva (prepared by rubbing it with 32 grs. of calcined magnesia, and then adding 64 drachms of peppermint and 62 ozs. of simple syrup) has been recommended. Balsam of copaiva has also been taken in the form of pills; the powders (starch, gum, rhubarb, magnesia, &c.) being emptied, giving it a proper consistence. If magnesia be employed (as is recommended by Mialhe), the copaivic acid unites with it, and forms copaivate of magnesia, which has considerable cohesion and absorbs the volatile oil. In some cases the balsam is used by magnesia, a pilla in consistence, but frequently it does not become thicker than honey. Bordeaux turpentine also possesses a property of solidifying with magnesia (see p. 1045). The following formula for copaiva pills is recommended:—Balsam of Copaiva, 3ij.; Magnesia, 5vj. or 5vij. (or common Carbonate of Magnesia). Several hours are frequently required to effect the solidification of the balsam.—Velpeau's copaiva lavement is thus prepared:—Copaiva, 3ij.; Yolk of one Egg; Distilled Water, 3vi. An emulsion, and to which add Tincture of Opium, gtt. xxx.

The resin of copaiva, which was much extolled a few years ago, is the least active part of the balm.

1. OLEUM COPAIBAE. E. Essential Oil of Copaiva.—(Copaiva Water, Ojss. Distil, preserving the water; when most of the oil has passed over, heat it, return it into the still, and resume the distillation; repeat this process so long as a sensible quantity of oil is still separated from the water.)—The directions of the Edinburgh College of Physicians for the process of obtaining the oil appear a more operose one than necessary. Mr. Whipple informs me, that from 249 lbs. of Balsam of Copaiva, 128 lbs. of volatile oil and 120 lbs. of resin, were obtained. A method for procuring the oil without distillation of the copaiva is more expensive, while the oil obtained by it is inferior in quality owing to the presence of a little resinous soap.

When oil of copaiva has been rectified, and afterwards distilled with water by digesting it on chloride of calcium, it has a specific gravity of 0.878. It is colourless, and has an acrid taste, and an agreeable peculiar odour. Sulphuret of carbon and sulphuric ether are formed in all proportions; absolute alcohol dissolves two-fifths its weight; ordinary rectified spirit takes up less than this. Potas}
be preserved in it unchanged, showing the absence of oxygen. It is sulphur, phosphorus, and iodine (by the latter it is coloured) absorbs chlorine, with which it becomes turbid and viscid. When dropped on iodine, heat and hydriodic acid are suddenly

Sulphuric and nitric acids convert it into a resinous substance. Hydrochloric acid gas is passed into this oil, crystals of the chlorate of the oil of copaiva (or artificial camphor of the oil of copaiva) are deposited, while a fuming oily product, saturated with remains. Hence, therefore, it is probable that oil of copaiva, the oil of turpentine (see p. 1050), consists of at least two isomeric one, which forms the crystallizable compound with hydrochloric the other, which does not form this crystalline matter.

Oil of copaiva is isomeric with oil of turpentine,—that is, it consists of C\textsubscript{10} H\textsubscript{8}.

For medicinal use I prefer the oil of copaiva to any other preparation of the balsam. The usual dose is from ten to twenty drops, which may be gradually increased; but I have known 130j, taken at dose without any ill effects. It may be taken on a lump of sugar.

2. GELATINE CAPSULES OF COPAIVA, *Bacca Copaifera factitia.* harm. Castrensis Ruthenica.—(Prepared by dipping the bulbous extremity of a metallic rod into a concentrated solution of gelatine. When the rod is withdrawn it is to be rotated in order to diffuse the gelatine equally over the bulb. As soon as the gelatinous film has hardened, it is to be removed from the bulb and placed on pins furnished with heads, and fixed on a cork table. When dried, the capsules are placed in little cells in the cork table, the balsam is introduced into them by means of a glass tube, and they are then closed by dropping some concentrated solution of gelatine on the orifices *). Desfontenelles \textsuperscript{v} has described another method of making the capsules. Gelatine capsules are the invention of a Frenchman of the name of Mothe. They have been introduced with the view of avoiding the nauseous odour and taste of various medicines (as balsam or oil of copaiva, oil of cubeb, creasote, Dippel’s oil, &c). When swallowed the gelatinous capsule dissolves in the gastro-intestinal juices, and the fluid medicine escapes. The capsules found in the shops are olive-exed, and contain about ten grains of balsam. Ratier \textsuperscript{v} has proposed to introduce them into the rectum. For this purpose they to be conveniently greased.

For further details consult Sir James Wylie’s *Pharmacopoeia Castrensis Ruthenica*, p. 681.

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For further details consult Sir James Wylie’s *Pharmacopoeia Castrensis Ruthenica*, p. 681.
OTHER MEDICINAL LEGUMINOSAE.

1. Spartium junceum, or Spanish broom, the *staptor* of Dioscorides, is occasionally employed in medicine. The seed, in large doses, are emetic and purgative; in smaller quantities, diuretic. They have been used by Dr. Eccles in dropsical affections. The advantage over other diuretics is their tonic action, in consequence of which they are sometimes given for an indefinite length of time. They may be taken, in the form of powder, from grs. x. to grs. xv., three times a day, with ginger-tea or mint-water; but the tincture prepared by digesting 3ij. of the bruised seed (f 3viij. of proof spirit) is the best form of administration. Its dose is f 3j. to f 5ij.

2. The But'ea frondos'a is a middling-sized tree, common in Benares, and in the mountainous parts of India. Natural fissures and wounds made in the branches of the same tree, during the hot season, there issue a beautiful red juice, which soon hardens to a rubber-coloured, brittle, astringent gum.* Gum butea. It has been recently brought to this country by Mr. Beckett, by whom samples were given me by Mr. Hoyle. On examination I found this gum identical with a substance which I had met with in an old drug firm of this city, and which they had sent to Professor Guibourt, who has given it under the name of *gummi rubrum astringens*, and samples of which were shown to me. I have long been accustomed to believe it to be the kind described by Mr. Fothergill, and indeed I am disposed to think that it is not Fothergill's gum (see p. 157); but the gum (called *Kuanee* in Northern India, *suka* in Sanscrit) is in small elongated teabags, and have pieces adhering to them. Small fragments examined by transmitted light, are to be seen to be ruby-red. Its taste is astringent. It contains from 15 to 25 per cent. of impurities (wood, bark, small pebbles, and sand). According to Mr. Fothergill, the gum, when purified by simple solution of water, so as to separate the impurities, consists of tannin, 73.26, difficulty soluble extractive 5.05, gum (with acid and other soluble substances) 21.67. It is used by the natives of Western India for precipitating their indigo, and in tanning. English indigo, however, object to its use on account of the colour which it commences in the leather*.

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*Pearson, Observ. on Bramseed. 1833, Lond.
* Roxburgh, Fl. India, vol. iii. p. 245.
* Proceedings of the Committee of Comm. and Agricult. of Royal Asiatic Soc. in India. Lond.
* Hist. des Drag. ii. 428. 3rd ed.
* Med. Obs. and Ing. i. 328, 4th ed.
* Proceedings of the Committee of Commerce and Agriculture of the Royal Asiatic Soc. 1844. Lond. 1841.
Indigo (pigmentum indicum; indicum, Dioscorides; indicum, Pliny) is a blue pigment obtainable from various plants by fermentation. The ancients also used the term indicum, or indicum, to some other substances. The indigo of commerce is procured from the genus Indigofera. In India, I. tinctoria is commonly cultivated for this purpose. During the fermentation, the indigo deposits as a fusculent matter. Lime-water promotes its separation. Blue indigo does not exist in the plants previous to fermentation; it is, therefore, a product, not an educt, of them. Commercial indigo is principally brought from the East Indies, but a considerable quantity is imported from Guatemala, and other places. It usually occurs in cubical cakes of an intense blue colour. Rubbed with a smooth hard body (as the nail), it assumes a coppery or bronze hue. This distinguishes it from Prussian blue, the coppery hue of which is removed by friction with the nail. It is insoluble in water, cold alcohol, ether, dilute sulphuric or hydrochloric acids, weak alkaline solutions, and cold oils (both fixed and volatile). When heated to about 520° F. it gives a reddish, violet vapour (vapour of indigotin), which condenses in minute droplets. Deoxidising agents (as protosulphate of iron, sesquisulphuret of carbon, the process of fermentation, &c.) destroy its blue colour by abstraction of oxygen from the indigotin, and converting it into indigogen, or white indigo; it, by exposure to the air, attracts oxygen, and becomes blue. Chlorine and hypochlorites destroy the blue colour of indigo. Rubber with oil of vitriol it is a deep blue liquid, commonly termed sulphate of indigo, Saxon blue, or d blue. Commercial indigo consists of indigo-blue (indigotin), indigo-brown, or red, and a glutinous substance. Indigotin consists, according to Dumas, of H5 N1 O2. Indigo has, of late years, been employed as a medicine. Its medicinal effects, according to Dr. Roth, are as follows:—Shortly after applying the patient experiences a sense of constriction at the fawces, and the ression of a metallic taste on the tongue. These are followed by nausea, and in some cases by actual vomiting. The intensity of these symptoms varies in different cases. In some the vomiting is so violent as to preclude the further use of remedy. The matter vomited presents no peculiarity except in its blue or greenish colour; the stools are more frequent, liquid, and of a blue or blackish colour. The vomiting and nausea are frequently accompanied by cardiacgia and colic. Occasionally the symptoms increase, and the use of the remedy is in consequence obliged to be discontinued. Dyspepsia and giddiness sometimes succeed. The urine has a dark, violet colour; but Dr. Roth never found the respiratory matter affected with it. After the use of indigo for a few weeks, twitchings of the muscles were observed, as after the use of strychnia. It has been employed equally in spasmodic affections—viz. epilepsy, convulsions of children, chorea, hysteria. In epilepsy it has been tried by Von Stahly, Lenhossek, Grosshans, Ideker, Wolf, Leinweber, Doppel, and Noble, with good effect. Some successful cases were of very long standing. Roth says, that at the commencement of the treatment, the frequency of the paroxysms was invariably increased. Idiopathic epilepsy is said to have been more benefited by it than by other remedies. I have tried it in a considerable number of epileptics at the London Hospital, but without deriving the least benefit from it. A dose of indigo should be as large as the stomach can bear. At the beginning it should be a few grains; afterwards this quantity should be increased to 20 grains, or more in the day. Some of the patients above referred to,
took from 3s. to 3l. daily, for three or more months. The best: exhibiting it is in the form of an electuary, composed of one part of in two parts of syrup, with a small portion of water. The powder is apt at spasm of the fauces. Aromatics, mild tonics, astringents, and opiates (as pound powder of ipecacuanha), may be conjoined, according to circumstances.

ORDER LXII.—TEREBINTHACEÆ, Jussieu.—THE TEREIN TH TREE.

BUSSEERaceæ, LANTHOXYLACEæ, CANNABACEæ, AMYRISACEæ, AND AMACARDIACI

ESSENTIAL CHARACTERS. — Flowers hermaphrodite, polygamous, or Sepals three to five, more or less united at the base, imbricated in a very rarely adherent to the ovary. Petals rarely none, generally di many as, and alternate with the sepals, very seldom united at the imbricated in exterior. Stamens, as well as the petals, arising from half of the calyx, or from the calycine disk, rarely from the torus ing the ovary; either equal in number to, and alternate with, the double (very rarely quadruple) the number of the petals, and the alternately before and between the petals. Carpels, in some, numretinct, with one style,—in others many, united by the ovaries; in some of them are frequently abortive, and hence the carpels in most solitary, one-celled, but the number of the styles and stigmas the indicates abortion. Fruit capsular or drupaceous. Seeds few, usually commonly exalbuminous. Embryo straight, curved, arched, or fold cotyledons various; radix usually superior (De Cand.)

PROPERTIES.—The principles common to all the Terebinthaceae, 1. Fixed oil in the seeds; 2dly, Volatile oil combined with resin in the of the pistiças; 3dly, Resin which flows either naturally or from openings in the stems of many of the species; 4thly, Gum usually with resin—as in olibanum, myrrh, tacamahaca, &c.¹

1. PISTACIA TEREIN'THUS, Linn. L. E. D.—THE TURPE PISTACIA.

Sex. Syst. Dioecia, Pentandria.

(Resina liquida, L.—Liquid resinous exudation, E.)

HISTORY.—This tree is the Τέμμυθος or Τερέβινθος of the Hippocrates employed the fruits, the buds, and the resin, medic BOTANY. Gen. Char.—Flowers dioecious, apetalous. Male cemes ameneuous, with one-flowered scales [bracts]. Cal cleft. Stamens five; anthers almost sessile, four-cornered. F. Racemes more lax. Calyx three- or four-cleft. Ovary one-celled. Stigmas three, rather thick. Drupe dry, ovate, with wha osseous nut, usually one-celled, one-seeded, sometimes t two abortive cells at the side. Seeds solitary in the cells, at the side of the cell, exalbuminous. Cotyledons thick, flesh with a superior lateral radicle.—Trees with pinnate leave Cand.)

¹ Fée, Cours d'Hist. Nat. i. 619.
THE MASTIC TREE.

-Leaves pinnate, with an odd one; leaflets about seven, ovate-lanceolate, rounded at the base, acute, mucronate (De Cand.)

A tree of thirty or thirty-five feet in height. Young leaves reddish, old ones dark-green. Racemes compound. Fruit almost round, purplish.

Hab.—Syria and the Greek Archipelago.

Extraction.—Tournefort¹ says, that the turpentine harvest in Scio is made, from the end of July to October, by cutting crosswise with a hatchet the trunks of the largest turpentine trees. The turpentine runs down on flat stones placed under the trees, where it hardens. The quantity yielded by each tree is small, not exceeding eight or ten ounces.

Properties.—Chian or Cyprus turpentine (Terebinthina Chia seu Cypria) has the properties of the coniferous turpaltines already described ( ). Its consistency is that of honey, but more glutinous. It is greenish-yellow. It has an agreeable turpentine-like bined with the odour of fennel, or, according to some, of jasmine. Its taste is very mild. By keeping it resinites, it becomes a somewhat less agreeable odour. Genuine Chian is scarce; the coniferous turpaltines being usually sold

TA'CIA LENTIS'CUS, Linn. L. E. D.—THE MASTIC OR LENTISK TREE.

Sex. Syst. Dicocia, Pentandria.

(Resina, L. D.—Concrete resinous exudation, &c.)

—This tree is the Σχίνος of the Greeks. Hippocrates mentions the leaves, resin (mastic), and the oil prepared from the licinc.

Gen. Char.—See Pistacia Terebinthus.

—Leaves abruptly pinnate; leaflets about eight, lanceolate winged (De Cand.)

took from 36s. to 3j. daily, for three or more months, exhibiting it in the form of an electuary, composed of two parts of syrup, with a small portion of water. The pain of the fauces. Aromatics, mild tonics, astringents, a pound powder of ipecacuanha, may be conjoined, according.

**ORDER LXII. — TEREBINTHACEÆ, J**

**BINTH TREE**

**Burseraceæ, Xanthoxylaceæ, Cannabaceæ, Amyx**

**Essential Characters. — Flowers** hermaphrodite. Sepals three to five, more or less united and very rarely adherent to the ovary. Petals many as, and alternate with, the sepals, bracteate in aestivation. Stamens, as many as there are petals in the calyx, or from the calyx, converted into stamens in aestivation; either equal in number to the petals, or double (very rarely quadruple) their number, alternately before and between the petals, with one style,—in others some of them are frequently solitary, one-celled, but the remainder more numerous, indicating abortion. Fruit commonly exalbuminous. The cotyledons various; radicle acicular.

**Properties. — The principles** are: 1stly, a fixed oil in the seeds; 2ndly, a volatile oil of the pistacæ; 3rdly, an aromatic resin in the stems. The resin is medicinal, and is used as a medicine, as well as for dyeing. The seeds are used in the preparation of certain medicinal compounds. The fruit is used in the preparation of certain confectionery products.

1. **PISTACIA TYPICA**

**History.** Hippocrates used pistacia as a medicine. Boethus used it in the treatment of certain diseases. The resin was used in the preparation of certain cosmetic products.

**Botany.** The flower is hermaphrodite. Sepals three to five, more or less united and very rarely adherent to the ovary. Petals many as, and alternate with, the sepals, bracteate in aestivation. Stamens, as many as there are petals in the calyx, or from the calyx, converted into stamens in aestivation; either equal in number to the petals, or double (very rarely quadruple) their number, alternately before and between the petals, with one style,—in others some of them are frequently solitary, one-celled, but the remainder more numerous, indicating abortion. Fruit commonly exalbuminous. The cotyledons various; radicle acicular.

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1. **PISTACIA TYPICA**
TRAILING POISON-OAK.

**TRAILING POISON-**

This country plant in 1798, by Cornutus, in his tiles, persistent. **Petals** in the male and hermaphrodite; globose, one-celled, ventricose. **Drupe** almost juiceless. Abortion one-seeded, and sometimes exalbuminous, invested by the bract of the nut; **cotyledons** foliaceous; edge of the cotyledons (De Cand.) with an odd leaflet, trifoliate; **leaflets** odd (De Cand.) set high. **Stems** many, branching, covered flowers greenish-white. **Fruit** a round drupe, a. — **Juice** acid, milky, becoming black by exposure and forming an indelible ink when applied to.

The poison is considered by some botanists as a variety only of Rhus followed Nuttall and De Candolle in considering it a distinct

**United States of America.**

**POSITION.** —I am not acquainted with any detailed analysis of it. There are at least two substances in it worthy of investigation—viz. the volatile, acid (narcotic-acid?) principle, and the which blackens by exposure to the air. **Tannic** and gallic are said to be constituents of it.

**Pharmacological Effects.**

1. **Of the Emanations.** — When not exposed the sun’s rays, as when it grows in shady places, and during it, this plant evolves a hydrocarburetted gas, mixed with an itpur, which acts most powerfully on certain individuals exposed its influence, and produces violent itching, redness, and erysipelatous swelling of the face, hands, or other parts, which have objected to its operation; these effects are followed by vesication and desquamation of the cuticle. In some cases the swelling face has been so great as to have almost obliterated the features, but all persons are not equally susceptible of its poisonous

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on the stem, partly or
same incisions furn
the end of Septem
quantities. The ma
on the stem is call
while that which fa
stitutes common ma

Properties.—Mastic (mastiche) occurs in sl
tened, or irregular, pale-yellow tears, which are ex
owing to their mutual attrition. Their fracture
have a mild, agreeable odour, and an aromatic ta

Composition.—Mastic consists of a minute par
about 90 per cent. of resin soluble in alcohol, an
resinous substance (masticine) insoluble in alcohol

1. Soluble Acid Mastic Resin; Resin a.; Mastic
soluble in alcohol. It possesses the properties of an ac
bases to form four series of salts. Its formula, accordi
H\textsubscript{11} O\textsubscript{4}.

2. Insoluble Non-acid Mastic Resin; Resin b.; Mastic
insoluble in alcohol. It is white, elastic, tenacious, a
solution of resin a., as well as in ether and oil of tur
according to Johnstone, is C\textsuperscript{40} H\textsubscript{31} O\textsubscript{5}. To this resin mastic

Physiological Effects.—Analogous to resin
(see pp. 1047 and 1058).

Uses.—Mastic is rarely employed as a medi
used to check excessive discharges from the mu
leucorrhæa, gleet, chronic pulmonary catarrh.
Dentists occasionally employ it for filling up the
teeth. The Turkish ladies chew it to sweeten t
serve the teeth and gums. Dissolved in alcoh
TRAILING POISON-OAK.

of the species *Tinctura ammoniac composita*, Ph. L.; formerly called *de luce* or *spiritus ammoniac succinatus*, which I have before described (see p. 303).

**RHUS TOXICODENDRON**, Linn. L. D.—TRAILING POISON-OAK OR SUMACH.

**Sex. Syst.** Pentandria, Trigynia.

(Folia, L. D.)

**History.**—The attention of medical practitioners of this country was first drawn to the medical properties of this plant in 1793, by J. Alderson, of Hull. It was first described by Comnitus, in his *Canad. Hist.* Paris, 1635.

**Botany. Gen. Char.**—Calyx small, five-partite, persistent. Petals ovate, spreading. Stamens five, all fertile in the male and hermaphrodite flowers. Ovary one, somewhat globose, one-celled, styles short, three, or stigmas three sessile. Drope almost juiceless, one-celled; nut bony, perhaps by abortion one-seeded, and sometimes two- or three-seeded. Seed exalbominous, invested by the nucellus arising from the base of the nut; cotyledons foliaceous; volvule incumbent on the upper edge of the cotyledons (De Cand.)

**Sp. Char.**—Leaves pinnate with an odd leaflet, trifoliate; leaflets gularly incised, pubescent (De Cand.)

Shrub, one to three feet high. Stems many, branching, covered in brown bark. Flowers greenish-white. Fruit a round drupe, out as large as a pea.—Juice acrid, milky, becoming black by exposure to the air, and forming an indelible ink when applied to cotton or linen.

*Rhod Toxidendron* is considered by some botanists as a variety only of *Rhus Toxidion*. I have followed Nuttall and De Candolle in considering it a distinct species.

**Hab.**—United States of America.

**Composition.**—I am not acquainted with any detailed analysis of this plant. There are at least two substances in it worthy of investigation:—viz. the volatile, acrid (narcotico-acid?) principle, and the tone which blackens by exposure to the air. Tannic and gallic acids are said to be constituents of it.

**Physiological Effects.** 1. Of the Emanations. —When not exposed to the sun's rays, as when it grows in shady places, and during the night, this plant evolves a hydrocarburetted gas, mixed with an acrid vapour, which acts most powerfully on certain individuals exposed to its influence, and produces violent itching, redness, and erythematous swelling of the face, hands, or other parts, which have been subjected to its operation; these effects are followed by vesications, and desquamation of the cuticle. In some cases the swelling of the face has been so great as to have almost obliterated the features, but all persons are not equally susceptible of its poisonous effects.
operation; so that some peculiar condition of the cutaneous seems necessary for the effect to be produced.

2. Of the Plant. a. On Animals.—Orfila made several exp with the watery extract of the Rhus radicans (whose operatio probably quite similar to that of R. Toxicodendron), and conclu “internally administered, or applied to the cellular texture, duces a local irritation, followed by an inflammation more or tense, and that it exerts a stupefying action on the nervou after being absorbed.” Lavina gave a few drops of the milk Rhus Toxicodendron to guinea-pigs and birds, who were stupefied by it, but gradually recovered without any other d effect.

β. On Man.—In the human subject small doses of the cress the secretions of the skin and kidneys, act slight bowels, and, in paralysed persons, are said to have produce of sensibility and of mobility, with a feeling of burning and with twitchings, in the paralysed parts. Large doses occ in the stomach, nausea, vomiting, giddiness, stupefaction, a inflammatory swelling of the paralysed parts. These effects the poison-oak possesses a two-fold operation, of an narcotic.

Uses.—It has been employed in old paralytic cases dep torpid condition of the nerves. It has also been given in chr matism, obstinate eruptive disorders, in some cases of ama other nervous affections of the eyes.

Administration.—The powder of the leaves is given it from half a grain to a grain, gradually increased until some effect is produced.

4. BOSWEL LIA THURIFERA, Colebrooke.—OLIBANUM

Boswellia serrata, L. D.

Sex. Syst. Decandria, Monogynia.

(Gummi-resina, L. D.)

History.—Olibanum was the frankincense used by the their religious ceremonies. It is the Lebonah of the the Lubân of the Arabs; from either of which terms the Gubably, derived their names for it, Λιβανος, Λιβανωνος. Th notice of it is by Moses. Dioscorides calls it Λιβανος.

Botany. Gen. Char.—Flowers bisexual. Calyx small, five persistent. Petals five, obovate-oblong, very patent, at base, inserted under the margin of the disk; aestivation ve imbricative. Stamens ten, inserted under the disk, alternate filaments subulate, persistent; anthers caducous. Tor shaped disk, fleshy, larger than the calyx, crenulated on the Ovary oblong, sessile; style one, the length of the stamens; stigma capitate, three-lobed. Fruit capsular, thr

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* Orfila, Toxicol. Gén.
* Colebrooke, Asiatic Research. ix. 377.
* Exol. xxx. 34.
* Lib. i. cap. 84.
OLIBANUM TREE.


p. Char. — Leaflets oblong, obtuse, serrated, pubescent. Racemes lary, single, shorter than the leaves (Wight and Arnott).

Tab. — Mountainous parts of Coromandel.

Description. — Olibanum, Indian Olibanum, or Olibanum of the exellia serrata (gummi-resina Olibanum; gummi Olibanum; Olibanum indicum seu ostindicum) is imported from India in chests. consists of round, oblong, or ovate pale-yellowish, semi-opaque, gile tears, having a balsamic resinous odour.

Mr. Johnstone states that it is a mixture of at least two gums:

1. One variety of gum-resin consists of opaque, dull, hard, and brittle pieces, which, when introduced into alcohol, become almost immediately white and smooth, from a white powdery coating or crust left on their surface as the solution is taken up. This variety constitutes the larger portion of the olibanum of commerce, and is the more fragrant when burned. It contains a resin and a volatile oil.

2. The second variety is in clearer, yellower, less brittle, and opaque pieces, usually in long tears (stalactite?) as they have flowed from the tree. When reduced into alcohol, they become clear and transparent. They contain less gum. Their resin resembles colophony.

On the above statement I may remark, that all the tears of olibanum which I have tried became opaque when immersed in alcohol.

The substance called on the continent African or Arabian Olibanum (Olibanum arabicum) is rarely met with in this country. It consists of smaller tears than those of the Indian variety. They are yellowish or reddish, and intermixed with crystals of carbonate of lime. Some have supposed it to be the produce of a species, — some of an Amyris, — others of Boswellia glabra, which Roxburgh yields a substance used as an incense and a pitch in India.

Composition. — Olibanum (Indian) was analysed by Bracconnet, and found the constituents to be as follows: — volatile oil 8%, resin 30%, matter like gum, insoluble in water and alcohol 52%; 90%.

1. Volatile Oil. — By distillation with water, olibanum yielded Stenhousenew, unless volatile oil, similar to oil of turpentine, but smelling more agreeably. Its formula is C_{35}H_{28}O, which is identical with that for oil of spearmint.

2. Resin. — According to Johnston, olibanum contains two kinds of resin: —

3. Acid Resin. — This is found in the rounded, opaque, dull, hard, and brittle piece, which becomes covered with a white crust. Its formula is C_{39}H_{32}O_{6}.

4. Resin resembling Colophony. — This is found in the clearer, yellower, less brittle and opaque long tears (stalactite?). Its formula is C_{40}H_{32}O_{4}.

Physiological Effects. — Olibanum is regarded as a stimulant of the same kind as the resins or oleo-resins (p. 182).

Uses. — It is rarely employed internally. Formerly it was used to

* Ann. de Chir. it viii. 69.
* Pharmaceutisches Central-Blatt für 1840, p. 528.
* Phil. Trans. for 1839, p. 304-5.
restrain excessive discharges from the mucous membranes. Thus it
was given in chronic diarrhoea, old catarrhs, but more especially in
leucorrhoea and gleet. It was also administered in affections of the
chest; as hemoptyisis. It has been used as an ingredient of stimu-
lating plasters. As a fumigating agent it is employed to overpower
unpleasant odours, and to destroy noxious vapours.

Administration.—Dose, 3ss. to 5j., formed into an emulsion by
the aid of the yolk of an egg.

5. BALSAMODENDRUM MYRIRHA, Nees, L.—THE MYRRH TREE.
Balsamodendron (Protium?) Myrrha, E.
Sec. Syst. Octandria, Monogynia.
(Gummi-resina, L.—Gummy-resinous exudation, E.—Myrrha, D.)

History.—The earliest notice of myrrh occurs in the Old Testament,
from which it appears that this gum-resin was an object of trade
with the Eastern nations more than 3,500 years ago. In the Hebrew
language it is termed Mar, in allusion to its bitterness. The Greeks
who were well acquainted with it, called it σαμπρα; or, in the Greek
dialect, Μήπα. Hippocrates employed it in medicine in several
diseases; and Dioscorides describes several kinds of it, the more
esteemed being the Troglodytica. Some of the ancient poets tell us
that the name of this gum-resin was derived from Myrrha, the
daughter of Cinyras, King of Cyprus, who fell in love with her own
father, and after having had criminal intercourse with him, fled to
Arabia, where she was changed into a tree which still bears her name.

Notwithstanding the early knowledge of, and acquaintance with
the uses of myrrh, we had no accurate account of the tree which
yields it until the return of Ehrenberg from his travels with Hen-
rich, during 1820-25, in various parts of Africa and Asia, and we
brought with us a specimen of the tree, which has been described
and figured by Nees von Esenbeck under the name of Balsamode-
dron Myrrha. The first notice of this discovery of these trees
which I have met with, is in Alex. Humboldt’s “Bericht über ein
naturhistorischen Reisen der Herren Ehrenberg und Hemprich,”
published at Berlin in 1826.

Botany. Gen. Char.—Flowers irregular. Calyx four-toothed, per-
sistent. Petals four, linear-oblong; stivation induplicate-valvate.
Stamens eight, inserted under the annular disk; elevated wards be-
tween the stamens. Ovary one. Style one, short, obtuse. Berry
drupe ovate, acute, with four sutures, one to two-celled; cells case
seeded.—Oriental trees giving out balsam. Leaves pinnate; leaf-
tips three to five, sessile, without dots (De Cand.)

Sp. Char.—Stem shrubby, arborescent; branches squarrose, square
cent. Leaves ternate; leaflets obovate, obtuse, obtusely toothed
at the apex, the lateral smooth. Fruit acuminate (Nex.)

3 Gen. xxvii. 25.
3 See Dierbach, Arzneim. der Hippok. p. 224.
1 Lib. i. cap. 77.
Bark pale ash-grey, approaching white. Wood yellowish white; both it and the bark have a peculiar odour. Leaves on short stalks. Flowers unknown. Fruit ovate, smooth, brown, somewhat larger than a pea; surrounded at the base by a four-toothed calyx, and supported on a very short stalk.

Hab.—Gison, on the borders of Arabia Felix.

This species is considered by Lindley to be identical with the Amrys Kataf of Forskål, the Balsamodendron Kataf, Nees; Protium Kataf, Lindley. But the identity of the two plants is by no means satisfactorily demonstrated. A. Kataf is distinguished, 1st, by the absence of thorns; 2dly, by the leaves being four times larger, and the lateral leaflets agreeing both in form and size with the terminal ones; 3dly, the fruit (according to Forskål) is round, with a depressed umbilicus at the point.

LOCATION OF MYRHR.—Myrrh, according to Ehrenberg, exudes tere-tree gum, from the bark of the tree. It is at first soft oily, a pale yellow colour; but, by drying, becomes darker and

DESCRIPTION.—Myrrh (gummi-resina myrrha; gummi myrrha) is a gum from the East Indies in chests, each containing from one to two hundred weight. Formerly the finest kind was brought from (Turkey myrrh), and an inferior one from the East Indies (India myrrh); but at the present time nearly the whole is from India. In 1839, duty (6s. per cwt.) was paid on it. Sometimes the same chest contains myrrh of all qualities, and then termed myrrh in sorts (myrrha naturalis seu myrrha in but commonly it is brought over more or less sorted.

It is only partially soluble in water, alcohol, or ether; the first two liquids take up the gum principally, the two latter the resin.

Water takes up more of the myrrh than alcohol does. Solutions are good solvents for myrrh. A few drops of nitric acid on a small fragment of myrrh, or on a concentrated solution, develops a red colour.

MYRHR OF FIRST QUALITY; Turkey myrrh (Myrrha turcica; M. vera vel pinguis).—It occurs in pieces, of irregular forms and of sizes, and which consist of tears (either distinct or agglutinated), usually covered with a fine powder or dust. In a chest of pieces of fine quality, may sometimes be met with, nearly as a man's fist. The colour varies, being pale reddish-yellow, reddish-brown. The pieces are fragile, semi-transparent, with a part splinterly; fatty kind of fracture. In consequence of its desiccation the largest and finest pieces often present inter-
nally, opaque, whitish or yellow striae, or veins, which have
compared by Dioscorides, Pliny, and many others, to the white
on the nails. The odour of myrrh is aromatic and balsamic, per-
but to most persons pleasant; the taste is bitter, acrid, and am-
The purest, palest, and most odorous pieces are sold as picked
(myrrha electa seu selecta).

2. Myrrh of second quality; Myrrh in distinct small tears or gr
Imported from the East Indies in chests. It consists of distinct
or grains, which are rounded or irregular, and vary in size from
of a pin’s head to a pepper-corn, none of them in my specimen
so large as a small pea. They are somewhat shiny, more or
transparent, and vary in colour from pale or whitish yellow to a
brown. It consists of tears of myrrh intermixed with fragr
 gum-arabic, and of some resin very like mastic, or juniper.
Druggists in this country regard it as merely the siftings of the
kind, but I cannot agree with them in this opinion.

3. Myrrh of third quality; East India Myrrh (Myrrha indi-
ostindica).—Formerly this was the only kind imported from
Indies. It occurs in pieces, which are darker coloured than
the so-called Turkey myrrh, and whose average size does not
that of a walnut. It is often mixed with other substances,
early with Indian Bdellium (the produce of Amyris Commiphora)
with a substance of similar appearance to dark red-coloured
b gum (Opocalpsin).

Composition.—Myrrh was analyzed, in 1816, by Pellet
in 1819 by Bracconnot and by Brandes.

<table>
<thead>
<tr>
<th></th>
<th>Brandes</th>
<th>Bracconnot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volatile oil</td>
<td>2·60</td>
<td>2·3</td>
</tr>
<tr>
<td>Resin (soft)</td>
<td>28·24</td>
<td>23·6</td>
</tr>
<tr>
<td></td>
<td>2·52</td>
<td>2·02</td>
</tr>
<tr>
<td>Gum soluble (dripping?)</td>
<td>54·12</td>
<td>46·0</td>
</tr>
<tr>
<td>Dinscloture</td>
<td>8·22</td>
<td>12·9</td>
</tr>
</tbody>
</table>
| Salts (benzoates, ma-
| laters, phosphates, sul-
| phates, and acetates
| of potash and lime)    | 1·36      | —         |
| Impurities             | 1·90      | 1·80      |
| Loss                   | 2·94      | 10·5      |
| Total                  | 100·00    | 100·9     |

1. Volatile Oil.—Colourless, though by age it becomes yellowish
thin fluid, heavier than water, having the odour and taste of myrrh,
soluble in alcohol, ether, and the fixed oils. It partially evaporates in
the residue being a glutinous varnish-like substance. It readily distils
water, but not with spirit. With sulphuric, nitric, and hydrochloric acids
forms red solutions.

2. Resin.—According to Brandes, this is of two kinds, both of which
lique in alcohol.
MYRRH TREE.

Soft resin.—Odorous, soft at ordinary temperatures, and soluble in theer. dorben regards it as a mixture of hard resin and volatile oil.

Hard resin (Myrrhia acid?)—Odorous, hard, insoluble in ether, soluble in alkalis, forming resinates (myrhhates?). The resinate of baryta is soluble in water, but not in alcohol.

Gum.—Is also of two kinds: a. Soluble in water; the solution forming precipitates with alcohol and the salts of lead, silver, the protosols of tin, and of mercurials. Insoluble in water.

Physiological Effects.—In small or moderate doses, myrrh, promotes the appetite, creates an agreeable warmth in the stomach, and relieves slight constipation. Its continued employment in these situations assists the assimilative functions, increases the muscularity, gives greater firmness to the solids, and diminishes excessive secretion from the mucous membranes.

Large doses (as from half a drachm to a drachm) excite a disagreeable sensation of heat in the stomach, and in irritable conditions of the viscera may bring on a slight inflammatory state; it augments the frequency and increases the fulness of the pulse, gives rise to a febrile condition of the body, and creates a feeling of warmth and irritation in the mucous membrane (especially in the membrane lining the air passages). It has been supposed to have a specific stimulant action on the uterus, and has, in consequence, been termed emmenagogue; but it does not appear to have any title to this appellation.

The local operation of myrrh is that of a mild astringent and a coating stimulant. Kraus says it is very similar to that of cinchona.

In its remote effects myrrh partakes of both the tonic and antispasmodic characters, and hence some have denominated it a tonico-antispasmodic; and as its stimulant powers are analogous to those of the cinchonas, it has also been called a tonico-balsamic.

Myrrh differs from the fetid gum-resins (asafetida, galbanum, &c.) possessing that influence over the nervous system which has been the cause of its use in various spasmodic diseases, and to their denomination of antispasmodics. From the balsamic substances it is distinguished by its tonic influence. It has some relation to castoreum, but is more stimulant.

Uses.—The employment of myrrh is indicated in diseases characterized by feebleness of the vascular action, by weakness of the muscular fibre, and by excessive secretion from the mucous membranes. Relaxed and leucophlegmatic constitutions best admit of its use. It is frequently associated with tonics, especially the chalybeates, or with aloes. Indeed it is rarely used alone. It is contraindicated in inflammatory diseases, and in plethoric individuals. It is used in the following cases:

In disordered conditions of the digestive organs arising from or connected with anatomic condition of the alimentary canal, as in forms of dyspepsia, aepigastrics, flatulence, &c.

In disordered states of the menstrual functions characterized by...
poses. Thus it is used as a dentifrice, either alone or in combination with other substances; and in cases of caries of the teeth, and in the ischaemic condition of the gums, is very serviceable. Ulcers of the throat, tincture of myrrh, dilute with glycerin, is frequently employed. In foul ulcers, myrrh has been much in demand, because of its pleasant odour, to promote granulations, and to render the surgical or medical treatment easier. To diminish the quantity of the secretion of the mouth, myrrh has been used in activities such as washing the mouth or as a wash.

**Administration.**—Dose, gr. x. to 3ss. It is given as a powder, pill, or emulsion. The aqueous infusion has been recommended for their mildness, and is, I think, very rightly so as I conceive. Myrrh is a common component of many pharmaceutical preparations; as *mistura ferri et myrrha* (p. 863), *pilulae aloes compositae* (p. 978), *pilulae rhei compositae* (p. 1462), and *pilulae galbanii compositae* (p. 1462).

**Tinctura Myrrhæ, L. E. D.; Tincture of Myrrh.** [in moderately, fine powder, *E. E.*], 6ij. [3ij. *E.*]. Oij. [Oss. and Proof Spirit, Ojss. *wine-measure*, a gallon]. Boil for fourteen days [seven, *D.*], and filter, *L. D.*. “Patiently, without any spirit, in a percolator; then pass through and when thirty-three fluidounces have passed through the cloth, dissolve the oleo-resinous matter which first passed through, and add the bottom. This tincture is much less convenient than the process of digestion for seven days,” *E.*—To wash the mouth. Seldom employed internally, and then usually as a mouthwash. Diluted with water (which renders it slightly milky).
to be the "concrete resinous exudation from one or more unascertained plants." London and Dublin Colleges, on the other hand, call it the resin of *Amphis gera* of Linnæus. But this distinguished botanist has confounded, under same; two distinct plants; viz., *Icera ICeraria*, De Candolle (*Icera Clara*, Pison), resin tree (yielding, according to Pison, a resin similar to the so-called *elemi*), and *Amphis Plutorian*, De Candolle, a native of the Antilles, which yields a resin. To assist in determining the origin of elemi, I have taken pains to ascertain its commercial route; and I find that all the importance of it, which I can trace, were from Amsterdam or Hamburg. Pomet also states, that true elemi was brought from Holland: whence I conclude that it is a produce of a Dutch settlement. But one of the importers expressed to me that true elemi is not the same as the resins which I may be for it, and he puts a query, whether this tree may not be the source of it. (The resins are), received from Dr. Christison a specimen of the resin of *Canarium africana* of Ceylon, which in odour and general appearance strongly resembles elemi. I have met with three kinds of elemi:—1st. *Elemi in flag*; 2nd. *Resine elemi en pains*, Guibourt; 3rd. *Resine Elemi orientalis*, Martius. is imported from Holland in triangular masses, weighing from one to two drachms each, enveloped in a palm-leaf. It agrees in most of its properties the next variety. Martius ascribes it to *Amphis zephyrina* (*Balsamodendron nicoum*, Kunth), But if this were correct, it would doubtless be imported from Ceylon to England, which it is not. —2nd. *Elemi in the lump.* differs from the following kind only in its much paler yellow colour. 1. *Brazilian Elemi*: *Resine elemi du Brésil*, Guibourt. This variety I received from Professor Guibourt. If it be really brought from the Brazils, it is less obtained from *Icera ICeraria* (De Candolle) by incisions into the stem, gathered twenty-four hours afterwards. "It is imported in cases containing two or three hundred pounds each. It is soft and unctuous, but becomes brittle by cold and age. It is semi-transparent, of a yellowish white, with greenish points; its odour is strong, agreeable, analogous to that of *elemia*; and owing to a volatile oil which may be obtained from it by distillation: besides its properties to this oil, it should be selected recent, not too dry, and gly odorous" (Guibourt). It is soluble in alcohol, with the exception of its rityes, and a white, opaque, insipid, inodorous, crystallizable substance, *elemia*, which is soluble in boiling alcohol. Martius describes *Africanus* (the genuine elemi of the ancients) as being in small pieces like scallops, and having an acrid taste. Bonastre analyzed elemi, and found its contents to be volatile oil 12-5, resin soluble in both hot and cold alcohol 60-0, soluble in hot but not in cold alcohol *elemia* 24-0, bitter extractive 24-0, impurities 1-5. The resin *a* (readily soluble in cold alcohol) consists, according to Stobie, of *C10H20O* 4; while the resin *b* (sparingly soluble in cold alcohol) imposessed of *C10H32O* 6.

The physiological effects of elemi are similar to those of the terebinthines. It is never employed externally. Its principal or sole use is as a constituent of the Unguentum Elemi, L.D., which is composed, according to the ton College, of Elemi, lb. ; Common Turpentine, 3. ; Suet, lb. j.; Olive 3. 3. The Elemi and Suet are melted together and then removed from the and the turpentine and oil immediately added; the mixture is then pressed through linen. The Dublin College employs lb. of Elemi, lb. ss. of te Wax, and lb. iv. of Prepared Hogslard. —Elemi ointment is stimulant andative. It is applied as a stimulant to old and indolent ulcers, and to promote discharge from ulcers and setons. It is an imitation of the ointment recom-
2. Balm of Gilead (Balsamum gileadense; B. de Meeus; Opopo Balm of the Old Testament; Balsamum of Theophrastus and Dioscorides) is obtained from Balsamodendron gileadense, a madding growing in Arabia. Mr. Bruce says it is cut off the branch with an axe, and the juice is collected in a small earthen bottle. The quantity of the juice in this way is, however, very small; and none of it reaches this country, which occasionally has been obtained by boiling the branches and leaves in water. It is a whitish, turbid, thick, very odorous juice, which resinifies, and becomes yellow by keeping. T. Forrest analyzed it, and found it to consist of 30.0, soft resin insoluble in alcohol 4.0, hard resin alcohol 54.0, extractive 0.4, loss 16. Bastard analyzed it. Its physiological effects are similar to balsam of copaiba and the liquid turpentine. The most wonderful properties were formerly ascribed to it. It is rarely or never employed by Europeans, adapted to the same cases as the terebinthine or turpentine.

1048. The Asiatics use it for its odoriferous as well as its medicinal qualities.

3. The term bdellium is applied to two gummy-resinous substances. One of these is Indian bdellium, or false Myrrh (the Bdellium of Scripture), obtained from Amyris (Balsamodendron?) Commiphora. Dr. Roxburg observed that the trunk of this tree is covered with a light-coloured pellicle, and the common birch, which peels off from time to time, exposing a smooth green coat, which in succession supplies other similar excreta. This tree diffuses a grateful fragrance, like that of the finest myrrh, and considerable distance around. Dr. Royle was informed that the Indian bdellium is obtained by breaking the tree up, and that it is a soft and rubbery substance. In confirmation of his statement I may add that many of the pieces of this bdellium in my museum have a yellowish adhering to them precisely like that procured from the common birch. Some of the pieces are perforated by spiny branches another serving to recognize the origin of this bdellium. Indian bdellium resembles myrrh. Many of the pieces have the goat adhering to them. The other kind of bdellium is called African bdellium, and is obtained from Heudolotia africana. It is a native of India and is called by the natives, who make toothpicks of its spines, a waxy fracture. By age they become opaque, and covered, external white or yellowish dust. It has a feeble but peculiar odour, and a bit of Pelletier found it to consist of resin 59.0, soluble gum 9.2, bassorin 30.0, oil and loss 1.2. Resin of bdellium [African bdellium?] consists, according to Johnstone, of C40 H31 O9.

ORDER LXIII.—RHAMNACEÆ, Lindl.—the Bu
THORN TRIBE.

RHAMNI, Just. PARKIER, De Candolle.

Essential Character.—Tube of the calyx adherent to the ovary, lobes in estimation, definite in number, four or five. Petals as many as (read) and alternate with the lobes of the calyx; often squariform with a limb. Stamina as many as the petals, and opposite to them; anthers to
COMMON BUCKTHORN.

Rhamnus catharticus, Linn. L. E. D.—COMMON BUCKTHORN.

Sex. Syst. Pentandria, Monogynia.

(Baccar., L. D.—Fruit, E.)

History.—According to Dr. Sibthorp⁴, the ραμνος of Dioscorides, Lycium europaeum. The earliest notice of Rhamnus catharticus is Tragus⁵.

Botany. Gen. Char.—Calyx four- to five-cleft, often circumscissile the middle after flowering; the base persistent under, and adhe-

Semen inserted opposite the petals. Style two- to four-

Fruit almost juiceless, or baccate, two- to four-celled; cells in juiceless fruit, separable, one-seeded (rarely two-seeded), dehiscing by a longitudinal chink. Seeds oblong, marked at the exer-

side by a deep groove, which is broader towards the base (De Cand.)

Sp. Char.—Erect. Leaves ovate, toothed. Flowers fascicled, poly-

tous-diacious. Berries four-seeded, somewhat globose (De Cand.)

spreading shrub with terminal spines. Leaves with four or six

spreading lateral nerves parallel with the margin or rib. Stipules linear.

Flowers yellowish green: the males with broader petals, four stamens

one short style, without either ovary or stigma: the females

taller, with four stigmas projecting beyond the calyx, and rudimen-

tary stamens. Fruit black, four-celled.

Tab.—Indigenous; in hedges, groves, and thickets.—Flowers in May. The fruit is ripe in September.

Composition.—The expressed juice of buckthorn berries has been examined, chemically, by Vogel⁶, and by Hubert⁷.

<table>
<thead>
<tr>
<th>Vogel’s Analysis</th>
<th>Hubert’s Analysis</th>
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<tbody>
<tr>
<td>Peculiar colouring matter</td>
<td>Green colouring matter</td>
</tr>
<tr>
<td>Acetic acid</td>
<td>Acetic and malic acids</td>
</tr>
<tr>
<td>Mucilage</td>
<td>Brown gum. matter</td>
</tr>
<tr>
<td>Sugar</td>
<td>Sugar</td>
</tr>
<tr>
<td>Nitrogenous matter</td>
<td>Bitter substance (cathartine?)</td>
</tr>
</tbody>
</table>

Buckthorn juice                                        | Buckthorn juice

---

⁵ See Sprengel, Hist. Rei Herb. ii. Pref. xi.
⁶ Bull. de Pharm. iv. 64.
1. Purgative Principle.—The nature of the purgative principle of buckthorn requires further elucidation. Hubert asserts that it possesses the property of cathartic before described (see p. 1604); but his experiments are not conclusive. As from 25 to 30 berries are sufficient to purge, while an ounce of the juice is required to produce the same effect, it is probable that the greater part of the purgative principle resides in the marc left after the expression of the fruit.

2. Colouring Matter.—It is soluble in water, less so in alcohol, and insoluble in ether and oils. Acids redden it; whereas alkalis render it green. When it thinks the proper colour is green, and that it only becomes purple by the addition of the acetic acid, which is developed in the ripe fruit. When the juice is separated from dryness with lime, it constitutes sap-green, or the vert de vase of the French.

3. Mucilage.—The mucilage of buckthorn is of a peculiar nature. It is abundant in the recent juice, to which it gives consistence.

Physiological Effects.—The berries, as well as their expressed juice, are powerful hydragogue cathartics; usually gripping and causing great thirst, and sometimes operating with considerable violence.

“Syrup of buckthorn,” says Sydenham’s, “purges in a manner like water, and evacuates a great quantity of it, and does not disturb the blood, nor render the urine high coloured, as other purges usually do. And this syrup has but one ill property—viz. that whilst it is working it makes the sick very thirsty. But if you give the greatest dose to those that are difficultly purged, it will not give many stools, but bring away so much water from them as it ought.”

Uses.—Buckthorn berries were formerly employed as cathartics, but their violent operation, and the sickness, griping, and thirst occasioned by them, have led to their disuse. “They be not meet to be ministered,” says Dodoens’s, “but to young and lustie people of the countrey, which doe set more store of their money than their lives.”

The syrup is the only preparation now in use.

Administration.—Dose of the recent berries, 2 j.; of the dry ones, 3 j.; of the expressed juice, 3 j. to 3 j.

SYRUPUS RHAMNI, L. E. D.; Syrup of Buckthorn.—(Fresh Juice of Buckthorn Berries, Oij. [Oij. wine-measure, D.]; Ginger silk, Allspice bruised, of each, 5 j. [5 j. D.]; Pure Sugar, lb. iv. [5 j. D.]) Set by the juice for three days, that the dregs may subside. Strain. To a pint of the clear juice add the Ginger and Allspice, then macerate for four hours with a gentle heat, and strain; then strain the residue to a pint and a half; mix the liquors; add the sugar, and dissolve. Cathartic. It is employed as an adjunct to purgative and occasionally to diuretic mixtures. Sydenham found in one case, most beneficial in dropsy; and “with the juvence and capacity of an inexperienced man, verily believed,” as he tells us, that he “had got a medicine that would cure any manner of dropsy, but he found his mistake in a few weeks.” Dose, 3 j. to 5 j.

* Works, by Dr. Pechey, p. 301, 4th ed.
* New Herbal, by Lyte, p. 301. Lond. 1612.
ORDER LXIV.—SIMARUBACEÆ, Lindley.—THE QUASSIA TRIBE.

SIMARUBEE, Richard.

Differential Character. — Flowers hermaphrodite, or rarely by abortion unisexual. Calyx four- or five-partite, persistent. Petals four or five, hypogynous, erect, deciduous. Stamens equal in number, or twice as many as the petals, inserted on a hypogynous disk, free. Ovary with lobes as numerous as the petals; style one, filiform, enlarged at the base. Carpels as many as the petals, articulated on the axis, capsular, bivalved, dehiscing inwardly, monomeroous. Seeds exalbuminous, pendulous; cotyledons two, thick; radicle short, superior.—Trees or shrubs with a very bitter bark and milky juice. Leaves alternate, pinnate, without stipules (De Cand.).

Properties.—Bitterness is the prevailing quality of the order (see Quassia).

SIMARU'BAMÁ'RA, Aublet, E.—BITTER SIMARUBA OR MOUNTAIN DAMSON.

Simaruba officinalis, De Candolle, L.—Quassia Simaruba, Linn. D.

Sex. Syst. Decandria, Monogynia.

(Radicis cortex, L.—Root, E.—Cortex radix, D.)

History.—Simaruba bark was first known to Europeans in 1713, in some of it was sent to Paris from Guiana, as the bark of a tree ed by the natives Simarouba, which they employed with great ess in dysentery. The first authentic botanical account of the was given by Dr. Wright*.

Botany. Gen. Char.—Flowers unisexual. Calyx small, cup-shaped, toothed or parted. Petals five, longer, spreading. Males: stamens nearly equal to the petals, arranged around a receptacle bear- at its apex five very minute lobes (rudiments of ovaries), or times none. Females: ovaries five, placed on an even disk, rounded at the base by ten short hairy scales (rudiments of stamens). Styles the same number, short, distinct at the base; there ped into one, crowned by a broader five-lobed stigma. Fruit five pes (Lindley).

Sp. Char.—Male flowers decandrous. Stigma five-partite. Leaves uptly pinnate; leaflets alternate, somewhat stalked, pubescent cath (De Cand.)

A very tall tree. Roots long and creeping. Stem thick; bark er, internally white, fibrous and tough, externally blackish and rowed in the old trees, but smooth and gray, with yellow spots, in young ones. Leaves alternate; leaflets alternate, two to nine on h side, oval, firm, mucronate. Flowers small, yellowish white, e male, others female, mixed, in panicles. Fruit of five, ovate, c, smooth capsules, placed on a fleshy disk.

* Trans. Royal Soc. of Edinb. vol. ii. part ii. p. 73.
Hab.—Guayana, Cayenne, Jamaica.

DESCRIPTION.—The simaruba bark (cortex simarubæ) of the shops, is the bark of the root (cortex radicis simarubæ), and is brought from Jamaica in bales. It is odourless, but bitter, and occurs in broad, folded, very fibrous pieces, several feet long, which are externally rough, warty, and marked with transverse ridges. The epidermis is of a grayish or whitish yellow colour: beneath it the bark is darker, and yellowish brown. On the inner surface the bark is pale yellowish white.

COMPOSITION.—Simaruba bark was analyzed by Morin, who found in it the following substances:—Quassite, a brittle resin, an aromatic volatile oil having the odour of benzoin, woody fibre, album, an ammoniacal salt, malic acid, traces of gallic acid, malate and orrate of lime, oxide of iron, and silica. No notice is taken of the mucilage, which, according to Pfaff, constitutes nearly one-fourth part of the bark.

PHYSIOLOGICAL EFFECTS.—In small doses simaruba acts like the simple bitter tonics, whose effects have been already described (p. 188). In full doses, however, it causes vomiting and purging, and is said also to promote perspiration and urine. Dr. Wright states, that negroes are less affected by it than whites.

Desbois de Rochefort classed it among emetics; and Bichat proposed it as a substitute for ipecacuanha. It is, however, usually arranged with the tonics.

USES.—Simaruba may be employed in the same cases as other vegetable bitters (see p. 188). It has been principally celebrated in dysentery (whence the Germans call it Ruhrinde, or dysentery-bark) by Dr. Wright and others. It is, of course, only applicable in the latter stages of the acute and the asthenic and chronic forms of the disease. More recently, Dr. O’Brien has borne testimony to its good effects, when given in conjunction with opium, in an epidemic dysentery. It has also been employed in the advanced stages of diarrhoea. Like other vegetable tonics, it may be administered in dyspepsia, anorexia, and intermittents. It is a remedy, however, which is seldom used.

INFUSUM SIMARUBE, L. E. D. Infusion of Simaruba bark.—Simaruba bark, bruised, 3ij. [3ss. D.]; Boiling [distilled, L.] Water, 3 [Oss. wine-measure, D.]. Macerate for two hours in a lightly-covered vessel, and strain [through linen or calico, E.].—Tonic; in large doses emetic.—Dose, as a tonic, f3j. to f3ij.
PICRÆ'NA EXCEL'SA, Lindley, E.—THE LOFTY BITTER-WOOD TREE.

Quassia excelsa, Swartz, L. D.—Pierania amara, Wright.—Quassia polygama, Lindley.

Sex. Syt. Decandria, Monogynia.

(Lignum, L. D.—Wood chiefly of Pierania excelsa, seldom of Quassia amara, E.)

History.—The wood of this tree has been introduced as a substitute of that of Quassia amara, with which it has often been confused.

Botany. Gen. Char.—Flowers polygamous. Sepals five, minute. Stems five, longer than the sepals. Stamens five, about as long as petals, rather shaggy; anthers roundish. Ovaries three, seated round, tumultuous receptacle. Style three-cornered, bifid: stigmata spreading. Fruit three, globose, one-celled, bivalved drupes, drawn apart from each other, and placed on a broad hemispherical receptacle (Lindley).

Char.—The only species.

Stately beautiful timber tree, sometimes 100 feet high. Leaves alternate with an odd one; leaflets four to eight pairs, opposite, ovate, oblong, acuminate, unequal at the base. Racemes towards ends of the branchlets, axillary, very compound. Flowers small, yellowish green. Drupe size of a pea, black, shining, round.

Jamaica.

Description.—Quassia wood (lignum quassiae),—sometimes called Jamaican quassia wood (lignum quassiae jamaicensis) in order to distinguish it from the wood of Quassia amara,—is imported from Jamaica as being of various sizes; sometimes a foot in diameter, and several inches in length, covered externally with a smooth brittle bark. The wood is white, but by exposure to the air becomes yellowish; it has a strong, but a most intensely bitter taste. Floors made of quassia wood retain for many years their bitterness. An efflorescence of nitrate of potash is frequently observed on it.

Adulteration.—Quassia wood has recently been somewhat adulterated with wood of other woods; but the intense bitterness of the genuine wood distinguishes it.

Composition.—Though quassia wood has been the subject of recent chemical investigation, I am unacquainted with any complete analysis of it. But from the experiments of Pfaff and others, the following appear to me to be the principal constituents of it:—volatile oil, a minute trace, a bitter principle (quassite), gummy extractive, woody fibre, and various salts (as oxalate, tartrate, and sulphate of lime, chlorides of calcium and sodium, an ammoniacal salt, nitrate of potash).
ments it appears that quassia wood acts on a poison. Dr. Wright tells us that no insect work made of it. It has been long known that of this substance was an excellent fly-poison. Buchner’s pupils, has lately shown that it also properties with respect to the larger animals. a rabbit, into a wound of whose thigh a grain of quassia had been introduced, lost his strength and died on the third day. A second experiment in a stronger animal was attended with the same result as appeared to be experienced, nor were there any signs of inflammation observable after death. Kurtz’s method of paralysis of the hind extremities of a dog affected (Fetträude) was brought on by washing the ulcer with quassia: in seven hours, however, it disappeared.

These experiments seem to show that the bitter quassia possesses properties somewhat like those of the

β. On Man.—In the usual medicinal doses, quassia is stimulant, stimulating, and astringent; and sometimes taken as a type of the simple or pure powerful than, but in other respects analogous to the

tration. “We can find nothing in this wood,” says a pure and simple bitter;”—and he goes on to observe it to be an excellent substance, capable of doing what a simple bitter can do, but no more.

Does it act as a narcotic on man, as on others employed, and seen others administer quassia repeatedly, and with beneficial effect, for it has been long known that

Raisins, 3vij.; Proof Spirit, Oij. Digest for seven days, strain liquor, express strongly the residuum, and filter. This syrup can also be obtained by percolation, as directed for the Compound Tincture of Cardamom [see p. 1032], provided the quassia be rasped powder). — An aromatic tonic. — Dose, f3j. to f5ij.

OTHER MEDICINAL SIMARUBACEÆ.

The wood of Quassia amara (Linn. E.) has been employed in medicine the name of Surinam quassia wood (lignum quassiae surinamense). Linnaeus mentions that about the year 1714 the flowers of this shrub were valued at Surinam on account of their stomachic properties. In 1742 root is said to have been found in the possession of Scba, a celebrated dealer of Amsterdam. Haller tells us that a relative of his took quassia, which he employed in the cure of endemic malignant fevers of that place. In this circumstance Linnaeus named the tree in honor of the slave, Quassia, who employed a secret remedy in the cure of endemic malignant fevers of that place. Linnaeus, who returned from Surinam in 1756, tells us he saw and conversed with this black, who was almost worshipped by some, and suspected of others. Rolander found him to be a simple man, better skilled in old tales than in magic. All parts of the plant are intensely bitter. The wood is in cylindrical pieces (covered by a thin, greyish-brown, bitter bark), not exceeding two inches in diameter, very light, without oil, having an extremely bitter taste. The chemical and medical properties are similar to the wood of Simaruba amara.

ORDER LXV. — RUTACEÆ, De Candolle.—THE RUE TREE.

Essential Character. — Sepals three, four, or five; more or less about one half the base, so that the calyx is cleft, cleft, or parted. Petals very numerous, usually as many as the sepals, frequently unguiculate, distinct. Disk glandular, surrounding the ovary, arising from the receptacle external to the petals, and bearing the stamens on the upper part. Stamens usually as many as the petals, and then either all fertile or the alternate ones fertile. Carpeis as many as the sepals, sometimes fewer by abortion, either united at the base, or perfectly connate. Style arising from the center of the ovary, single, divided into as many stigmas as there are ovaries. When ripe, generally distinct, one-celled, dehiscent, trivalved, ovoidal. Seeds attached to the inner angle, inverse; embryo straight, compressed, superior. — Herbs or shrubs, with opposite or alternate stipulate leaves (De Candolle).

Properties. — Volatile oil and bitter matter are the predominating ones of this order. These confer stimulant, tonic, and, in some cases, qualities.

Murray, App. Med. iii. 433.
UTA GRAVE'OLENS, Linn. L. E. D.—COMMON OR GARDEN RUE.

Sect. Syst. Decandria, Monogynia.

(Folia, L. D.—Leaves and unripe fruit, E.)

History.—This plant was highly esteemed by the ancients; and frequently mentioned by Hippocrates under the name of Ἰβυαῦρον. Pliny says that Pythagoras (who died in the year 489 before Christ) declared that rue was hurtful to the eyes: but, adds Pliny, he was in error, since engravers and painters eat it with bread or cresses to fit their eyes. The ancients had a curious idea that stolen rue sheds the best; just as, says Pliny, it is said that stolen bees are the worst.

Tany. Gen. Char.—Calyx persistent, four-, rarely three- to five-lobed. Petals as many as the segments of the calyx, unguiculate, what cochléeate. Stamens twice as many as the petals. Nectary pores at the base of the ovary, as many as the stamens. Style on a short, thick stalk. Style one. Capsule somewhat globose, divided into as many cells as there are petals. Seeds affixed by the funal angle; albumen fleshy; embryo curved; radicle long; cotyledon linear.—Perennial or suffruting, fetid herbs, of a sea-green t. Leaves alternate. Flowers corymbose, yellow, central, often left (De Cand.)

Char.—Leaves supradecompond; lobes oblong, the terminal ovate. Petals entire or somewhat toothed (De Cand.) small, branching, hairless undershrub, with the lower part of the stem woody. Leaves dotted, glaucous or bluish green. Flowers in umbellate racemes. Petals four or five, unguiculate, conical, yellow. The first flower has usually ten stamens, the others five. It is remarkable that the anthers move in turn to the pistil, and, after having shed their pollen, retire. Fruit roundish, d, four-lobed, each lobe opening into two valves.

A.—South of Europe. Commonly cultivated in gardens.

Description.—The herb (herba rude; herba rude hortensis) is by recognised by its strong disagreeable odour, which it owes to its oil. Its taste is bitter and nauseous. 100 lbs. yield by dry-bout 22 lbs. The dried herb is greyish green, and has a lessrful odour. The unripe fruit (fructus immaturus rude) is also cited in the Edinburgh Pharmacopoeia.

Composition.—Rue was analysed, in 1811, by Mädl, who found the following constituents:—Volatile oil, bitter extractive, chlorell, peculiar vegeto-animal matter precipitable by tincture of tis, malic acid, gum, albumen, starch, and woody fibre.

Volatile Oil.—(See p. 1645.)

Bitter Extractive.—Very bitter, insoluble in alcohol and ether.
Aschaffenburg, cut down a considerable quantity of bloom, and separated the leaves from the stalk; both his hands were very red and hot, and, on taking them, as if they had been exposed to hot aqueous vapours, smeared with oil. Towards evening vesication became most copious at the points of the fingers. On the second day both hands were still much swollen; and, between the joints, assumed a dark red or purplish hue. On the fifth day the swelling extended up the back part of the arm and under the panniculus (of chamomile and elder flowers) which was cut. Within four weeks the skin had returned. His children, who had played with the rue, suffered from a swelling in the face and hands.

The constitutional effects of rue are those of a narcotic. It has long been celebrated as an antispasmodic in cases of hysteria, and flatulent colic. It is a very powerful remedy, especially in hysterical cases, and is sometimes used for the purpose of procuring abortion. Its narcotic and sedative influence seems to be proved by three cases of poisoning from the use of rue. In these cases the rue produced the effects of an acute and violent epigastric pain, violent and continued vomiting, swelling of the tongue, salivation, colic, fever, and muscular system (manifested by tottering gait, the muscles becoming contracted), giddiness, contracted pupil, delirium, or rather reverie, some days, miscarriage. During the stupor the bowels were very small, and slow (in one case beating only every minute); there were great debility, faintness, and cold sweat. The general appearance was that of an acute palsy.
GARDEN RUE.

Rue is comparatively but little employed by the medical profession. It formerly enjoyed great celebrity as an antispasmodic, emmenagogue; a celebrity which it still retains among the Greeks. The observations above made on the effects of rue prove it is a much more active agent than is commonly supposed, and remedial powers deserve to be more carefully examined than they have hitherto been. In the flatulent colic, especially of children, it is exceedingly valuable remedy, and may be administered either by swallowing or, in infants, by the rectum, in the form of olyster. It may also be employed with benefit in some cases of infantile convulsions. It has been employed in hysteria, amenorrhoea, and epilepsy. The two first of these maladies it will probably at times prove serviceable, and in them it deserves further trials. It has likewise been used as an anthelmintic. In former times it was eaten as a condiment, and was regarded as an universal antidote to poisons. It has been employed topically as an antiseptic in gangrene and foul ulcers, and as a local stimulant, rubefacient, and disinfector, in cold affections, contusions, &c.

Administration.—Dose of the powder from 3ij. to 5ss.; but this is an eligible mode of preparation, as rue loses part of its activity on the volatilization of its essential oil, by drying. An infusion prepared by digesting an ounce of the fresh herb in Oj. of boiling water, called rue tea, is a popular remedy. It is given in doses of 1/2 to 1 ij. Rue water (aqua rute) may be prepared with the oil, as it water (see p. 1197); its dose is 1/4 to 5/4.

1. CONFECTION RUTE, L. Conserve Rute, D. Confection of Rue. Rue, dried; Caraway; Bay Berries, of each, 3ij.; Sagapenum, 5ss.; Black Pepper, 3ij.; Clarified Honey, 3xvij. Rub the dry ingredients in a very fine powder. The London College directs the honey not be added until the confection is to be used; the Dublin College, however, mixes it with the dry ingredients at once.—Carminative and antispasmodic. Employed in flatulent colic and infantile convulsions. Objectionable in inflammation of the intestinal mucous membrane. Dose, 3ij. to 5ij. Sometimes employed in the maladies of children in the form of enema, composed of gruel and a scrupule of confection.

2. OLEUM RUTE, D. E. Oil of Rue. (Obtained by submitting the herb, with water, to distillation). From 12lbs. of the leaves, dried before the plant had flowered, Lewis obtained only about 5 of oil; but the same quantity of herb, with the seeds almost yielded above 8.—It is pale yellow, has a bitterish acrid taste, a sp. gr. of 0·911. It is somewhat more soluble in water than other volatile oils. It is stimulant, antispasmodic, and emmenagogue. Used in spasmody and convulsive diseases, and in amenorrhoea.—Dose, grt. ij. to vj., rubbed down with sugar and water.

3. SYRUPUS RUTE. Syrup of Rue.—Though syrup of rue is not retained in any of the British pharmacopoeias, it is a useful prepara-

\* Mat. Med.
2. Baros'ma, Willdenow.—Various Sp.

Diosma crenata, De Cand. L.D.
Sex. Synt. Pentandria, Monogyria.
(Folis, L. D.—Leaves, E.)

History.—The natives of the Cape of Good Hope species of Barosma, on account of their odoriferous properties. The Hottentots employ a powder, leaves of various odoriferous plants (principally Buken or Boku), for anointing their bodies. Diosma crenata was introduced into the botanical gardens in 1774, but it was not employed in medicine till 1838.

Botany. Gen. Char.—Calyx five-cleft or parted, lining the bottom of the calyx generally with a showery, rim. Petals five, with short claws. Filaments opposite the petals sterile, petaloid, sessile, ciliolate at the apex; the other five longer, smooth or with the anthers usually furnished with a minute Style as long as the petals. Stigma minute, five-loculate at the apex, usually glandular and tuberculate, cleft at the apex, composed of five coeci covered with glandular dots at the base.

—Shrubs. Leaves opposite, flat, smooth, dotted, axillary.

Species.—The leaves of several species of Barosma or Buku.

1. Baros'ma crenulata, Willd.; Diosma crenulata, De Cand.; D. latifolia, Loddiges; D. serrata; Leaves ovate-oblong, crenate, smooth, glandular, with two bracts immediately under the flower (Diosma shrub), between two and three feet in height; b
Barosma.

The leaves of several species of Barosma are known in the shops as Buchu (Bucku, E.; Folha Barrosa seu Di-e). They are intermixed with stalks and fruit. They are both, somewhat shining, sharply or bluntly serrated or crenated, beset both on the edges, especially between the teeth, and on the under surface, with glands filled with essential oil. Their colour is coriaceous: their colour pale or yellowish-green; their or strong and rue-like (though some compare it to rosemary, others to mint, or cat's urine), and their taste is warm and mint-like. They exhibit considerable variety in shape. The most common are the wing:

**Ovate or obovate Buchu. Leaves of Barosma crenata, Eckl. and Zeyher.**—Leaves ovate, oval, oblong, or obovate.

**Ovate-oblong Buchu. Leaves of Barosma crenulata, Willd.**—Leaves ovate-oblong or obovate-oblong or oval-lanceolate, obtuse.

**Linear-lanceolate Buchu. Leaves of Barosma serratifolia, Willd.**—Leaves linear-lanceolate or lanceolate, acuminate.

Composition—Two analyses of buchu have been made: one, in 1801, by Brandes; the other, in the same year, by Cadet de Sicourt.

### Brandes's Analysis

<table>
<thead>
<tr>
<th>Substance</th>
<th>Percentage</th>
</tr>
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<tr>
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<tr>
<td>Gum</td>
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<tr>
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<td>3-26</td>
</tr>
<tr>
<td>Chlorophyll, etc.</td>
<td>2-97</td>
</tr>
<tr>
<td>Resin</td>
<td>1-00</td>
</tr>
<tr>
<td>Phytol, with wax and essential</td>
<td>6-00</td>
</tr>
<tr>
<td>Substances</td>
<td>1-94</td>
</tr>
<tr>
<td>Total</td>
<td>10-00</td>
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### Cadet's Analysis

<table>
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<th>Percentage</th>
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<tr>
<td>Volatile oil</td>
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</tr>
<tr>
<td>Gum</td>
<td>21-170</td>
</tr>
<tr>
<td>Extractive</td>
<td>5-170</td>
</tr>
<tr>
<td>Chlorophyll, etc.</td>
<td>1-100</td>
</tr>
<tr>
<td>Resin</td>
<td>2-151</td>
</tr>
<tr>
<td>Lignin, etc.</td>
<td>69-744</td>
</tr>
</tbody>
</table>

Leaves of Diosma crenata... 100/000

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Notes:
- Bot. Mag. t. 3473.
- Gimel, Handb. d. Chem. ii. 1238.
- Journ. de Chim. Méd. iii. 44.
Uses.—The natives of the Cape of Good Hope use buchu (which they term buchu brandy), by diluting the dregs of wine, which they employ in chronic stomach and bladder.

In this country buchu has been principally employed in astringing in the urinary-genital organs. Dr. Recce has mentioned the use of buchu by practitioners and the public in this country, and in 1823, Dr. McDowell gave a most favorable account of its good effects. It has since been employed by a number of practitioners, and its remedial powers seem to be principally adapted to chronic catarrhal conditions. In chronic inflammation of the bladder, attended with a copious discharge of urine, it frequently checks the secretion, and diminishes the pain and inflammation of the bladder, thereby enabling the patient to retain urine for a longer period; but I have several times seen it fail to give relief, and in some cases it appeared rather to add to the symptoms. In irritable conditions of the urethra, as spasm or in gleet, it has occasionally proved serviceable. In chronic genitourinary diseases, with increased secretion of uric acid, it has been of considerable benefit by Dr. Carter, and others, and has checked the formation of this acid. For the most part, it has been used in these cases in combination with alkalies (e.g., pepsin). In prostatic affections, in rheumatism, and even djembe has also been employed; and, it is said, with good results.

Administration.—The dose of buchu, in poisons, is usually taken in wine. But the infusion is excellent in eligible preparations.

4. INFUSUM BUCHU. D. Infusions. Buchu. E. L.
2. Tinctura Buchu, D. Tinctura Buchu, E. Tincture of Buchu.—

Bucchu, 5v.; Proof Spirit, Oij. Digest for seven days, pour off the

thick liquor, and filter. This tincture may be conveniently and
tightly made also by the process of percolation, E.—The proportions
ed by the Dublin College are essentially the same, and the tincture
directed to be prepared by maceration.)—Dose, f.5j. to f.3iv.

3. Galipeæa officinalis, Hancock, E.; and G. cusparia,

De Candolle, L.

Bonplandia trifoliata, Willd. D.

Sex. Syst. Diandria, Monogynia.

(Cortex, L. D.—Bark, E.)

History.—Mutis is said to have employed angostura bark in

759; but it did not come to England until 1788, and was first

pubically noticed in the London Medical Journal for 1789. Mr. A. E.

Andre 4 says, that, in 1791, 40,000 lbs. or upwards had been im-
ered. It was called Cortex Angusture, from Angostura, a place in

South America, whence the Spaniards first brought it.

Botany. Gen. Char.—Calyx short, five-toothed. Petals five, united
to a salver-shaped corolla, or closely approximating; tube short,
entagonal; lobes spreading, acute. Stamens four to seven,
ogynous, somewhat adherent to the petals, unequal, sometimes
fertile, commonly two antiperipherous, two to five shorter, sterile.
nectary cupuliform. Styles five, afterwards combined into one, and
ringing a four- or five-grooved stigma. Carpella five, or by abortion
ner, containing two ovules, obtuse, cocculiform, sessile, with a
orable endocarp. Seeds solitary by abortion; cotyledons large,
rugated, biauriculate.—Smooth shrubs. Leaves alternate, simple,
urifoliate; leaflets oblong, acuminate. Peduncles axillary, many
ered (De Cand.)

Species.—Humboldt and Bonpland 5 state that Galipea Cusparia,
Cand. yields Angostura bark; whereas Dr. Hancock 6 asserts
not it is a species which he calls Galipea officinalis. But it appears
me not improbable that both species may yield a febrifuge bark.


cusparia febrifuga, Humb. and Bonpl.—Leaves trifoliate. Ra-
mes stalked, almost terminal. Calyx five-toothed. Sterile stamens

ree (De Cand.).—A majestic forest tree, sixty or eighty feet high.

aves two feet long, gratefully fragrant; petioles one foot long, or
arily so; leaflets sessile, unequal, ovate-lanceolate, acute. Flowers
ite, with fascicles of hairs seated on glandular bodies on the
outside. Stamens monadelphous (Kunth); fertile ones, two; sterile
es, three, according to Roemer—four according to Kunth; anthers
with two short appendages. Stigmas five. Seed solitary. —Forests of
perical America. Yields Angostura bark (Humboldt and Bonpland).

2. Galipeæa officinalis, Hancock, E.—Leaves trifoliate. Racemes
aked, axillary, terminal. Stamens two. Nectaries (sterile stamens?)
ve (Hancock).—A tree, usually twelve or fifteen feet high, never
ceeding twenty feet. Leaves, when fresh, having the odour of
acco; leaflets oblong, pointed at both extremities, from six to ten
ches long, on very short stalks: petioles as long as the leaflets.

5 Pl. Rapinot, hi. 39, t. 59.
**Flowers** white, hairy. **Stamens** distinct; fertile ones, two; stamens five; **anthers** without appendages. **Stigma** simple. **Seeds** two in each capsule; one usually abortive. Neighbors of the Orinoco (Carony, Alta Gracia, &c.) Yields **Angostura Carony bark** (Hancock).

**Description.**—Angostura or Cusparia bark (cortex angosturae cuspariae) is imported directly or indirectly from South America. "The most of what I have seen," says Mr. A. E. Brande, "has been put into casks in the West Indies; but where the original plants remain it is very curious, and formed carefully of the large leaves of a species of palm, surrounded by a kind of net-work made of sticks." It occurs in flat pieces and quills, of various sizes, the longest pieces being from six to ten inches in length, covered with yellowish-grey or greyish-white spongy epidermis, easily scratched by the nail. The internal surface is brownish, not quite smooth, somewhat fibrous or splintery, easily separable into laminae, and the fracture is short and resinous; the odour strong but peculiar, somewhat animal; the taste bitter, aromatic, and slightly acid.

**Substitution.**—I have already (see p. 1292) noticed the accidents which have resulted in consequence of the bark of the nux-vomica tree being substituted, either from ignorance or commercial cupidity, for angostura bark. Hence arose the distinction into true or West India angostura, and false, spurious, or East India angostura. Though the characters of the latter have been described (see p. 1291), it may be as well to place them in comparison with those of the genuine angostura. In drawing up the following table of characteristics, I have been greatly assisted by the tables of Guibourt's and Fée's.

<table>
<thead>
<tr>
<th>Angostura Bark</th>
<th>Nux Vomica (False or Eastern Angostura) Bark</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Form</strong></td>
<td>Quills or flat pieces, straight or slightly bent.</td>
</tr>
<tr>
<td><strong>Odour</strong></td>
<td>Disagreeable.</td>
</tr>
<tr>
<td><strong>Taste</strong></td>
<td>Bitter, afterwards somewhat acid, persistent.</td>
</tr>
<tr>
<td><strong>Hardness and Density</strong></td>
<td>Bark fragile when dry, easily cut, light, tissue not very dense.</td>
</tr>
<tr>
<td><strong>Fracture</strong></td>
<td>Dull and blackish.</td>
</tr>
<tr>
<td><strong>Epidermoid crust</strong></td>
<td>Whitish or yellowish, isodipod, unchanged, or rendered slightly orange-red by nitric acid.</td>
</tr>
<tr>
<td><strong>Inner-surface</strong></td>
<td>Separable into laminae; deepened by nitric acid.</td>
</tr>
<tr>
<td><strong>Tint of Líquor</strong></td>
<td>Blue colour destroyed.</td>
</tr>
<tr>
<td><strong>Ferrocyanide of Potassium</strong></td>
<td>No change; hydrochloric acid caused a yellow precipitate.</td>
</tr>
<tr>
<td><strong>Nitric Acid</strong></td>
<td>A small quantity makes the liquor cloudy; a large quantity renders it transparent deep red.</td>
</tr>
</tbody>
</table>

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*Guibourt's and Fée's.*
ANGOSTURA BARK.

COMPOSITION.—Angostura bark has been the subject of repeated chemical investigation. Notices of the earlier attempts to analyse it are given by Meyer \(^1\) and by Pfaff \(^2\). The analyses which deserve noting are those of Pfaff \(^k\) and Fischer \(^1\).

**Pfaff's Analysis.**

<table>
<thead>
<tr>
<th>Component</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volatile oil</td>
<td>0.3%</td>
</tr>
<tr>
<td>Peculiar bitter principle</td>
<td>3.7%</td>
</tr>
<tr>
<td>Bitter hard resin</td>
<td>1.7%</td>
</tr>
<tr>
<td>Balsamic soft resin</td>
<td>1.9%</td>
</tr>
<tr>
<td>Elastic resin</td>
<td>0.2%</td>
</tr>
<tr>
<td>Gum</td>
<td>3.7%</td>
</tr>
<tr>
<td>Lignin</td>
<td>39.1%</td>
</tr>
<tr>
<td>Angostura bark</td>
<td>102.6%</td>
</tr>
</tbody>
</table>

**Fischer's Analysis.**

<table>
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<th>Quantity</th>
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<tbody>
<tr>
<td>Volatile oil</td>
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</tr>
</tbody>
</table>

1. **Volat\(\text{il}^\text{e Oil; Odor\(\text{ous Principle of Angostura.**—Obtained by submitting the bark to distillation with water. It is yellowish white, lighter than water, as the peculiar odour of the bark, and an acrid taste. To this, as well as to the resin, the bark owes its acrid, aromatic taste.**

2. **Angosturine; Cuparin, Saladin; Bitter extractive, Pfaff; Peculiar Bitter principle.**—A neutral principle obtained by Saladin \(^a\) in the form of tetrahedral crystals, by submitting the alcoholic tincture of the bark (prepared without heat) to spontaneous evaporation. When heated it fuses, loses 23–99 per cent. of its weight, and subsequently inflames, without giving any evidence of its being volatile or nitrogenous. It is insoluble in the volatile oils and in ether; but dissolves slightly in water, more so in alcohol. Alkaline solutions also dissolve it. Nitric acid renders it greenish-yellow; sulphuric acid reddish brown. Tincture of nutgalls precipitates it from its aqueous and alcoholic solutions.

3. **Resin.**—The hard resin is brown, bitter, soluble in potash, alcohol, and acetic ether; but insoluble in sulphuric ether and oil of turpentine. The soft resin is acid, greenish yellow, soluble in alcohol, ether, oil of turpentine, and almond oil; but insoluble in a solution of potash. It is coloured red by nitric acid.

**Physiological Effects.**—A powerful aromatic or stimulant tonic (see the effects of the **aromatic bitters**, p. 189). Its aromatic or stimulant properties depend on the volatile oil and resin; its tonic operation on the bitter principle. In its tonic and febrifuge powers it approximates to cinchona bark, but is devoid of astringency. It is less likely to irritate the stomach or to cause constipation than cinchona; but usually keeps the bowels gently open. In small doses it is capable of nauseating and purging. Dr. Hancock says the warm infusion causes sweating and diuresis. In its combination of tonic and aromatic properties, it is most allied to cascarilla. In its stomachic qualities it approaches calumba.

**Uses.**—Angostura bark is but little employed by practitioners of this country. We may fairly ascribe this in part to the serious consequences which have resulted from the use of the false angostura, and in part to the belief that we have other remedies of equal, if not superior, efficacy to it. In some of the continental states, its employment has been prohibited (see p. 1292). It may be administered...
as a febrifuge in intermittents and remittents, especially in the forms of the bilious remittents of tropical climates. Drs. Wm. Wilkinson, Winterbottom, and, more recently, Dr. Hancox, spoken in the highest terms of its efficacy. In some of these is said to have proved greatly superior to cinchona. It situates readily on the stomach, and does not cause constipation like the latter, but keeps the bowels gently open. In a dynamic condition of fever, especially when complicated with great disorder of the digestive organs (manifested by vomiting or purging), it has been with good effect. As an aromatic tonic and stomachic, it relaxes and muscular debility, and in atonic conditions stomach and intestinal tube (as some forms of dyspepsia, and &c.), it has been employed with great success. It has also been administered to check profuse mucous discharges. Thus in stages and chronic forms of dysentery and diarrhoea, and in bronchial affections attended with excessive secretion of mucus, angostura is applicable to any of the purposes for which vegetable tonics, (especially cascarilla, calumba, and cinchona) are commonly employed.

Administration.—It may be given in powder in doses of from x. to 5ss. But the infusion and tincture are more palatable.

1. Infusum Cuspariae, L. E. Infusum Angusturea, D. Infusorium Cuspariae. (Cusparia, bruised, 3v. [5i]. D.); Boiling [distill Water, Oj. [Oss. wine-measure, D.].] Macerate for two hours in a lightly covered vessel, and strain [through linen or calico, E.].-stomachic, and stimulant. Used in low fever, bilious diarrhea, dysenteries, muscular debility, dyspepsia, &c.—Dose, ½j. Tincture of cinnamon is an agreeable addition to it.

2. Tinctura Cuspariae, E. Tinctura Angusturea, D. Tincture of Cusparia. (Cusparia, in moderately fine powder, 3vss. [3v]. Proof Spirit, Oj. [wine-measure, D.].) Macerate for fourteen days, filter, D.—This tincture is to be made like the tincture of cinchona, and most expeditiously by the process of percolation, E.—stimulant, and stomachic. Generally employed as an adj suppative infusions.—Dose, ½j. to 3½j.

Other Medicinal Rutaceae.

The root of Dictamnus Fraxinella, or Bastard Dittany, was employed in medicine, but of late years has fallen into almost total disuse. There are two varieties of this plant: a. purpurea with purple flowers; alba with white flowers. It is a native of the South of Europe. The root contains volatile oil, resin, bitter extractive, and probably gum. It is an irritant, and is reputed to possess antispasmodic, diuretic, and emmenagogic properties. It was formerly employed in intermittents, epilepsy, hysteria, and

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* Winterbottom; also Lettsom, Mem. of the Med. Soc. of Lond. vol. iv. p. 199.
OFFICINAL GUAIAUCM.

ELerosis, and worms. The dose of it is from $\frac{1}{2}$ to $\frac{3}{4}$. Attention has been drawn to it by Dr. Aldis, who states that it has been employed, during fevers, with great success, in the cure of epilepsy, by Baron A. Slotz van Lennoborg and family. I am acquainted with one patient (a young lady) took it for six months without receiving any ultimate benefit from it.

VER LXVI.—ZYGOPHYLLACEA, Lindley.—THE BEAN CAPER TRIBE.

ZYGOPHYLLA.—R. Brown.

Initial Character.—Sepals five, distinct, or scarcely coherent at the base, each five, alternate with the sepals, inserted on the receptacle. Stamens ten, distinct, hypogynous, five opposite to the sepals, and five to the petals. Ovary single, five-celled; styles five united into one, sometimes rather distinct at the apex. Capsule of five carpels, which are more or less adnate to each other and the central axis; cells dehiscent at the superior angle, usually many-seeded, one-seeded, neither coelocarpous nor arilliferous. Seeds albuminous, or commonly exalbunmious; embryo straight; radicle superior; cotyledons foliaceous. Herbs, shrubs, or trees. Leaves with stipules at the base, usually compound in Cand.

Properties.—The Guaiacums are resinous, and possess stimulant properties.

AI'ACUM OFFICINALE, Linn. E. D.—OFFICINAL GUAIAUCM.

Sex. Syst. Decandria, Monogynia.

(Lignum. Resina. L. D.—Wood. Resin obtained by heat from the wood, E.)

History.—The Spaniards derived their knowledge of the medical of Guaiacum from the natives of St. Domingo, and introduced remedy into Europe in the early part of the sixteenth century at 1508. The first importer of it was Gonsalvo Ferrand, who, infected with the venereal disease, and not obtaining any cure in Europe, went to the West Indies, to ascertain how the natives in that part of the world treated themselves, as the disease was common with them as small-pox with Europeans. Having obtained that Guaiacum was employed, he returned to Spain, and encased practitioner himself. "I suppose," says Freind, "he made a monopoly of it; for it appears that some time after sold for seven gold crowns a pound."

Staty. Gen. Char. — Calyx five-partite, obtuse. Petals five, ferns ten; filaments naked, or somewhat appendiculate. Style stigma one. Capsule somewhat stalked, five-celled, five-angled, abortion two- or three-celled. Seeds solitary in the cells, angular, endous; albumen cartilaginous, with small seeds; cotyledons somewhat thick. —Trees with a hard wood. Leaves pinnate. Peduncles axillary, one-flowered (De Cand.)

Char.—Leaves bijugate: leaflets obovate or oval, obtuse (De d.)

A tree rising thirty or forty feet high. Stem commonly bark furrowed; wood very hard and heavy. Leaves five. Flowers six to ten in the axillae of the upper leaves. Pedicel inch and a half long, unifloral. Sepals five, oval. Petals long or somewhat wedge-shaped, pale blue. Stamens shorter than the petals. Ovary compressed, two-celled; stigma pointed. Capsule obovate, coriaceous, yellow.

Hab.—St. Domingo and Jamaica.

Description and Composition.—In this country the wood is the resin only are officinal; but on the continent the bark is used. They are imported from St. Domingo.

1. Guaiacum Wood (Lignum Guaiaci). This is commonly called lignum vitae. It is imported in large logs or billets, and is extensively used for making pestles, rulers, skittle-balls, and various articles of turnery ware. On examining the transverse sections of the stems, hardly any traces of medulla or pith are observable, for the annual or concentric layers or zones are extremely indistinct. This wood is remarkable, says Dr. Lindley*, for the direction of each layer of which crosses the preceding diagonally; a circumstance first pointed out to me by Professor Voigt. This fact was noticed by Brown† above fifty years ago. The distinction between the young and the old wood is marked. The young wood (called alburnum or sapwood) is of a pale yellow colour; the old wood (called duramen or heartwood) which forms the principal part of the stem is of a greenish brown colour, the consequence of the deposition of resinous matter, first in the pith subsequently in all parts of the tissue. By boiling a thin slice of the wood in nitric acid, the whole of the deposited matter is destroyed, and the tissue restored to its original colourless character.

Shavings, turnings, or rasplings of guaiacum (lignum guaiaci seu rasum; rasura vel scobs guaiaci) are prepared by the use of druggists and apothecaries. They are distinguished from the rasplings of other woods by nitric acid, which commonly gives them a temporary bluish-green colour. A decoction of the rasplings is yellowish, and does not change colour in the air, and very slightly by nitric acid, though after some time it becomes turbid. A solution of emetic tartar nor the tincture of nutgalls causes it to coagulate. The ferruginous salts deepen its colour.

Trommsdorff‡ analysed the wood, and found it to contain 26.0, bitter, piquant extractive 0.8, mucous extractive with a salt of lime 2.8, colouring matter (?) similar to that of the tapping and woody fibre 69.4.

Guaiacum Bark (Cortex Guaiaci) is gray, compact, very hard, heavy. Its internal surface sometimes presents numerous, small, brilliantly crystalline points, which Guibourt supposes to be benzoic acid.

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† Nat. Hist. of Junc. p. 226  
OFFICINAL GUAIAUCM.

1655

dissolved this bark, and found it to consist of the following substances:—

— resin different from that of the wood 2:3, peculiar, bitter, piquant extractible by acid 48, gum 0:8, brownish yellow colouring matter 4:1, mucous with sulphate of lime 12:0, and lignin 76:0.

Guaiaucm Resin (Resina Guaiaci).—This is commonly, though erroneously, denominated gum guaiacum. It is obtained from the tree by the following methods:

natural exudation.—It exudes naturally from the stem, and is seen on it at all seasons of the year.  

β. By jagging.—If the wound is made in different parts, a copious exudation takes place from the wounds, which hardens by exposure to the sun. This operation is performed in May.  

g. By heat.—Another method of obtaining the following:—The trunk and larger limbs being sawn into lengths of about three feet long, an auger hole is bored lengthwise, and one end of the billet so placed on a fire that a cａｌａｙ receive the melted resin which runs through the hole as the resin b.  

δ. By boiling.—It is also obtained in small quantities from chips or sawings of the wood in water with common salt. It swims at the top, and may be skimmed off. The salt is raised at the boiling point of the water.

Guaiaucm occurs in tears and in masses. Guaiaucm in tears (Guaiaucm in lacrymis) occurs in rounded or oval tears, of varying size being larger than a walnut. Externally they are covered with brownish dust. They are said to be produced by Guaiaucm sanc-

Lump Guaiaucm (Guaiaucm in massis) is the ordinary kind in the shops. These masses are of considerable size, and nearly mixed with pieces of bark, wood, and other impurities: a brownish or greenish brown colour, and have a bril-

lance, resinous fracture. Thin laminae are nearly transparent, and a yellowish green colour. The odour is balsamic, but very strong becoming more sensible by pulverization. When guaiacum softens under the teeth, but has scarcely any taste, it leaves a burning sensation in the throat. Its specific gra-

-2899. When heated guaiacum melts and evolves a fragrant odour. The products of the destructive distillation of guaiacum have a strong smell both by Mr. Brande and Unverdorben. Among the substances obtained by the latter are two empyreumatic oils of n (one volatile, the other fixed,) and pyro-guaiiac acid.

The characters of guaiacum resin, according to the Edinburgh Pharmacopoeia (1741):—"Fresh fracture red, slowly passing to green: the tincture slowly dyed blue colour on the inner surface of a thin paring of a raw potato." Mr. Brande e analysed guaiacum. In 1806 it was exa-

by Bucholz,  and in 1828 by Buchner. Dr. Ure h has made an analysis of it.

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1 Ibid. vii. 429.  
3 Wright, Med. Plants of Jamaica.  
4 Wright, op. supra cit.  
5 Jour. de Pharm. xx. 320.  
6 Phil. Trans. for 1860, p. 89.  
7 Quoted by Schwartz, Pharm. Tubell 293, 2nd Aug.  
9 Diet. of Chem.
1. Guaiacic Acid; Guaiacum. — Is insoluble in water, but is readily soluble in alcohol, and is precipitated from its alcoholic solution by water, sodium nitrate, and chlorine. Ether dissolves the resin, but not so readily as alcohol. Solutions of the caustic alkalies (potash and soda) dissolve the alkaline guaiacetes (guaiacum soaps; sapones guaiacini). The mineral precipitate it from its alkaline solution. Various salts (as acetate of barium, acetate of lead, nitrate of silver, and chloride of gold) precipitate (guaiacetes) with the alkaline solution. Guaiacic acid is remarkable for its change of colour if it undergoes the influence of various agents. Powdered guaiacum, with its tincture, becomes green in air; gas, but not in carbonic acid gas. This change, which seems connected with the absorption of oxygen, is influenced by the intensity and duration of the exposure; and the colour is intensified by the addition of nitric acid and chlorin. Various substances give a blue tint to guaiacum when in contact with starch, but not with gluten. Hence powdered guaiacum has been proposed as a substitute for the identification of wheaten flour (which contains gluten), and of adulterated starch. Gum arabic, dissolved in cold water, has the same effect as tragacanth gum has not. Milk, and various fresh roots and under these, those of the horseradish, potato, carrot, colchicum, &c., possess this property. Certain agents change the colour of guaiacum green, blue, and brown: thus, nitric acid and chlorin. Nitric acid moistened with the tincture of guaiacum green, then blue, and afterwards brown, paper moistened with the tincture exposed to the fumes of the acid is immediately changed to blue. Spirit of nitric ether usually gives the brownest tincture of guaiacum (see p. 384). Mr. Brande has conjectured that hydrogen peroxide, that these different-coloured compounds of oxygen with guaiacum,—the green compound containing the most oxygen, the blue is intermediate. Mr. Johnston has shown that the tincture of guaiacum with hydrocyanic acid produces an intensely blue colour (see p. 436).

2. Extractive. — This is obtained from guaiacum by the agency of alcohol. The quantity obtained is liable to variation. It is a brown acid substance.

These observations, then, show that guaiacum is essentially resin, mechanically mixed with variable but small quantities of extractive and other impurities.

Adulteration. — Various adulterations are described as being practised on guaiacum. Though I have found this substance in this country of unequal degrees of impurity, I had reason to suspect that sophistication had been practised on the presence of turpentine resin might be detected by the peculiar smell evolved when the suspected resin is heated. Another method of detecting this fraud is to add water to the alcoholic solution of suspected guaiacum, and to the milky liquid thus formed add a small quantity of a caustic potash; the liquor becomes clear; an excess of potash causes no precipitate, no resin is precipitated.
The guaiacate of potash is soluble in water, the salt produced by the action of potash and resin is not completely so.

Physiological Effects. 1. Of the Resin.—Guaiacum resin is an acid stimulant. Its acridity depends in a great measure on the extract with which the resin is mixed, or which resides in the fragments of bark contained in the resin.

Under the use of small and repeated doses of guaiacum, various constitutional diseases sometimes gradually subside, and a healthy condition of system is brought about with no other sensible effect of a remedy than perhaps the production of some dyspeptic symptoms, of a slight tendency to increased secretion. We designate this immoderate, though not less certain, influence over the system, by the name of alterative.

When we give guaiacum in moderately large doses, or to plethoric or febrile-exciters, we observe the combined operation of an acid and stimulant. The local symptoms are, the dryness of the mouth, the sensation of heat at the stomach, nausea, loss of appetite, a relaxed condition of bowels. The stimulant operation is obviated partly in the vascular system, but principally in the exhalation of the secreting organs, especially the skin and kidneys. Dr. Cullen observes that it seems to stimulate the exhalations more in proportion than it does the heart and great arteries. If diluents be added, and the skin kept warm, guaiacum acts as a powerful sudorific; whereas, when the surface is kept cool, perspiration is checked, diuresis promoted. By continued use it has caused a mild salivation.

The stimulant influence of guaiacum is extended to the pelvic vesicles, and thus the hemorrhoidal and menstrual discharges are somewhat promoted by it. But there is no reason for supposing that the hemorrhoidal organs are specifically affected by it. In very large doses guaiacum causes heat and burning in the throat and stomach, vomiting, purging, pyrexia, and headache.

In its operation on the system guaiacum is allied to the balsams (p. 183). Dr. Cullen considered its resinous part to be very analgesic to the balsams and turpentine.

2. Of the Wood.—The operation of the wood is similar to, though weaker than, that of the resin. Any activity which the wood communicates to boiling water must depend on the extractive, as the resin is soluble in this fluid.

Earl, says, that the decoction excites a sensation of warmth in the stomach, produces dryness of the mouth, with thirst, increases the natural temperature of the skin, renders the pulse more frequent, and if the patient lie in bed and take the decoction warm, it proves ferately sudorific; but if he be exposed freely to the air, it acts as an astringent. Continued use occasions heartburn, flatulence, and constipation. Krause mentions a measles-like eruption over the whole body, as being produced by large doses of the wood.
3. Of the Bark.—The bark acts in a similar way to the wood. Nandot injected, at eight in the morning, three ounces of an infusion of it into the veins of a young man of twenty years of age. In half an hour a shivering fit came on, with colicky pains, lasting by two stools; this shivering remained till five o'clock in the evening.

Uses.—In the employment of guaiacum the acrid and stimulating properties of this resin are to be remembered. The first unit is used in cases of impaired digestion, where there is irritation of the stomach, or inflammatory tendency in the alimentary canal. The second renders it improper in plethoric individuals, in cases of excitement or acute inflammation, and in persons whose nervous system is easily excited, and who are disposed to hemorrhage. It is admissible and useful, on the other hand, in atonic or chronic cases of disease, with retained secretions, especially in relaxed and atonic constitutions.

The following are some of the diseases in which it has been employed:

1. In chronic rheumatism, especially when occurring in cold subjects, or in persons affected with venereal disease, guaiacum may be administered with considerable advantage under the conditions before mentioned. In cases of great debility, with coldness of the skin and in old persons, the ammoniated tincture may be employed.

2. In gout.—As a preventive of gout it was introduced by Emerigon, of Martinico. His remedy (the specificum antipo-roculinum Emerigoni, as our German brethren term it) consisted of two spoonfuls of guaiacum digested for eight days in three pints warm water. The dose was a tablespoonful, taken every morning fast. It was prescribed for twelve months. Its stimulant qualities render it inadmissible during the paroxysm of gout; and with regard to its use in the interval, it is not only admissible but necessary, as the disease is always present in a latent state. It is not to be used without some regularity of exercise and diet.

3. In chronic skin diseases, where sudorifics and stimulants are indicated, guaiacum may be serviceable, especially in scrofulous and syphilitic subjects.

4. In obstructed and painful menstruation not arising from plethoric, inflammatory, or congested state of the system, the tincture of guaiacum has been employed with advantage. Dewees states he has long been in the habit of employing guaiacum for painful menstruation with good effect. Drs. Macleod and Wm. Telford have borne testimony to its emmenagogue qualities.

5. As a remedy for venereal diseases, guaiacum wood has long been in the greatest repute. Nicholas Poll tells us, that within a few years from the time of its introduction into Europe, more than a thousand persons had derived permanent benefit from its use. Experience, however, has taught us the true value of this remedy; we now know that it has no specific powers of curing or allaying syphilis. It is applicable, as an alterative and sudorific

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* Wibmer, *Wirh. d. Auff. 6.* (Bd. ii. S. 411.)
* Treat. of the Diseases of Women, p. 81, 3rd ed. 1823.
* Quoted by Vevers, op. surg. cit.
of secondary symptoms, especially venereal rheumatism and
eous eruptions, more particularly of scrofulous subjects. Mr.
son found it serviceable after the patient had been subjected to a
rual course. Under its use, thickening of the ligaments or
osseum subsided, and foul indolent sores healed. During its
estion the patient should adhere to a sudorific regimen.
. In scrofula, especially that form called cutaneous, guaiacum is
ed with occasional advantage.
. In chronic pulmonary catarrh, especially of gouty subjects, it has
been used.

ATION.—The powder of guaiacum resin may be given
oses of from grs. x. to 5ss. It may be administered in the form
ill, bolus, or mixture (see Mistura Guaiaci). The resin is a con-
ent of the pilule hydrargyri chloridi composite, Ph. L., com-
ly termed Plummer’s Pills (see p. 745), and of the pulvis aloes
positus (see p. 977). The resin is also given in the form of
thic and ammoniated tincture. The wood is exhibited in deco-
only. It is a constituent of the decoctum sarcae compositum, L.
001).

MISTURA GUAIAČI, L. E. Guaiacum Mixture.—(Guaiacum, 3ijj; 
, 3ss.; Mucilage of Gum Arabic, f3ss.; Cinnamon Water, f5xix.
xixs. E.] Rub the Guaiacum with Sugar, then with the Muc-
, and to these, while rubbing, add gradually the Cinnamon
er.)—Dose, f3ss. to f3ijj. twice or thrice a-day.

TINCTURA GUAIAČI, L. E. D. Tincture of Guaiacum.—(Guai-
in coarse powder, 3vij. [3iv. D.]; Rectified Spirit, Oij. [wine-
sure, D.]) Digest for fourteen [seven E. D.] days, and then
.—Stimulant, sudorific, and laxative. Dose, f3j. to f5iv. As
decomposed by water, it should be administered in mucilage,
tened water, or milk, to hold the precipitated resin in suspen-

TINCTURA GUAIAČI COMPOSITA, L. Compound Tincture of
iacum; Tinctura Guaiaci Ammoniata E. D.; Volatile Tincture of
iacum.—(Guaiacum, in coarse powder, 3vij. [3iv. D.]; Aromatic
it of Ammonia, Oij. [lb.iss. D., Spirit of Ammonia Oij. E.]) Digest
fourteen [seven, E. D.] days [in a well-closed vessel, E.], and
lter.)—A powerfully stimulating sudorific and emmenagogue.
ose, f3ss. to f3ijj. May be taken as the preceding.

DECOCTUM GUAIAČI, E. D. Decoction of Guaiacum.—(Guaiacum
ings, 3ijj.; [Raisins, 3ij. E.]; Sassafras, rasped, 3j. [3x. D.];
orice Root, bruised, 3j. [3ijss. D.]; Water, Ovij. [Ox. wine-
sure, D.]) Boil the Guaiacum [and Raisins, E.] with the Water,
y down to Ov., adding the Liquorice and Sassafras towards the
ain the decoction.)—This is the old Decoction of the
. The resin of guaiacum being insoluble in water, the extrac-
done dissolves in this menstruum. The sassafras can confer but
activity to the preparation. Taken in doses of f3iv., four times
, and continued with a sudorific regimen, it acts on the skin, and
cells, and from five to ten valves. Seeds few, fixed to the a fleshy integument, which curls back at the maturity of the seeds with elasticity. Albumen between cartilaginous the length of the allumen, with a long radicle pointing to aceous cotyledons.—Herbaceous plants, undershrubs, or in compound, sometimes simple by abortion, very seldom o whorled (Lindley).

Properties.—Acidulous and refrigerant.

OXY' LIS A CETOSELLA, Linn. L.—COMMON V

Sex. Syst. Decandra, Pentagyna.

History.—Mr. Bichenoy declares this to be a rock.

Botany. Gen. Char.—Sepals five, free or united a five. Stamens ten; filaments slightly monadelphic five external alternate ones shorter. Styles five, apex or capitate. Capsule pentagonal, oblong, (Cand.)—Perennial herb. Leaves never abruptly }

Sp. Char.—Leaves all radical, ternate; leaflets shaped, hairy. Scapes single-flowered. Root [rhizome An elegant little plant. Leaflets delicate brigh plish at the back, drooping at night. Footstalks Bract two, scaly. Flowers drooping, white, with Habit.—Indigenous; woody and shady places. 

Description.—Woodsorrel (herba acetosella) taste is agreeably acidulous.

Composition.—I am unacquainted with any ana Its expressed juice yields by evaporation biso.
COMMON GRAPE-VINE.

OXALATE OF POTASH; SALT OF WOODSORREL.—In Switzerland and some parts ofardy this salt is obtained on the large scale from wood sorrel, by evaporating expressed juice, redissolving the residue, and crystallizing. 500 parts of the salt yield four parts of the crystallized salt. It crystallizes in white rhombic

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<td>Potash</td>
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</tr>
<tr>
<td>Water</td>
<td>2</td>
<td>18</td>
</tr>
</tbody>
</table>

Crystallized binoxalate potash........ 1........ 138

In commerce the quadroxalate of potash is substituted for it (see p. 344).

PHYSIOLOGICAL EFFECTS AND USES.—Woodsorrel is refrigerant.

When as a salad, it is considered a good antiscorbutic. Infused in Ik to form whey, or in water, it furnishes a grateful drink in fevers.

Solution of the binoxalate of potash has been employed as a substitute for lemonade.

ORDER LXVIII.—VITACEÆ, Lindley.—THE VINE TRIBE.

AMPELIDÆ, Kunth, De Candolle.

SENTIAL CHARACTER.—Calyx small, nearly entire at the edge. Petals four or five, inserted on the outside of the disk surrounding the ovary; in revivification turned inwards at the edge, in a valvate manner, and often inflected at the point. Stamens equal in number to the petals, and opposite them, inserted upon the disk, sometimes sterile by abortion; filaments distinct, or slightly cornering at the base; anthers ovate, versatile. Ovary superior, two-celled; style one, very short; stigma simple; ovules erect, definite. Berry round, often by abortion one-celled, pulpy. Seeds four or five, or fewer by abortion, bony, erect; albumen hard; embryo erect, about one-half the length of the albumen; radicle taper; cotyledons lanceolate, plano-convex.—Scrambling, climbing shrubs, with tumid separable joints. Leaves with stipules at the base, the lower opposite, the upper alternate, simple or compound. Peuduncles racemose, sometimes by abortion changing to tendrils often opposite the leaves. Flowers small, green (Lindley).

PROPERTIES.—Acid leaves, and a fruit like that of the common grape, is the usual character of the order (Lindley).

VI'TIS VINÆ'ERA, Linn. L. E. D.—COMMON GRAPE-VINE.

Sex. Syt. Pentandria, Monogynia.

(Bacca exsiccata dempti acinis, L.—Dried fruit, E.—Fructus siccatus, D.)

HISTORY.—The grape-vine has been known and cultivated from the most remote periods of antiquity. The Sacred Historian tells us; that Noah, planted a vineyard and made wine. This was more than 2000 years before Christ. Among the most ancient of the prose writers, Homer, Hippocrates, and Herodotus, may be referred to speaking of the vine.

1 Gen. ix. 20.
2 Od. vii. 131, and xxiv. 342.
3 Enterpe, lxxvii.
BOTANY. Gen. Char. — (1) somewhat five-toothed.
(2) five, cohering at the point, at the base, and detached, and often abortive (De Cand.)
Stamen Style none. Berry two or four-seeded; the cells of the berry
Sp. Char. — Leaves lobed, toothed, smooth or pubescent (De Cand.)
A hardy, exceedingly shrub. Leaves more or less smooth, pubescent or downy, or crisp, pale or intense
[Stem opposite to each leaf stalk, solitary, spiral.] prostrate, climbing or erect or hard. Racemes loose, paniculate, ovate or cylindrical, red, pale, or white, with fleshy, globose, ovate or sweet, musky or auster, variable in number, or solitary
the whole of them abortive (De Cand.) — No less than 10 varieties are cultivated at the Luxembourg gardens.
DESCRIPTION.—Grapes (Uve), considered with respect to shape and colour, may be thus arranged:—

1. Round, dark-red, purple, or black grapes.—The most remarkable of this division is the black Corinthian grape, which, when dried, is called currant of the grocer.

2. Oval, dark-red, purple, or black grapes.—To this division belongs the black Hamburgh grape.

3. Round and white grapes.

4. Oval and white grapes. — The Portugal grape comes under this division. It is imported, packed in sawdust and contained in earthen jars, from Portugal and Spain. The berries are large, fleshy, sweet, and slightly acid, and keep a long time after they have ripened. In 1822, the ad volorem per cent, on these grapes produced £1720. The white Cynickon is remarkable for its elongated elliptical berry.

5. Red, rose-coloured, grayish, or striped grapes.

Various parts of the vine, some of which were formerly in medicine, are distinguished by peculiar names; thus, are termed pampini; the cirrhii or tendrils, capreoli; the shoots, palmætes; the juice or sap, lachryma; and the juice of grapes, omphacium, or commonly agresta. The twigs or rachises of the vine are used for flavouring vinegar (see p. 389).
COMPPOSITION.—The juice of unripe and ripe grapes
Juice of the Unripe Grape.

<table>
<thead>
<tr>
<th>Content</th>
<th>Geiger</th>
</tr>
</thead>
</table>

Juice of the Ripe Grape.

<table>
<thead>
<tr>
<th>Content</th>
<th>Proust</th>
<th>Bérard</th>
</tr>
</thead>
</table>

Grape Sugar.—This is one variety of the granular or crumbling sugars (crucers) of the Germans. It agrees with common sugar in its most properties (see p. 898), but is less soluble in water and in alcohol than, and does not sweeten so effectually. From its boiling alcoholic solutions deposited on cooling, in the form of an irregularly crystalline mass. It, according to Sausseur, of carbon 36:71, hydrogen 6:78, and oxygen 56:51; 7° O°.

Tartaric of Potash.—The impure bitartrate of potash, called crude tartar, which is deposited during the fermentation of grape wine, and the purified, have been already described (see p. 524).

DRIED GRAPES OR RAISINS.—Grapes, when properly dried, are called Raisins (Uva passa). Of these there are two principal

RAISINS COMMONLY SO CALLED (Uva passa majores; Passula majors). In a finest kinds of raisins (viz. the Muscatels and the Bloomas) are sun-dried the Lexias (so called from the liquor in which they are immersed) in a mixture of water, ashes, and oil, and afterwards sun-dried. By the juice exudes and candies on the fruit. Dillon states that the ed raisins have their stalk half cut through while the bunch remains on the tree. The raisins of Valencia are prepared by steeping them in boiling water to which a dye of vine stems has been added. Some raisins are said to be by the heat of an oven. Raisins are imported in casks, barrels, boxes, packs. The best come in jars and quarter boxes weighing twenty-five lbs. Varieties known in the market are distinguished partly from their place of origin, as Valencias and Smyrnas; partly from the variety of grape from which they are prepared, as Sultanas, Bloomas, and Muscatels; and partly from the method of curing them, as Raisins of Sun. Muscatels are the finest. Sultanas are useless. The raisins of Malaga are of three kinds: 1st Muscatels; 2nd Bloom Raisins (obtained from a long grape called Uva larga); and the Raisins of Corinth.

CORINTHIAN RAISINS OR CURRANKS (Uva passa mineores; Passula mineores; Uva Corinthicae). These are obtained from a remarkably small variety of grape called the Black Corinth. They were formerly produced at Corinth (whence

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Fu, Handb. d. Chem. ii. 1253.
3. through Spain, p. 376.
5. by's Journal of a recent Visit to the principal Vineyards of Spain and France, p. 41. Lond.
they received their name), but are now grown in Zante, Cephalonia, At Zante they are gathered in August, disposed in couches on the ground, and laid up in magazines (called seraglions), where they remain so firmly as to require digging out. They require eight, ten, or six for drying. For exportation they are stored in barrels.

Physiological Effects.—Fresh grapes, when ripe, a some, nutritious, refrigerant, and, when taken freely, dilative. The skin and the seeds are indigestible, and are rejected. "I think we may assert," says Dr. Cullen, "that which contain a large quantity of sugar are, if taken with the husks, the safest and most nutritive of summer fruits." Freshly made, more nutritive, and less refrigerant; for they are in sugar, and less in acid, than the fresh grape; but, if freely, they are apt to disorder the digestive organs, and cause colic. They possess demulcent and emollient qualities.

Uses.—Both grapes and raisins are employed as a dessert. They are apt to disagree with dyspeptics and Raisins are also used in various articles of pastry. Considerably, fresh grapes prove valuable in febrile and inflammatory states. They allay thirst, and diminish febrile heat. They have been found serviceable in dysentery and in phthisical conditions. "The subjects of pulmonary affections, who pass the summer in Switzerland," observes Sir J. Clark, "may try the effects of grapes, Cure de Raisins, a remedy in high estimation in parts of the continent."

Raisins are employed in medicine principally as a flavoring. They enter into several officinal preparations (as Decoction compositum, p. 908; Decoctum Quassia, p. 1659; Tincturam composita, p. 1032; Tinctura Sennae composita, p. 1; Tinctura Quassie composita, p. 1641), the flavor of which is said to be the best, though they contribute nothing to the efficacy of the drug.

1. POTASSIUM BITARTRAS. See p. 524.
2. ACIDUM TARTARICUM. See p. 409.
3. TROCHISCI ACIDI TARTARICI, E.; Acidulated Lemon. Acidulated Drops.—(Tartaric Acid, 3ij.; Pure Sugar, xviiij. Oil Lemons, max. Pulverize the sugar and acid, add them thoroughly, and with mucilage beat them into a proper mass, and when ready, take off and cool.)—Employed for coughs and sore-throat.

4. VINUM; Wine.—The necessarily confined limits of time and the great extent to which the preceding subjects have occupied me to devote a much smaller space to the consideration than its interest and importance otherwise demand.

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5. Holland, Travels in the Ionian Isles, p. 21; and Williams, Travels in Italy, &c. vol. 1. Med. i. 233.
8. The Influence of Climate, p. 256. 3d ed. 1841.
In the British pharmacopoeias the only official wine directed to be used is Sherry (Vinum Xericum, L.; Vinum album; Sherry, E.; Vino album Hispanum, D.) For medicinal purposes, however, other wines are also used; so that it is necessary to take a general view of the properties of wines.

The manufacture of wine deserves a passing notice. Grape juice does not ferment in the grape itself. This is owing, not, as Fabroni suggests, to the gluten being contained in distinct cells to those in which the saccharine juice is lodged, but to the exclusion of atmospheric oxygen, the contact of which, Gay-Lussac has shown, is necessary to effect some change in the gluten, whereby it is enabled to set up the process of fermentation. The expressed juice of the grape, called must (mustum), whose composition has been already described (see p. 1663), readily undergoes the vinous fermentation when subjected to a temperature of between 60° and 80° F. It becomes thick, muddy, and warm, and evolves carbonic acid gas. After a few days this process ceases, the thick part subsides, the liquid becomes clear, and is then found to have lost its sweet taste, and to have become vinous. I have already explained the theory of the process (p. 345; also, for some remarks respecting yeast, p. 904). The wine is now drawn off into casks, where it undergoes further changes. It is then racked off into other casks, where it is subjected to sulphuring (i.e. exposed to sulphurous acid, either baking sulphur matches in the cask or by the addition of wine pregnant with this acid), to render the glutinous matter incapable of exciting fermentation. After this, the wine is usually clarified, fined (i.e. deprived of those matters which render the wine turbid, I dispose it to undergo deteriorating changes). Isinglass or white egg (i.e. gelatine or albumen) is commonly employed for this purpose. The first forms with the tannic acid—the second with the ethanol, reticulated coagula, which envelop and carry down the solid particles that endanger the safety of the wine. The peculiar qualities of the different kinds of wine depend on several circumstances; such as the variety and place of growth of the vine from which the wine is prepared, the time of year when the must is collected, the preparation of the grapes previously to their being trodden and pressed, and the various manipulations and processes adopted in their fermentation.

The wines of different countries are distinguished in commerce by various names. The following is a list of the wines most commonly met with, arranged according to the countries producing them:

1. French Wines.—Champagne (of which we have the still, sparkling, or sherry sparkling, the full frothing, the white—and the pink); Burgundy (red and white); Hermitage; Côtes Rôties; Rousillon; Frontignac; Clairet (the most

De l'Art de faire le Vin. Paris, 1801.

dixi de Chim., xxvi. 245.

For further details consult Fabroni, De l'Art de faire le Vin, traduit de l'Italien par F. R. Mascart, Paris, 1801; Chaptal, L'Art de faire le Vin, 2e éd. Paris, 1819; and Duret de Chazettes, Remarks on the Art of Making Wine, 1816; and Busby's Journal were quoted.
esteemed being the produce of Lafitte, Latour, Château Margaux, and Haut-Brion; Vin de Grave; Sauterne; and Barsac.
2. SPANISH WINES.—Sherry (Xeres); Tent (Rota); Moutainia (Malaga); Beniarclo (Alcarent).
3. PORTUGAL WINES.—Port, red and white (Oporto); Bucelas, Lisbon, Colares, and Colares (Lisbon). An inferior description of red Port Wine is shipped at Figueria and Aveiro.
4. GERMAN WINES.—Rhine and Moselle Wines. The term Hock (a corruption of Hochheimer) is usually applied to the first growths of the Rhine. The term Rhénish commonly indicates an inferior Rhine wine.
5. HUNGARIAN WINES.—Tokay.
6. ITALIAN AND SICILIAN WINES.—Lachryma Christi; Marsala; Siracusa; Marsa.
7. GRECIAN AND IONIAN WINES.—Candian and Cyprus wines.
9. WINES OF THE CAPE OF GOOD HOPE.—Cape Madeira, Pernac, Constantia. Red and white (a sweet, luscious wine, much esteemed).
10. PERSIAN WINES.—Shiraz.
11. ENGLISH WINES.—Grape, Raisin, Currant, Gooseberry, &c.

Wines are also designated, according to their colour, red or white; according to their taste and other properties, sweet, acidulous, dry, strong or generous, light, rough, sparkling, &c.

The constituents of wine are, according to Gmelin**, as follows:—
Alcohol, an odorous principle (volatile oil?), blue colouring matter of the husk (in red wine), tannin, bitter extractive, sugar (especially in sweet wines), gum, yeast, acetic acid (from the commencement of the acetic fermentation), malic acid, tartaric acid, bitartrate of potash, bitartrate of lime, sulphates and chlorides, phosphate of lime, carbolic acid (especially in the effervescent wines), and water. To these may be added paratartraric or racemic acid.

1. BOUQUET OF WINE: Odoriferous Principle of Wine.—Every wine has a peculiar odour, which depends, doubtless, on a small quantity of volatile oil. The oil obtained from corn and potatoe spirit has been already noticed (see p. 349). Lichlg and Pelouze* have examined the oily liquid procured in the distillation of wine as well as by submitting wine lees to distillation, and found it to be ananthic ether (C18 H38 O4) mixed with ananthic acid (C14 H18 O4). From 22,000 lbs. (about 2600 imperial gallons) only two lbs. and one-fifth of oily liquid were procured.

2. ALCOHOL.—Mr. Brande* has shewn that alcohol exists ready formed in wine. He also ascertained the quantity of this substance which exists in different wines. The latter point has also been examined by several other chemists as Geiger, Julia-Fontenelle, Prout, and Ziez, and more recently by Dr. Chiswkeon. Buris‡ has ascertained the alcoholic strength of the wines of the France-Orientales. Wines which contain a comparatively small quantity of spirit are denominated light wines; while those which have a much larger quantity are denominated strong or generous wines.

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* Handb. d. Chem. ii. 1255.
* Phil. Trans. for 1811, p. 337; for 1813, p. 82.
** Gmelin, Handb. d. Chem. ii. 1236.
* Journ. de Chim. Méd. iii. 332.
† Henderson, op. cit. p. 363.
‡ Leblanc's Journal.
* For further details respecting wines the reader is referred to the works of Barry and Henderson already quoted, and to The Topography of all the known Vineyards, eng. Transl. 1831; Reclus, History of Modern Wines, 1833; and Bulloz's Visit to the Vineyards of Spain and France, 1836.
Table of the proportion of Alcohol (sp. gr. 0·835 at 60° F.), by measure, contained in 100 parts of Wine.

<table>
<thead>
<tr>
<th>Brande.</th>
<th>Others.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lisa...</td>
<td>A. 25·41</td>
</tr>
<tr>
<td>Raisin</td>
<td>A. 25·12</td>
</tr>
<tr>
<td>Marsala</td>
<td>A. 35·09</td>
</tr>
<tr>
<td>Port...</td>
<td>A. 22·36</td>
</tr>
<tr>
<td>Madeira</td>
<td>A. 22·27</td>
</tr>
<tr>
<td>Sherry...</td>
<td>A. 20·35</td>
</tr>
<tr>
<td>Teneriffe</td>
<td>A. 19·17</td>
</tr>
<tr>
<td>Colores...</td>
<td>A. 19·79</td>
</tr>
<tr>
<td>Lachryma Christi</td>
<td>A. 19·90</td>
</tr>
<tr>
<td>Constantia, white</td>
<td>A. 19·75</td>
</tr>
<tr>
<td>Constantia, red</td>
<td>A. 18·92</td>
</tr>
<tr>
<td>Lisbon</td>
<td>A. 18·94</td>
</tr>
<tr>
<td>Malaga</td>
<td>A. 18·94</td>
</tr>
<tr>
<td>Biscaya</td>
<td>A. 18·49</td>
</tr>
<tr>
<td>Red Madeira</td>
<td>A. 30·35</td>
</tr>
<tr>
<td>Cape Mouchet</td>
<td>A. 20·25</td>
</tr>
<tr>
<td>Cape Madeira</td>
<td>A. 20·51</td>
</tr>
<tr>
<td>Grape Wine</td>
<td>A. 18·11</td>
</tr>
<tr>
<td>Calvendra</td>
<td>A. 18·65</td>
</tr>
<tr>
<td>Vidonia</td>
<td>A. 19·25</td>
</tr>
<tr>
<td>Alba Flora</td>
<td>A. 17·26</td>
</tr>
<tr>
<td>Malaga</td>
<td>A. 17·36</td>
</tr>
</tbody>
</table>

24. White Hermitage... | A. 17·43 |
25. Roussillon... | A. 18·13 |
26. Clar... | A. 15·10 |
27. Zante... | A. 17·05 |
28. Malmsey-Madeira... | A. 15·40 |
29. Louei... | A. 15·22 |
30. Sheraax... | A. 15·23 |
31. Syracuse... | A. 15·28 |
32. Sauerte... | A. 14·22 |
33. Burgundy | A. 14·57 |
34. Hock... | A. 12·08 |
35. Nice... | A. 14·63 |
36. Barsac... | A. 13·91 |
37. Tent... | A. 13·40 |
38. Champagne... | A. 12·61 |
39. Red Hermitage... | A. 12·37 |
40. Vin de Grave... | A. 13·94 |
41. Frontignac (Rivesaltes) | A. 12·79 |
42. Côte Rôtie... | A. 12·92 |
43. Gooreberry | A. 11·94 |
44. Orange | A. 11·19 |
45. Tokay... | A. 9·58 |
46. Elder... | A. 8·79 |

* A. means average, F. Fontenelle, P. Frout.

According to the more recent experiments of Dr. Christison, the quantity of alcohol in wines has been somewhat overrated. The following are his results:

<table>
<thead>
<tr>
<th>Alcohol (0·7539)</th>
<th>Proof Spirit</th>
</tr>
</thead>
<tbody>
<tr>
<td>per cent. by weight.</td>
<td>per cent. by volume.</td>
</tr>
<tr>
<td>weakest</td>
<td>strongest</td>
</tr>
</tbody>
</table>

Port

Widest | Mean of 7 wines... | 14·97 | 30·56 |
Strongest | Mean of 13 wines, excluding those very long kept in cask | 16·30 | 39·91 |

Sherry

Mean of 6 wines... | 15·37 | 33·59 |
Strongest | Mean of 9 wines very long kept in the East Indies | 16·17 | 35·12 |

Madeira—All long in cask in the East Indies

Strongest | Widest | 16·29 | 36·81 |

Teneriffe—Long in cask at Calcutta

Ceree... | 15·45 | 33·65 |
Dry Lisbon... | 16·14 | 34·71 |
Shiraz... | 12·85 | 28·30 |
Amontillado... | 12·63 | 27·60 |
Claret, first growth of 1811... | 7·72 | 16·95 |
Chateau Latour, first growth 1825... | 7·78 | 17·06 |
Rosan, second growth 1825... | 7·61 | 16·74 |
Ordinary Claret, a superior "vin ordinaire"... | 8·99 | 18·96 |
Rivesaltes... | 9·31 | 20·56 |
Malmsey... | 12·95 | 28·37 |
Rudesheimer, superior quality... | 8·40 | 18·44 |
Ditto... | Inferior quality | 7·35 | 15·19 |
Hambacher, superior quality... | 7·35 | 16·45 |

Dr. Christison states that by keeping wines, as Sherry and Madeira, in casks, for a moderate term of years, the quantity of alcohol increases; but after a certain time it decreases; and it is probable that at the period when wines begin to lose alcohol they cease to improve in flavour.

3. Free Acids.—All wines are more or less acidulous, as determined by litmus. They owe this property principally to malic acid, but in part also to lactic and tartaric acids. The Rhenish and Moselle wines and claret are termed
Acid wines. The brisk, frothing, sparkling, or effervescent wines (as Ch. which are bottled before fermentation is complete, owe their persist to the retention, and subsequent escape when the confining force is the developed carbonic acid gas. They are apt to become rose, a char is prevented by pure tannic acid or powdered nutgalls. The tannic winery, especially the red wines (as Port), is derived, in great part, free of the grape, but partly, perhaps, from the seeds. It gives to the astringency and power of becoming dark-coloured with the ferruginous.

4. Sugar.—This constituent varies considerably in quantity in different wines in which it is abundant are denominated sweet wines, as Tokay Frontignac.

5. Extractive.—Exists in all wines, but diminishes (by deposition age.

6. Colouring Matter.—All wines contain more or less colour when grape juice, without the husks of the fruit, is fermented, the wine and is denominated white wine; but if the husk be present during fermentation, the wine is deep coloured, and is usually called red wine. Except in the or teinturier grape the purple colouring matter resides in the husk, solved by the newly-formed alcohol, and is reddened by the free acid exception just mentioned, the colouring matter is diffused through the wine. According to Nees von Esenbeck, the purple colouring matter in the sides on the inner side of the husk (epicarp). By exposure to the sun by age, the colour of wines is diminished; the colouring matter be tated. It may be artificially removed by milk, lime water, or charcoal.

7. Tartar (Bitartrate of Potash).—The most important saline component wine is tartar. It deposits, along with colouring and extractive matter, the cask and bottle, constituting argol (see p. 525) and the crust. Formation increases with the formation of alcohol. Red wines (the youngest, roughest, and most coloured) contain more than white wine.

Adulteration, &c.—Various impositions are said to be practiced by dealers on the consumers of wines. These are almost confined to the mixing of wines of various qualities. In some cases, however, the finest wines have been prepared by mixture. The gradual mixture of wines of various ages,” observes Mr. no wine can be further from what may be called a natural sherry.” In some cases inferior kinds of wine are substituted for fraudulent dealers for finer ones.

To augment the strength of wine, brandy is frequently added. This is done to sherry before it is shipped from Spain. Brandy, however, it is never added in greater quantities than five per cent. By recent regulations, ten per cent. of brandy may be added to wines after their arrival in this country, and when bonded vaults; the increased quantity only paying the wine duties.

Colouring matters are also employed to deepen or change the wine. In Spain, boiled must (of the consistence of treacle, and a similar flavour, but with a strong empyreumatic taste) is used to deepen the colour of sherry. It is prepared by boiling down a fifth part of its original bulk. In this country, cane juice (see p. 901) is said to be used for a similar purpose. In Port wine, the produce of poor vintages. To such an ex...
at one time, practised, that the Wine Company of Portugal cut the trees and prohibited their growth in the wine district. Touring substances are also occasionally added to wines. Thus in, Amontillado or Montillado (a very dry kind of sherry) is to sherries which are deficient in the nutty flavour. Being light in colour, it is also used to reduce the colour of sherries to too high. Kino is said to be used in this country to augment the astringent flavour of Port-wine.

Earthenware, formerly used to sweeten wine?, may be occasionally deemed in very minute quantity, in wine (by sulphured hydrogen), usually to be traced to shot in the bottle, and rarely to fraud. The physiological effects of wine next deserve our attention. In moderate quantities, wine operates as a stimulant to the heart and arteries, diffuses an agreeable warmth in the body, promotes the different secretions, communicates increased muscular force, excites the mental powers, dispels unpleasant ideas. In a state of perfect health, its use is no way beneficial, but, on the contrary, its habitual emnut in many cases proves injurious, by exhausting the vital force, and inducing disease (see some further remarks on the dietproprieties of wines, at pp. 71 and 72). The actual amount of which it may inflict will of course vary with the quantity of the wine taken, and according to the greater or less position to disease which may exist in the system. Maladies digestive organs, and of the cerebro-spinal system, gout and, are those most likely to be induced or aggravated by it. Intoxication in its varied forms is the effect of excessive quantities of alcohol. It is remarkable, however, that though the effects of wine depend on the alcohol contained in this liquor, yet they differal circumstances from those of the latter (described at p. 358).

In the first place, wine possesses a tonic influence not ob after the use of ardent spirit. Common experience proves to one, that the stimulant influence communicated by wine is in its production and subsidence than that developed by spirit. Second place, the intoxicating influence of wine is not equal of mixtures of ardent spirit and water of corresponding alcohol which they contain. This will be obvious from the table, drawn up from Mr. Brande's results, before.

<table>
<thead>
<tr>
<th>Alcohol Type</th>
<th>Amount of Alcohol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brandy</td>
<td>8 fluidounces</td>
</tr>
<tr>
<td>Fort Wine</td>
<td>186 ditto</td>
</tr>
<tr>
<td>Claret</td>
<td>264 ditto</td>
</tr>
<tr>
<td>Champagne</td>
<td>32 ditto</td>
</tr>
</tbody>
</table>

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\(^1\) See Beckmann, *Hist. of Invent.*, vol. I, p. 396.

\(^2\) See a case in the *Phil. Mag.* l. v. 229.
Now it is obvious from this table that the intoxicating power of vinous liquids was in proportion to the spirit contained in them, that a pint of Port-wine would be almost equal to half a pint of brandy, and that Claret would exceed Champagne in its influence over the nervous system; all of which we know not to be the case. It is therefore obvious, that the other constituents of the wine possess the power of modifying the influence of the alcohol. Furthermore, it is probable that they are enabled to do this by being in chemical combination with the spirit. For it is asserted by connoisseurs, that a brandied wine (i.e. wine to which brandy has been added) is more intoxicating than a non-brandied wine equally strong in alcohol. Hence dealers endeavour to obviate this by the operation of _freling in_, and which, in a scientific point of view, may be regarded as effecting the chemical combination of the foreign spirit with the constituents of the wine, by a second or renewed fermentation. A distinct distinction between the operation of wine and ardent spirit is the greater tendency of the latter to induce disease of the liver. "It is well known," observes Dr. Maculloch, "that diseases of the liver are the most common, and the most formidable of those produced by the use of ardent spirits; it is equally certain that no such disease follows the intemperate use of pure wine, however long indulged in. To the concealed and unwitting consumption of spirit, therefore, contained in the wines commonly drank in this country, is to be attributed the excessive prevalence of those hepatic affections which are comparatively little known to our continental neighbours."

Uses.—The _uses_ of wines are threefold—diētetical, medicinal, and pharmaceutical. To persons in health, the _dietetical_ employment of wine is either useless or pernicious. The least injurious are light wines, especially Claret.

As a _medicinal_ agent, wine is employed principally as a _con
destimulant_, and tonic; but some of the wines possess astringent and acid properties, for which they are occasionally resorted to. In the latter stages of fever, when languor and torpor have succeeded to previous state of violent action, and in the low forms of this disease, wine is at times undeniably useful. It supports the vital power and often relieves delirium and subsultus tendinum, and promotes sleep. But it is much less frequently and copiously employed formerly. As a stimulating tonic and invigorating agent, it is given in the state of convalescence from fever, and from various chronic non-febrile diseases. In extensive ulceration, copious suppurating gangrene of the extremities, and after extensive injuries or severe operations, or profuse hemorrhages, when the powers of life appear to be failing, wine is administered often with the best effects. It has been liberally employed in tetanus, and at times with apparent alleviation of the disease. If in any of the preceding cases it causes dryness of the tongue, thirst, quick pulse, restlessness, or delirium.
WINE.

of course be immediately laid aside. And it is obvious that
the inflammation, especially of the brain or thoracic organs, in
the sanguineous apoplexy, and in the first or acute stage of
the employment of wine is objectionable, and calculated to
be highly injurious.

Port-wine (Vinum Lusitanicum seu Portugallicum) is applied to most of the
cases mentioned for which a stimulant and tonic is required, and is the
ordinarily employed in the public hospitals of this metropolis. On
account of its astrigency, it is particularly useful in those cases which are
attended with a relaxed condition of the bowels; but it is apt to disagree with
stomachs. A mixture of two-thirds Port-wine and one-third water is used
for the radical cure of hydrocele.

Burgundy (Vinum Burgundicum) is a stimulant, and somewhat astringent
but is rarely used in this country for medicinal purposes.

Sherry (Vinum Xericum, Ph. L.; Vinum Album, Ph. Ed.; Vinum album
suum, Ph. D.) is peculiarly valuable, on account of the small quantity of
acid which it contains; and it is, therefore, the wine best adapted for
its use in troubled with gout, or having acidity of stomach, or a deposition
of acid in the urine.

Madeira (Vinum Maderaeicum) is a more stimulating wine than Sherry, and
therefore, better adapted for old persons and debilitated broken-down consti-
tuents, where its slight acidity is not objectionable. It is an excellent wine for
diabetic affections.

Champagne (Vinum Campanicum) is a diuretic and a speedy intoxicator.
In its lively and agreeable feelings, and, in consequence, is adapted for
hysteric and hysterical cases. On account of the evolution of carbonic acid, it
is occasionally employed to allay vomiting. It is objectionable in gouty
affections.

The Rhinewines (Vinum Rhenanum), of which Hock (Vinum Hocheimense)
most familiar example, and the Moselle wine (Vinum Mosellanum), are
refreshing and light wines. They prove diuretic and slightly aperient. Their
advantages are for use where phosphatic sediments are observed in the
urine. They are used also in low fever, with at least less likelihood of doing
harm than the stronger wines.

Claret (Vinum rubellum) has been already mentioned as one of the least
objectionable wines. It is adapted for the same cases as the Rhine and Moselle.
Both are, of course, objectionable in gouty cases and lithic acid deposits,
owing to their acidity.

A pharmaceutical agent, wine is employed for the preparation of
edicated wines (vina medicata). Sherry is the kind employed by
British colleges; but for economy druggists often use Cape
Sherry. Its efficacy resides essentially in the alcohol which it con-
trains. In some cases, however, its acidity may increase its solvent
power. But as the quantity of alcohol which it contains is variable,
so it is more liable to undergo decomposition than a tincture con-
ing the same proportion of spirit, the medicated wines are ob-
cainable preparations.

SPIRITUS VINI GALLICI, L.—See p. 362.

MISTURA SPIRITUS VINI GALLICI, L.—See p. 363.
solitary, one- or many-celled or several in each cell, er numerous and attached to style usually none or very spicuous; stigmas peltate capsular or fleshy, or (many-celled, valvular an dehiscent. Seeds defini terous, often arillate; te branous; albumen none radicle small next the large, thick and fleshy Trees or shrubs, sometimes resinous. Leaves exstipulate, always opposite, coriaceous midrib, and many oblique lateral parallel veins. Flow their peduncle.—(Wight and Arnott.)

Properties.—The species all abound in a viscid, yellow, gum-resinous juice resembling Gamboge (Lindley). Several yield edible fruits. The fruit G. Mangostana (fig. 306) is of East Indian fruits, and is "the only fruit which sick eat without scruple."

1. **HEBRADENDRON CAMBOGIOIDES, Graham, E.—**

**HEBRADENDRON.**

Cambogia Gutta, Linn.—Stalagmitis cambogioides, A

*Sex. Syst.*: Monoe, Monadelphia.

(Gummy-resinous exudation, E.)

History.—The first notice of gamboge is by C He received this gum-resin in 1603 from Peter Gar He had been brought from China by Admiral van N
Botany. Gen. Char.—Flowers unisexual. Males: sepals four, membranous, permanent. Petals four. Stamens monadelphous, with a quadrangular column; anthers terminal, with an umbilicated circumscissile operculum. Females unknown. Berry many-(four) celled; cells one-seeded; surrounded by a few abortive distinct stamens, and crowned by a sessile-lobed muricate stigma. Cotyledons thick, consolidated; radicle central filiform.—Trees with entire leaves 4.

Sp. Char.—Male flowers axillary, fascicled. Sepals when young nearly equal. Leaves obovate-elliptical, abruptly subacute, and acuminate (Graham).—A tree of moderate size. Leaves opposite, stalked. Male flowers: sepals four, imbricated, concave, yellow on the inside, yellowish-white on the outside. Petals spatulate-elliptical, crenulate, yellowish-white, red on the inside. Berry about the size of a cherry, round, with a sh-brown external coat, and sweet pulp. Seeds large in to the berry, reniform elliptical. (Condensed from Graham).

Gamboge, the Gamboge of the shops, is a “gum-resin from an unascertained species of Hebradendron,” E. The Cambogioides, Murray 5, L.; S. Cambogia, Persoon, D., does not agree. The specimen, which has been described as such, is in the Banksian Herbarium and was found by Mr. Brown 6 to consist of two plants (Xanthochymus Roxburgh, and Hebradendron cambogioides Graham), the latter has been concealed by sealing-wax. As it appears, according to Beccari, that the gamboge of Siam is “as nearly as possible identical in name and properties” with that of Ceylon, it is probable that both are in the same, or some nearly allied species. Indeed it has been suggested that the plant may have been carried from Siam to Ceylon for the production of the gamboge for use in the temples and holy dresses with gamboge.

Ation.—The only account which we possess of the method of making gamboge, is that given to König by a Catholic Missionary at Cochin-China 8. According to this statement, when the branchlets are broken, a yellow milky juice issues from them, from whence is transferred into large flat earthen vessels, allowed to harden during the summer season, and is after-
palm of the hand, early in the morning, from the pore of the bark in a semi-liquid and is scraped off by the collectors next month the tree, the wounds in the bark readily heal and undergo the operation again.

DESCRIPTION.—Two kinds of gamboge are described by pharmacological writers—Ceylon. Of these the first only is known in

1. Siam Gamboge. (Cambogia Siamensis, Ph.

boge of the shops. It is brought to this country from Siam, at other times indirectly by way of Canton. It comes over in boxes, cases, or (4s. per cwt.) was paid on 15 cwt. ; in 1858 it sends itself in commerce in three forms:—1st. in cakes; 2dly. in pipes or hollow cylinders; 3dly. as masses. Both the solid and hollow cylinders were known as pipe gamboge. What is called coarse pipe gamboge is the commonest pieces of the above.

a. Pipe gamboge consists of cylindrical sticks from one to three inches in diameter. Some are formed by rolling, but many of them are formed by the pressure of the bamboo stems into the hollow tubs, and the juice has been run, and not unfrequently the stems are still adherent; and on one occasion, as a record of the importation of the stems, gamboge in cylinders are sometimes distinct, and consist of a dirty greenish-yellow dust; at others agglutinated as to form masses of varying sizes and forms in all qualities,—the finest and the worst, which I ever saw having this form.
It is completely dissolved by the successive action of
and water. Mixed with a sufficient quantity of water, it forms
emulsion, the films of which are excellent microscopic
for observing the **active molecules** described by Mr. R. Brown.
Powder of fine gamboge is bright yellow. The **Edinburgh Colles**
the following characters of pure gamboge:

- Fracture somewhat conchoidal, smooth, and glistening: a decoction of its
cooled, is not rendered green by tincture of iodine, but merely somewhat
iodine is employed to prove the absence of starch. ** Inferior**
gamboge are harder, more earthy in fracture; the frac-
ture is brownish- or grayish-yellow, frequently with black
from the presence of foreign bodies which are intermixed. It
completely dissolved by the successive action of ether and
Iodine readily detects, in the cooled decoction, starch, by the
colour which it gives rise to.

**Lump** or **Cake Gamboge** occurs in masses of several pounds.
Its quality is inferior to the finest pipe kind. Internally
serve fragments of wood, twigs, and air-cells. In most of its
others it agrees with the inferior qualities of pipe gamboge, and
contains starch.

**Ceylon or Cingalas Gamboge** (Cambogia Zeylanica, Ph. Ed.) — I
acquainted with this kind of gamboge, which is unknown in a
commerce. Dr. Christison says, that, as he has seen it, it
ually in small irregular fragments, but as originally collected,
tattish round masses, as if moulded in shallow bowls, weighing
pound or upwards; and it appears to be composed of aggre-
gruent tears, with interspaces and cavities, which are lined
dark powdery matter, or with a powder of an earthy appear-
Altogether it seems a very coarse article.” It forms, “with
ase, an emulsion nowise inferior in smoothness, and very little,
, in liveliness of tint, to that of the very best Pipe Gamboge

**Position.**—Gamboge was analysed, in 1808, by Braconnot;  
; by John ; and in 1836, by Dr. Christison.

<table>
<thead>
<tr>
<th>Siam Gamboge.</th>
<th>Ceylon Gamboge.</th>
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<tr>
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<td>Cylindrical or Pipe.</td>
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<td>20.9</td>
<td>20.7</td>
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<td>4.8</td>
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1 Phil. Mag. for Sept. 1815 and 1818.  
2 Ann. de Chim. liv., ii. 223.  
3 Gmelin, Hand. de Chem. ii. 626.  
4 Companion to the Botanical Magazine, ii. 233.
according to Dr. Charpentier, this is not the case. Hence, the active ingredient, or it becomes somewhat altered in the process, the latter supposition is the more probable.

2. **Gum** (Arabine).—The gum of gamboge is soluble in water and Police.

3. **Starch or Fecula.**—This substance, which is found in doubtless an adulterating substance.

**Chemical Characteristics.**—Gamboge emulsifies in water, and deep red on the addition of potash, form potash. Digested in alcohol or ether, gamboge tinctures (solutions of gambogic acid). The etherial on water yields, on the evaporation of the ether, a thin layer, opaque film or scum (gambogic acid), soluble in cold alcoholic tincture dropped into water yields a bright emulsion, which becomes clear, deep red, and translucent on the addition of caustic potash. The gambogiate of potash (one of the above processes) gives, if the alkali be not in excess, a yellow precipitate (gambogic acid); with acetate of potash (gambogiate of lead); with sulphate of potash (gambogiate of copper); and with the salts of iron, gambogate of iron.

The detection of gamboge in pills has become, on an important object of medico-legal research. Spurious extracts of gamboge, and the pill concoction of the shops, sometimes contain gamboge. The mode of detection, in all these cases, is simple:—Digest the suspected substance in alcohol, and another in ether. The alcoholic and etherial tinctures to the tests above mentioned.

In external appearance the resin of *Xanthorrhoea hastile* is only a substance that could, by a remote possibility, be confused. But the above chemical characters readily distinguish it from the yellow colouring matter of saffron (p. 1007), and of rhubarb (p. 1184), from being confounded with that
of the animal tissues, its fatal operation depends, not on its absorp-
tion, but on its powerful local action, and on the sympathetic
action of the nervous system. It appears to be an uncertain and
generous medicine for herbivorous animals, and is, therefore, never
ployed by veterinarians. Daubenton states, that two drachms
ed a sheep. Two ounces and a half have been found to produce
little effect on a cow; while twice that quantity caused dysentery,
continued seventeen days. On the horse, from six to twelve
hours have merely rendered the stools somewhat softer and more
venet, although shivering, loss of appetite, irregularity of pulse,
d anxiety, and other alarming constitutional symptoms, were
right on. On the other hand, Viborg * has given an ounce to
horse without any remarkable effect.

On Man.—Taken in small doses, gamboge promotes the secre-
tion of the alimentary canal and of the kidneys, and causes more fre-
tant and liquid stools than natural. In larger doses it occasions
vomiting, griping pains of the bowels, watery
and increased discharge of urine. When the action is very
severe, there is great depression of the vascular system. In excessive
doses it acts as an acrid poison. A drachm caused horrible vomiting
and purging, followed by syncope and death. The deaths which
occurred from the use of enormous quantities of Morison's pills
were mainly ascribable to the gamboge contained in these medicines.
In these cases the symptoms were, violent vomiting and purging,
abdominal pain and tenderness, cold extremities, and sinking pulse.
Post-mortem examination, inflamed, ulceration, and mortifi-
ion of the intestines, were found.

Gamboge belongs to the active hydragogues and drastic purgatives.
activity is inferior to elaterium and croton oil. In acridity it ex-
ceeds jalap, scammony, and even colocynth. In its mode of oper-
in it is allied to, though scarcely so acrid as, euphorbium. It is
readily apt to irritate the stomach, and to occasion nausea and
ting. This arises from its ready solubility in the gastric juices.
In its action on the stomach is exceedingly objectionable, we some-
times endeavour to lessen it by conjoining aloe, or some other sub-
stance which diminishes the solubility of gamboge in aqueous fluids,
by giving the medicine in the form of pill. Sundelin * ascribes
gamboge an especial power of exciting the vascular system (arteries
veins) of the pelvic organs, in virtue of which, he says, it readily
rise to the hemorrhoidal flux and uterine hemorrhage. Further-
more, he regards it as powerfully irritating and exciting to the abdo-
nal nerves, especially the sacral and pelvic divisions.

Doses.—From the foregoing account of the effects of gamboge, it is
evident that it is a remedy well adapted for acting as a stimulis

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2. ibid., Pneum. and Vet. p. 267, s.
5. Loc. cit. ii. 412 and 759; xvii. 337, 415, and 623; xviii. 73 and 297; and
6. Lcirmittel, ii. 29, 3rd Aufl.
to the abdominal and pelvic viscera, either to rouse their
sluggish state, or to give them preternatural activity, and
relieve some distant organ, on the principle of counter-irri-
tation. On the other hand, the use of gamboge is highly objectionable
as an irritant or inflammatory condition of the stomach or,intestines,
tendency to abortion, or to uterine hemorrhage, and also,
not want to promote or increase the hemorrhoidal dis-
ease. Following are some of the cases in which we employ it:

1. In constipation, where an active cathartic of small
dosage is required, gamboge is employed. It is, however, not given in
such large doses as is necessary to create nausea and vomit,
and is therefore, usually conjoined with other and milder purgatives,
operation of which it increases and quickens, while they, by
increasing its solubility in the juices of the stomach, lessen its
ability to produce nausea or vomiting. The *pulvis cathartica com-
posite* U. S. (see p. 746), and the *pulvis cambogiae composite* I,
are referred to as preparations in which these objectives have
been more generally employed.

2. In cerebral affections, as apoplexy, or a tendency to
hemorrhage, usually associated with other purgatives as above,
highly valuable counter-irritant purgative. By stimulating the
nerves, blood-vessels, and secretory apparatus of the brain, it is often calculated to relieve determinations of blood
in the head, and in those cases where the cerebral hemorrhage is
more especially serviceable in those forms of dropsy caused by
hepatic obstruction.

3. In dropsies gamboge has been employed, on account of
its hydragogue properties, where the use of drastic purgatives
is not feasible. To its efficacy numerous practitioners have borne testimony, however, rarely given alone, but usually in combination with the milder remedies (as jalap and bitartrate of potash) of the same class. If it be desirable to act on the kidneys, an administra-
tion of gamboge has been recommended. Gamboge has been
found more especially serviceable in those forms of dropsy caused by
hepatic obstruction.

4. As an anthelmintic.—Gamboge has been frequently
employed as a remedy for tape-worm, and not unfrequently with
success. Several empirical anthelmintic remedies are
now known to be effective against this substance. It is an important
ingredient of Madame Nonffer's *specific* (see p. 892).

Administration.—On account of its tendency to occu-
pying and gripping, gamboge is usually given in small doses,
to three or four grains, in the form of pill, and repeated
at six hours. In this way it may be given with safety and
inconvenience. The full dose of it is said to be from
seven to eight grains. An alkaline solution of gamboge has been long
used in the continent under the name of *tincture of gamboge* (tinct.
guttæ), and has been employed as a powerful diuretic in

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8 In Voight's *Arzneim.* Bd. ii. Abt. ii. S. 203.
consists of gamboge, in powder, 3 ss.; carbonate of potash, 3 j. (intensely mixed with the gamboge); and brandy, 3 x j. Digest with a tile heat for four days.—Dose, ½ ss. to 1 j.

ANTIDOTE.—In poisoning by gamboge our chief reliance must be placed on the palliatives already mentioned for poisoning by euphorbium (p. 1130) and elaterium (p. 1509). I am acquainted with no thl-ascertained antidote, though the alkalies (carbonate of potash, according to Hahnemann*) have been said to diminish the violence of the topical action of gamboge.

**PILULE CAMBOGIE COMPOSITE.** L. D.; *Pilulae Cambogiae, E.*

Gamboge Pills.—(Gamboge, bruised, ½ j. [one part, E.]; Aloes, bruised, ⅛ j. [East Indian or Barbadoes Aloes, one part, E.];—Hepatic Aloes, ⅛ D.]; Ginger, bruised, 3 ss. [Aromatic powder, one part, E.]; stile Soap, ½ j. [two parts, E.]. Mix the powders together, them the soap [and then a sufficiency of syrup, E.; treacle, D.] and beat m into one mass).—Cathartic, considerably more active than the *Pilulae composite* (p. 977). Employed in obstinate constipation.—Dose, grs. x. to grs. xv.—The aloes, by diminishing the solubility of the gamboge, renders the latter less likely to irritate the mch. The formula is said to be a simplification of one proposed by Dr. George Fordyce.

**CANELL'A AL'B'A, Murray, L. E. D.—LAUREL-LEAVED CANELLA, OR WILD CINNAMON.**

*Sex. Syet.* Dodecandra, Monogynia.

(Cortex, L. D.—Bark, E.)

**HISTORY.**—The bark of this tree has been frequently confounded with that of *Drimys Winteri*, hereafter to be described. Clusiusb describes both barks, and notices two kinds of canella bark.

**BOTANY.** Gen. Char.—*Sepals* five. *Petals* five. Somewhat coriaceous, glaucous-blue, contorted in aestivation. *Stamens* united to a tube; *anthers* fifteen, resembling furrows. *Stigmas* three. *Perry three-celled, or by abortion one-celled; cells one- or twoded. Embryo (according to Gaertner, but perhaps an error) surrounded by fleshy albumen, curved, with linear cotyledons. (De Cand.)

**Sp. Char.**—The only species.

A *tree* growing from ten to fifty feet high. *Leaves* alternate, shining, cuate, ciliate at the base, coriaceous and opaque when old, dotted en young. *Flowers* small, clustered, purple. *Berry* the size of a., fleshy, smooth, blue or black.

**Hab.**—West Indies and continent of America.

**DESCRIPTION.**—The canella bark of the shops (cortex canellae albae), sometimes termed on the continent *costus dulcis*, or *costus corticissus*,

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* *Hufeland's Jour.* Bd. v. S. 12.
* *East.*, iv. cap. i. p. 73, and cap. iii. p. 78.
* *Swartz, Trans. Linn. Soc.* i. 96.
is the inner bark of the stem and branches. It occurs broken pieces, which are hard, somewhat twisted, of a white or pale orange-colour, somewhat lighter on the inner and have an aromatic clove-like odour, an acrid peppery white granular fracture.

J. Bauhin and others have confounded it with \textit{Winter's bark,} hence it has been denominated \textit{spurious Winter's bark} (\textit{Cyperus spurius}). The pale colour of its inner surface is several physical characters by which the two barks may be distinguished. Chemically they may be distinguished by nitrate and sulphate of iron, both of which cause precipitates in the of Winter's bark, but not in that of canella\(^a\).

**Composition.**—Canella bark was analysed, in 1820, and, in 1828, by Petroz and Robinet\(^f\).

<table>
<thead>
<tr>
<th>Henry's Analysis</th>
<th>Petroz and Robinet's Analysis</th>
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<tr>
<td>Volatile oil</td>
<td>Volatile Oil.</td>
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<tr>
<td>Aromatic resin</td>
<td>Resin.</td>
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<tr>
<td>Brownish yellow colouring matter</td>
<td>Bitter extractive.</td>
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<tr>
<td>Extractive</td>
<td>Canella.</td>
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<tr>
<td>Gum</td>
<td>Gum.</td>
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<tr>
<td>Starch</td>
<td>Starch.</td>
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<tr>
<td>Albumen</td>
<td>Albumen.</td>
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<tr>
<td>Lignin</td>
<td>Lignin.</td>
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<tr>
<td>Salts</td>
<td>Salts.</td>
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<td>Canella bark.</td>
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1. **Volatile Oil of Canella Bark.**—According to Cartheuser it is low, fluid, and heavier than water. It has an acrid taste.
2. **Resin.**—Henry found this constituent to be aromatic, but not as
3. **Bitter Extractive.**—Brown, very bitter, not crystallizable.
4. **Canellin (Mannite)\(^b\).**—A crystallizable, saccharine substance of undergoing the vinous fermentation.

**Physiological Effects.**—Canella bark is an aromatic and tonic. Its aromatic qualities depend on the oil and tonic properties on its bitter principle. As an aromatic it between cinnamon and cloves.

**Uses.**—In this country it is employed principally as an addition to purgatives and tonics (see \textit{pulvis aloës cum a} and \textit{vinum aloës}, p. 978; and \textit{tinctura gentianæ composita}, E. and \textit{vinum gentianæ}, E.); and is well adapted for debilitations of the digestive organs.

By the Caribs (the ancient natives of the Antilles) and the West Indies, it is employed as a condiment. It has considered useful in scurvy.

**Administration.**—Dose of the powder, grs. x. to 5ss.

**Vinum Gentianæ, E.**; \textit{Wine of Gentian.}—(Gentian, in co

\(^a\) \textit{Journ. de Pharm.} t. v. p. 481.
\(^b\) \textit{Ibid.}
ss.; Yellow Bark, in coarse powder, 5j.; Bitter Orange-peel, and sliced, 5j.; Canella, in coarse powder, 5j.; Proof Spirit, 1.; Sherry, 0.1. and 35xv. Digest the root and barks for twenty-hours in the spirit; add the wine, and digest for seven days; strain and express the residuum strongly, and filter the tis.—This formula should have been introduced at p. 1281.—of gentian is an aromatic tonic, useful in dyspepsia and anorexia. It is apt to become acetic by keeping.—The dose of it is to 5j.

DER LXX.—AURANTIACEÆ, Corrêa.—THE ORANGE TRIBE.

TIAL CHARACTER.—Calyx urceolate or campanulate, somewhat adhering to disk, short, three- or five-toothed, withering. Petals three to five, broad the base, sometimes distinct, sometimes slightly combined, inserted upon outside of a hypogynous disk, slightly imbricated at the edges. Stamens in number to the petals, or twice as many, or some multiple of their number, inserted upon a hypogynous disk; filaments flattened at the base, sometimes distinct, sometimes combined in one or several parcels; anthers terminal, innate. Ovary many-celled; style one, taper; stigma slightly divided, discoid. Fruit pulpy, many-celled, with a leathery rind replete with receptacles of volatile oil, and sometimes separable from the cells; cells often filled with pulp. Seeds attached to the axis, sometimes numerous, sometimes solitary, usually pendulous, occasionally containing more embryos than one; he and chalaza usually very distinctly marked; embryo straight; cotyledons thick, fleshy; placenta conspicuous.—Trees or shrubs, almost always smooth, filled every where with little transparent receptacles of volatile oil. Leaves entire, often compound, always articulated with the petiole, which is frently winged. Spines, if present, axillary (Lindley).

PARTS.—In the bark, leaves, flowers, and rind of the fruit, are numerous bitter or rounded reservoirs, which contain a highly fragrant volatile oil. A part of the fruit acidulous and refrigerant.

1. CITRUS MED'ICA, Risso, E.—THE CITRON TREE.

Sex. Syst. Polydendrphio, Polyandria.

HISTORY.—The fruit of this species is supposed to be the μῦλον of Theophrastus. Pliny calls it malum citreum. It is probable the citron is referred to in the Old Testament on several occasions, where, in our translation, the word apple has been emended.

TANY. Gen. Char.—Flowers usually with a quinary proportion of petals. Calyx urceolate, three- to five-cleft. Petals five to eight. Corolla twenty to sixty; filaments compressed, more or less united at the base, polyadephous; anthers oblong. Style terete; stigma spherical. Fruit baccate, seven- to twelve-celled; cells many-

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The Edinburgh Pharmacopoeia of 1830, and also in that of 1841, Lemons are referred to Citrus, Risso (De Cand.). This is an error.

1. Plant. 1. 23, and iv. 4.
3. ii. viii., and viii.; Job. l.
seeded, pulpy. *Spermoderms* (seed coats) membranous; auricles of the *cotyledons* very short (De Cand.). —*Trees or shrubs*, with axillary spines. *Leaves* reduced to one terminal leaflet at the apex of the petiole, often winged. The *rind* of the fruit is regarded by De Candolle as a kind of tons, by Dr. Lindley as the union of the epicarp and sarcocarp. In the external yellow portion (*flavedo* or *zeste*) of it are the rounded or vesicular receptacles containing volatile oil; the inner white portion is spongy. The cells of the fruit are filled with small pulpy bags, readily separable from each other, and containing the acid juice. *Seeds* exalbinous, marked externally with the raphe; inner coat stained at one extremity, indicating the place of the chalaza.

**Sp. Char.** — *Petioles* naked. *Leaves* oblong, acute. *Flowers* with forty anthers, one without pistils. *Fruit* oblong, rugose, with a thick rind and acidulous pulp (De Cand).

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**Tree.** Young branches violet. *Leaves* subciliate. *Pétalas* externally purplish. *Fruit* large, violet-red when young, fine yellow when mature; its rind adherent, with an agreeable odour. Risso enumerates three varieties.

**Hab.** — A native of Asia. Cultivated in the South of Europe.

**Description, &c.** — The fruit of this tree is the *citron* (*alus citreum*). It sometimes attains a weight of more than 20 lbs. The fruits which preserve their pistilla are called *pitima*. Risso says they are sought after by the Jews, who suspend them to palms at the feast of the tabernacle. The flavedo of the citron abounds in volatile oil, which may be obtained either by expression or distillation. The leaves, as also the flowers, of the citron-tree, yield a volatile oil by distillation. The leaves are interposed between linen, to which they communicate a fragrant odour; moreover they are said to keep away insects.

Two volatile oils, known respectively as the *essence* or *essential oil of core* and the *essence* or *essential oil of cedra*, are employed in perfumery. Both are highly fragrant, almost colourless, and lighter than water. They are distinguished by their odour: that of the essence of cedra combining the odors of citron and bergamot. These two oils are usually confounded by pharmacological writers. From their apparent freedom from muriage I presume both have been procured by distillation. The composition of one of these has been ascertained by Dumas, to be identical with that of the essential oil of lemons, viz. *Citrus*.

**Physiological Effects and Uses.** — Analogous to those of the orange and lemon. The fruit is seldom brought to the table in the raw state, but it yields some excellent preserves and sweetmeats. Its juice is employed to flavour punch and negus. It forms, with such
a refreshing, refrigerant beverage. The essential oil is
imery, and may be employed in medicine for scenting.

**RUS BERGAMIA, Risso. — THE BERGAMOT CITRUS.**

*Citrus Limetta Bergamium, L.—Citrus Limetta, E.*

*Sex. Sæt. Polyadelphus, Polyandria.*

etractus cortece destillatum, L.—Volatile oil of the rind of the fruit, E.)

**Gen. Char. — See Citrus medica.**

—Leaves oblong, more or less elongated, acute or obtuse, somewhat pale. Petiole more or less winged or margined. Usually small, white. Fruit pale yellow, pyriform or deformed with concave receptacles of oil; pulp more or less (t and Arnott), cultivated in the south of Europe.

**Bot. Char. — The volatile oil or essence of bergamot (oleum bergamotae), imported from the South of Europe, is procured externally the fruit. It may be obtained either by expression of the oil of lemons) or by distillation.** It is pale greenish yellow, in a remarkable odour, and a sp. gr. of 0.885. Its composition is identical with that of oil of lemons, being C₁₀ H₁₈.

Oil of bergamot is employed as a perfume only. It is a derisory adjunct to unguents.

**RUS LIMONUM, Risso, L.E.P.—THE LEMON TREE.**

*Citrus medica, D.*


—It is supposed that the Greeks and Romans were unacquainted with the Orange and Lemon, which only became known to us at the time of the Crusades. This supposition receives proof from the fact, C that the Persian and Arabian authors do not, as is their wont, give any Greek synonyme of either, but of the citron, which is supposed to have been known to the Romans. C

**Botany. Gen. Char. — See Citrus medica.**

**Sp. Char. — Young branches flexible. Leaves oval or oblong, usually toothed. Petiole simply margined. Flowers white, tinged with red. Fruit yellow, ovoid or rarely globular; terminated by a more or less elongated knob; rind with convex vesicles of oil; pulp acid (Wight and Arnott).**

**Hab. — A native of Asia (Himalaya, Royle; Persia, Risso). Cultivated in the south of Europe.**

*nd. Journ. de Pharm. Août 1854.*

Edinburgh Pharmacopoeia limes are erroneously referred to this species.

*dyen, in Hooker's Bot. Miscell. vol. i. p. 299.*

*Illustr. p. 130.*
...ination and expression, a volatile oil (essential oil) is obtained; this is a watery infusion of lemon peel becomes greenish-brown in colouration of the sesquichloride of iron.

Lemon peel has not been regularly analysed, though a number of its constituents have been examined. It contains volatile oil, a bitter principle, and gallic acid.

1. Volatile Oil.—(See p. 1686.)

2. Hesperidin.—A crystallizable, neutral, resinous (?) principle is present in the white portion of the rind of the fruit of the genus Citrus, especially in the genus Citrus aurantium. It possesses a slight bitterness, which is usually associated with the presence of oil. It is fusible, slightly soluble in water, but more so in alcohol, and the oils both fixed and volatile. Oil of vitriol reddens the bitter principle.

3. Bitter Matter (Aurantiin).—This is referred to the genus Citrus. It is a vaguely denominated extractive. It is the presence of this principle which enables an aqueous solution of impure hesperidin to form a precipitate with the perversals of iron. It frequently contains a large proportion of sugar.

Lemon peel is a grateful stomachic and aromatic stimulant, more as a flavouring ingredient than for its own properties. It is a constituent of the infusion gentianae compositum, (infusum aurantii compositum. Candied lemon peel (Candita) is an agreeable stomachic, and is employed in confectionery.

2. Lemon Juice (Succus Limonum, L.)—A slightly acid aqueous liquor, with a grateful flavour, obtained from lemon fruit by squeezing and straining. Owing to the mucilage and extractive matter, it readily undergoes decomposition, though it is a useful stomachic. On this account lemon juice has been proposed as a substitute (substitute) for the juice both of lemons and limes (the fruit of Citrus aurantium), or C. acida, Roxburgh) is extensively imported.
Citric Acid. — (See p. 405.)

Lemon juice furnishes a most agreeable and refreshing beverage, proves refrigerant and antiscorbutic. It is employed for several purposes, as follows:—

In the preparation of refrigerant drinks.—It may be either added to barley-water or mixed with sugar and water to form lemonade. The latter may be extemporaneously made, by adding two lemons sliced; and two ounces of sugar to two pints of boiling water, digesting until cold. A similar beverage is called, by Mr. de la Croix, *King's Cup*. These acidulated drinks are exceedingly useful for allaying thirst, and as refrigerants in febrile and inflammatory complaints, and in hemorrhages. In the latter maladies iced lemonade should be preferred. Where there is nausea or a tendency to sickness, effervescent lemonade is useful. "Lemonade, as a beverage in febrile diseases, was first introduced by the French physicians in the beginning of the seventeenth century; and about the year 1660, an Italian from Florence, having learnt a process of freezing confecery, conceived the happy idea of converting such beverage into this found a ready sale, and was the occasion of so great an ease in the number of sellers of lemonade, that in the year 1676 Lemonadiers of Paris were formed into a company, and received a patent from the Government.""

In the formation of the effervescent draught.—The effervescent draught, made with lemon juice (or citric acid) and bicarbonate of potash, is one of the best remedies we possess for allaying sickness and vomiting (see p. 409). The citrate of potash, which is formed, is a diaphoretic and diuretic, and often allays restlessness and watchfulness in fever. It is adapted for lithic acid deposits; but, like other remedies of the same class, is objectionable in phthisic diseases. When our object is to determine to the skin, an effervescent draught, composed of lemon juice or citric acid and sesquicarbonate of ammonia, is to be preferred. The relative proportions of the alkali-carbonates, and of lemon juice or citric acid (see p. 409) for the preparation of effervescent draughts, is as follows:—

<table>
<thead>
<tr>
<th>Citric Acid</th>
<th>Lemon Juice</th>
<th>A scruple of the Alkali</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grs. 14 or f 3/16</td>
<td>Grs. 17 or f 1/4</td>
<td>Bicarbonate of Potash</td>
</tr>
<tr>
<td>Grs. 24 or f 3/4</td>
<td>Grs. 24 or f 3/4</td>
<td>Carbonate of Potash</td>
</tr>
</tbody>
</table>

Effervescent draughts are exceedingly valuable vehicles for the exhibition of other remedies.

As an Antiscorbutic.—Lemon juice has long been regarded as an invaluable antiscorbutic; but on account of the difficulty of pre-

* Diet. of Pharm. 341.
* Dr. Parls, Pharmacol. 11. 301, 6th ed.
serving it, crystallized citric acid is usually substituted. "These only," says Sir Gilbert Blane", "who have made themselves acquainted with the early part of the naval history of this country, or those who have perused the interesting, popular, and eloquent narrative of Commodore Anson's voyage, can duly appreciate the value of this simple remedy." Yet, on hypothetical grounds, Dr. Stewar ventures to assert that citric acid produces scurvy!

5. As an Antidote.—In poisoning by the alkalis and their carbonates, the vegetable acids are the antidotes, and the most convenient easily procurable acidulous substances are, in general, vinegar and lemon juice.

6. As an Anti-narcotic.—In poisoning by narcotic substances, as opium, lemon juice may be administered, after the poison has been removed from the stomach, to counteract the effects.

2. Other uses.—Several of the medicinal uses of lemon juice can only receive a passing notice. Such are the employment of it, with common salt, in dysentery, remittent fever, bellyache, and putrid sore throat, as recommended by Dr. Wright*; its use in cardinalgia, by Dr. Dewees; and in syphilis, by Dr. Rollo. As a topical remedy for uterine hemorrhage after delivery, Dr. Evratt recommends that a peeled lemon be introduced into the uterus, and the juice expressed. It causes uterine contractions by which the juice is expelled, and the hemorrhage stopped. In hospital gangrene, Dr. Wecksta applied, with good effect, in the first stage of the disease, lint soaked in lemon juice, or segments of lemons.

Administration.—The mode of employing lemons will be obvious from the preceding remarks.

1. Oleum Limonium, L. E.; Essential Oil of Lemon Peel; Essence of Lemons.—This oil is usually procured by expression, as follows:—The flavedo of the lemons is removed by rasping, and is afterwards expressed in hair sacks. The oil which is thus procured is receive in flasks, where it deposits some of its impurities, and is then decanted and filtered. Baumô says the rasped flavedo is pressed between glass plates. Expressed oil of lemons is somewhat turbid, or liable to undergo change by keeping, owing to the mucilaginous matter which it contains in solution. Oil of lemons may be procured also by distillation; and the oil thus procured is not disposed to undergo change by keeping, and is employed under the name of scouring drops, for removing grease spots from silks and other textures; but its flavour is less pleasant and strong. The greater part of the oil of commerce is brought from Portugal and Italy; some, however, is procured from France. When quite pure, it is colourless, limpid, and of a fragrant odour, like that of lemon. Its specific gravity at 70° F. is 0·847. It is soluble in all proportions of

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* Select Dissert. p. 8, 1822; see also Observ. on the Diseases incident to Scurvy.
* On the Blood.
* Mem. of the late Dr. Wright, p. 322.
* Henry and Guibourt, Pharma. Raison. t. i. p. 284, 2° ed.
* Elem. de Pharm. t. v. p. 105.
hydrous alcohol, and it boils at about 145° F. When the commercial
oil is exposed to a temperature of —4° F, it deposits white crystals,
whose nature is not known: the rectified oil remains perfectly liquid
and transparent at this temperature. Oil of lemons is composed of
isomeric oils,—one (citrene, Dumas, citronyle, Blanchet and
Bell) capable of forming, with hydrochloric acid, a crystalline com-
pound (composed of C10 H18 + H Cl); the other (citryle) not form-
ing any crystalline compound with this acid. The composition of
oil of lemons is C10 H18 — i.e. it is identical with that of the oil of
ternine, savin, copaiva, bergamot, and citrus.

Oil or essence of lemons possesses the stimulant properties of the
volatile oils, and is denominated carminative and diaphoretic.

Full doses it is said to be apt to occasion headache and giddiness.
Principal use is for communicating an agreeable odour and
to other medicines. It may be taken as a carminative, in the
of a few drops, on sugar (eleosaccharum limonium). As a per-
tine, it is an exceedingly useful adjunct to sulphur ointment, and to
porating lotions. To this, as to some other volatile oils (see oleum
marinum), has been ascribed the power of promoting the growth of
hair, and, in consequence, it has been added to pomatum. More
ently it has been employed as a stimulant application in various
al inflammations of the eye. It was first used in these diseases
Dr. Wollitz, who applied it by squeezing the little drops of oil
the rind of the lemon into the eye. He used it with good effect
heimatic, catarrhal, and serofulous inflammations of the eye, in
s and pterygium, and in opacity and some other consequences
flammation of the cornea. It has since been tried by Mr. Foote,
the Ophthalmic Hospital, who dropped the oil into the eye in the
way that the vinum opii is applied. In some cases it caused
essive pain. He thinks it preferable to the vinum opii, in all
es where a stimulant is required.

SYRUPUS LIMONUM. L. E. D. Syrup of Lemons.—(Lemon juice
ined [and freed from impurities by subsidence, E. D.], Oj.; Sugar,
ss. [mill]. D.] Dissolve the sugar in the lemon juice, by the aid
nt gentle heat; then set aside for twenty-four hours; afterwards
ove the scum, and should there be any dregs, pour off the clear
or).—Refrigirant. An agreeable adjunct to diluent drinks, as
y-water, in febrile and inflammatory complaints, and to gargles.
ose, 15 to 35v.
petiole more or less dilated and winged. Flower orange-coloured. Fruit orange-coloured, ovoid or sub-ovoid, usually terminated by a short stalk, with convex vesicles containing a sweet (Wight and Arnott) juice. There are a great number of cultivated varieties; the common orange and of the Portuguese kinds are the hardest and most popular. Michael's orange is a hardy and less variety. The Egyptian has a reddish yellow fruit, with a pulp irregularly coloured with crimson.

**Hab.**—Asia; Europe; North America. Cultivated in the Azores, the Azores, and the West Indies.

**Description.**—Orange leaves (*folia aurantii*) are used as a disinfectant. Their watery infusion is greenish and somewhat bituminous. They contain a fragrant volatile oil, which is procured by distillation and called, in the shops, *essence de petit grain*. Orange leaves or *aurantii* (syn. *napha*), when fresh, are white. They are exported from the South of Europe, stratified with peat in barrels (Risso). Dried orange flowers are yellowish with an agreeable odour, which is less powerful than that of the essential oil. By distillation, orange flowers yield a fragrant volatile oil called *Neroli; oleum aurantii*). The small green fruits (*fruits aurantii*) which fall during the great heats of the summer are called *mirra-citrus*. The fruit is sometimes eaten by the natives as a cucumber.
THE SWEET ORANGE TREE.

1689

a lathe, they constitute the *issue peas* of the shops: they are pre-
ed to ordinary peas for keeping up the discharge of an issue, on
ount of their pleasant odour. An infusion of orange berries is
dered green by the sesquichloride of iron. By distillation these
ries yield a fragrant oil (the original *essence de petit grain*). The
e fruit, or the orange (*aurantium*; *pomina aurantiorum*), is im-
ted in chests and boxes, each orange being separately packed in
ner. The best come from the Azores and Spain; very good ones
also brought from Portugal, Italy, and other places. The *rind* is
etimes employed as a substitute for the rind of the bitter orange.
yields, by distillation, a fragrant volatile oil (essential oil of sweet
age).

**Composition.**—1. *Orange Flowers* were analyzed by Boullay a, and
nd to contain volatile oil, bitter extractive, gum, acetic acid, and
te of lime.

2. *Orange Berries* were analyzed, in 1828, by Lebreton b, who found
r constituents to be as follows:—Volatil oil, sulphur, chlorophylle, matter, hesperidin, bitter astringent matter, with some traces of
ic acid, citric and malic acids, citrates and malates of lime and
sh, gum, albumen, lignin, mineral salts, and traces of iron and
.

Widemann c obtained a crystalline substance analogous to, but
different from, hesperidin.

3. *Orange Peel* has not been analyzed; but its composition is, doubt-
h analog to that of lemon peel (p. 1684).

4. *Orange Juice* consists of citric acid, malic acid, mucilage, albu-
, sugar, citrate of lime, and water.

**Volatile Oils from the Sweet Orange Tree.**—The volatile oils obtained
leaves, flowers, and fruit rind of the sweet orange tree, agree, in their
ital chemical characters, with each other, with the corresponding oils
ed from the bitter orange, and with the volatile oil of lemons (see p. 1686).

5. Oil of sweet orange kept in the perfumers’ shops is obtained by distillation
water, from the rind of the fruit.

6. The other volatile oils of this species are not distinguished in English com-
from those of the next species (see p. 1690).

Hesperidin

Bitter principle (*Aurantiin*)

Widemann’s crystalline matter.—Obtained from unripe oranges. Is
nguished from Hesperidin by its very distinct prismatic crystallization, by its
ubility in alcohol, by its solubility in water, and by its not forming oxalic
with nitric acid.

**Physiological Effects and Uses.**— *Sweet Orange Peel* is an aro-
ic stomachic and tonic analogous to lemon peel, and is occasion-
edly employed as a substitute for the bitter orange peel. “Large
en of it are sometimes productive of mischief, especially in
ren, in whom colic, and even convulsions, are sometimes induced
. We have known the case of a child, in which death resulted
ating the rind of an orange!"

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a *Bull. de Pharm.* i. 327.

b *Journ. de Pharm.* xiv. 377.

c *ibid.* xvi. 797.

d United States’ Dispensatory.
Orange Juice is a refreshing and grateful beverage, and is used at the table. In febrile and inflammatory complaints it is a valuable refrigerant;—allaying thirst and diminishing preheat.

5. CITRUS VULGA' RIS, Risso, L. E.—THE BIGARADE ORANGE TREE.

Sex. Syst. Polyadelphia, Polyandria.

(Fructus cortex exterior, L.—Distilled Water of the flowers, Rind of the fruit, Volat flowers, E.)

History.—The bitter orange became known to Europe in the middle ages. All the old established orange groves of those at Seville, planted by the Moors, are of the bitter orange.


Sp. Char.—Leaves elliptical, acuminate, slightly toothed, more or less winged. Flowers white. Fruit orange-coloured, or slightly elongated or depressed, with concave vesicles of oil; and bitter (Wight and Arnott).

Numerous varieties of this species. One of these yields a species known in the English market as the Seville Orange.

Hab. — Asia. Cultivated in India.

Description.—The leaves are species, when rubbed, emit a very agreeable odour. Distilled water they yield a bitter aromatic water, known in Larue de naphre (aqua naphae). At the same operation is obtained the volatile oil, called the essence de petit grain, of finer quality.

The flowers distillation with water, orange-flower water (aqua aurantiaca) and oil of Neroli (oleum auranti, Ph. Ed.) of finer quality corresponding preparations obtained from the flowers of orange. The unripe fruits, like those of the sweet orange and orange berries, are employed for the purposes before (p. 1688). The Seville orange is round and dark, and has a rugged, very bitter rind (bitter orange peel; cortex auranti, Ed.), which is employed for medical purposes as well as in the preparation of candied orange peel, and for flavouring the spirit called Curaçoa.

Composition.—The composition of the leaves, flowers, of the bitter orange is doubtless analogous to that of corresponding parts of the sweet orange.

* Macfadyen, in Hooker's Bot. Misc. i. 302.
1. **Oil of Orange-leaf; Essences de petit grain.**—The term essence de petit grain was originally applied to the volatile oil of the orange berry, which, however, readily underwent decomposition. It is now used to indicate the volatile oil obtained from the leaves both of the bitter and sweet orange. That procured from the bitter orange is of better quality than that from the sweet.

2. **Oil of Orange-flower; Oil of Neroli (Oleum Aurantii).**—Procured from the flowers of both the bitter and sweet orange; but that from the former is referred. It is obtained by submitting the flowers, with water, to distillation; and it is found floating on the water in the receiver. It has an aromatic and fragrant odour, somewhat different from that of the flower. "It appears to me," says Soubeiran, "to be a product of the alteration of the natural essential oil. The latter is more soluble than the neroli oil, and remains in solution in the water. Its presence may be demonstrated by agitating the distilled water with ether deprived of alcohol; by spontaneous evaporation the ethereal solution leaves behind an essential oil, which has absolutely the same odour as the essences, and which dissolves in water." Oil of neroli, furnished me by one of the most respectable importers as genuine oil, has a reddish colour. I am informed that the essence de petit grain is frequently substituted for it.

3. **Oil of the Kind of the Bitter Orange.**—This is sold by perfumers as essential oil of bitter orange. It has a considerable resemblance to the oil of the sweet orange.

**Physiological Effects and Uses.**—The rind of the Seville orange being considerably more bitter than that of the sweet orange, is to be regarded as more stomachic and tonic. Its uses are the same.

1. **Infusum Aurantii Compositum, L. D.; Infusum Aurantii, D.** Compound Infusion of Orange Peel. (Bitter Orange-peel, dried, 3ss. Sij. D.); Fresh Lemon-peel, 5ij. [3j. D.]; Cloves, bruised, 5j. [3ss. S.]; Boiling [distilled] Water, Oj. [Oss. D.]. Digest for a quarter of an hour in a vessel lightly covered, and strain [through linen or salico, E.].—An agreeable stomachic. It is an excellent vehicle for the exhibition of various other medicines, as saline purgatives, ammonia, bitter tinctures, &c.—Dose, f Sj. to f Sj.

2. **Confection Aurantii, L.; Conserva Aurantii, E.** Confection of Orange-Peel. (Fresh Orange-peel separated by a rasp, lb. j.; sugar, lb. iij. Beat the rind in a stone mortar, with a wooden mallet; then, the sugar being added, again beat them until they are thoroughly incorporated, L.—Grate off the rind of bitter oranges, and beat it into a pulp, adding gradually three times its weight of white sugar, E.)—An agreeable stomachic. Employed as an adjunct to bitter and purgative powders, which are to be formed into electuaries. It is a good vehicle for the exhibition of the sesquioxide of iron.

3. **Syrupus Aurantii, L. E. D.; Syrup of Orange-Peel.** (Fresh bitter Orange-peel, 5ij. [3 Sivij. D.]; Boiling Water, Oj. [Ovj. wine-essence, D.]; Pure Sugar, lb. iij. [lb. xivss. D.]. Macerate the peel in the water for twelve hours, in a vessel lightly covered; then strain the liquor [if necessary, E.] and add the sugar [and dissolve in the aid of heat, E.].—To avoid the volatilization of the
the Dublin Pharmacopoeia. It is an agreeable stop, principally employed as a flavouring adjunct to decoctions (tonic or purgative), effervescing mixtures, &c. f’sijj.

5. AQUA FLORUM AURANTII, L.; Aqua Aurantii, flower Water. (Orange-flowers, lb. x.; Proof Spirit, Cong. ij. Let a gallon distil, L.)—Orange-flower water imported. That prepared from the flowers of the bisesses the most fragrant odour, but it is sometimes prepared from the flowers of the sweet orange. It contains free acetone from the flowers; hence, if kept in a vessel of lead acquires a metallic impregnation. The presence of lead has been pointed out by Mr. Squire. The following characters of the pure orange-flower water:

"Nearly colourless: unaffected by sulphuretted hydrogen."

Sulphuretted hydrogen produces, with either lead or coloured precipitate. Orange-flower water is employed as well as in perfumery, on account of its agreeable odour.

Aqua Coloniensis; Eau de Cologne; Cologne Water.—A mixt. Two varieties are known in the shops—the French and the German. The latter fetches the highest price. Both profess to be made by perfumers, with the same number of ingredients. I subjoin one, which is said, to be followed in the Cologne manufactories:—Oil of Nero; Oil of Bergamot; Oil of Orange; Oil of Rosemary; of each 3%; Malabar Cardamom, 3%; Rectified Spirit, 6%. Distill.—Eau de Cologne is an agreeable evaporating lotion in headache, fever, &c. It should be applied to the person in layers of linen.
THE TEA TRIBE.

probable, therefore, that part of the East India gum brought to this country (p. 1582) may be the produce of this tree.

LXXI.—TERNSTRÖMIACEÆ, Lindley.—THE TEA TRIBE.

I am able to do more than bestow a passing notice on Tea, I could not wholly omit all reference to this important and interesting substance. Two kinds of Tea plant are cultivated in our green-houses; the one called Thea viridis or Green Tea, the other Thea Bohea or Black Tea. Great discrepancy of opinion exists as to whether the different varieties of tea of commerce are obtained from one or from two species. The well-known differences between green and black teas lend great support to the assertions of those who contend that these teas are obtained from different plants, growing in different provinces of China. Mr. Reeves's observations on this point appear to me to be exceedingly apposite. In commerce, two principal kinds of tea are distinguished,—the Black and Green: to the first belong Bohea, Congou, Campou, Souchong, Caper, and Pekoe; to the latter, Twankay, Hyson-skin, Hyson, Imperial, and Gunpowder. Frank analyzed both black and green teas, and obtained the following results:—

<table>
<thead>
<tr>
<th>Substance</th>
<th>Black</th>
<th>Green</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tannin</td>
<td>40.6</td>
<td>34.8</td>
</tr>
<tr>
<td>Gum</td>
<td>6.5</td>
<td>5.9</td>
</tr>
<tr>
<td>Woody fibre</td>
<td>4.8</td>
<td>5.1</td>
</tr>
<tr>
<td>Glutinous matter</td>
<td>9.3</td>
<td>5.7</td>
</tr>
<tr>
<td>Volatile matter and loss</td>
<td>2.0</td>
<td>2.5</td>
</tr>
<tr>
<td>Tea</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

ivy also found more tannin in black than in green tea, in the proportion 41. But these results are opposed to our daily experience, as derived from tea, which indicates the greater astringency in the green tea, and to the experiments of Mr. Brande. The difference in the quantity of tannin in black and green tea is, however, not very great. A few years ago, Oudry anciently existed in tea of a crystalline, salifiable base, to which he gave the name of glean; but more recently, Jobst has asserted its identity with the aly noticed. Dr. R. D. Thomson has described a fixed substance obtained from the tea plant. It is composed of ethylene 75 and steam-stained withstanding the extensive employment of tea as an article of diet, easy matter to ascertain correctly its precise effects on the constitution. The astringency is proved by its chemical properties: and hence tea may be as an easily accessible antidote in cases of poisoning by subduing vegetable alkaloids (see p. 179), or by emetic tartrate. Another property, especially by green tea, is that of diminishing the tendency

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1 Illustr. p. 109; and Hooker, Bot. Mag. t. 3148.
del. cit.

Interesting observations on Assam Tea, see Boyle's Essay on the Productive Resources of India, 1802; and Bruce's Report on the Manufacture of Tea, and on the Recent and Prospective Plantations in Assam, in Jameson's Journ. vol. xviii. p. 195. 1849.

2 Annals d. Chem. ill. 1352.

3 t. 1834, p. 265.

4 from the xi. 201.

5 Qua. Chem. p. 265.

6 from xxv. 63. 1838.

to sleep. Hence, like coffee (see p. 1441) tea is often resorted to by those who desire nocturnal study. Moreover, it may be employed as an antiseptic to counteract the effects of opium and intoxicating liquors; and Dr. Clutterbuck has suggested its application to the relief of the stupor of fever, which he considers to be nearly allied to intoxication. Tea appears to possess a salutary influence with regard to the vascular system, and in this, as well as in its watchfulness which it produces, tea somewhat resembles foxglove. On account of its sedative power, Dr. T. Percival recommends its use in fevers and inflammatory diseases, and I can speak from frequent observation of its good effects in these maladies. To this power should also be referred the relief of headache experienced by the use of tea. In colds, catarrhs, rheumatism, the warm infusion of tea is frequently employed as a diluent, diaphoretic, and diuretic. Strong green tea taken in large quantities is capable, in some constitutions, of producing most distressing feelings; and of operating as a narcotic. Dr. Lettsom found that a strong infusion of tea introduced into the abdomen of a frog caused paralysis of the hind extremities of the animal.

**Order LXXII.—Dipteraceae, Lindlery.** —The Diptero-Carpus Tribe.

**Dipterocarpus, Blume.**

*Dryobalanops aromatica*, Gaertner (D. Camphora, Colebrooke; Shorea aromatica, Roxb.) is a large tree growing in Sumatra and Borneo. From its heart are obtained a liquid called *Camphor Oil*, and a crystalline solid denominated *Sumatra or Borneo Camphor*.

1. *Liquid Camphor*. *Camphor Oil*.—Is obtained by making deep incisions in the tree with an axe. The oil gushes out, and is received in bamboo or earthenware vessels. It is occasionally imported into this country in cisterns. It is sometimes perfectly limpid, transparent, and colourless; but more usually it is more or less coloured, being yellow or brownish. Its odour is very much analogous to that of oil of cajuputi, combined with the odour of camphor and cardamoms. Some samples have a strong odour of turpentine. This oil has been analyzed by Martius. The mean of three analyses gave him for its constituents: carbon 83-129, hydrogen 11-346, and oxygen 5-525. More recently Pelouze has analyzed it. He regards it as a hydrocarbon, whose formula is C20H18. By exposure to the air it rapidly oxidizes and becomes C20H36. Hence, therefore, it would appear that Martius must have analyzed an oxidised oil. Camphor oil has been employed in the preparation of scented soaps. Pounds of dark brown oil yielded a distiller forty pounds of colourless oil, and twenty pounds of crystalline camphor.

2. *Sumatra or Borneo Camphor*. By the natives of Sumatra it is termed *Baroos* (i.e. Baroos Camphor).—It is found in the natural fissures or crevices in the wood, and is obtained by cutting down the tree, dividing it transversely into several blocks, which are split with wedges into small pieces from the inner sides of which the camphor, if there be any, is extracted. After being freed from impurities, it is packed in *catties*. Being much esteemed by the Chinese, it fetches a very high price. According to Mr. Crawford it is valued at 78 times that of Japan camphor. It rarely comes to this country as a special article. For some of the samples in my museum I am indebted to the
of the firm of Howard, Jewell, and Gibson, of Stratford), who stated they are part of two very small boxes imported about twenty years ago, and bought by me at the common price of camphor at the time, but which, afterwards discovered, were invoiced at an enormous price. Our firm gave to the importers, reserving samples, and they were re-shipped for India. On any other occasion, except one, saw a small specimen of what I have called Camphor.

Camphor occurs in small white fragments of crystals. They are transparent, brittle, and have a camphoraceous odor and a hot taste. According to Pelouze its crystalline form is a prism with six regular faces, and from the rhombohedral system (see also p. 1152). It is lighter than water, only soluble in water; but is very soluble in alcohol and fusible and volatile. Its composition according to Pelouze is CO.

C. Camphor is distinguished from Common or Laurel Camphor by characters such as the form of the crystals above mentioned; their brittleness, so that when shaken in a bottle they produce a ringing sound; more brittle, and do not so readily sublime and condense in crystals in parts of the bottle.

But in the East, especially by the Chinese, the most extravagant assignments are made of it, and it is accordingly highly valued. In the PuntOUNTRY Lung Naou Heang, or “Dragon’s Brain perfume.”

Page LXXIII.—BYTTNERIACEÆ, De Candolle.—THE CACAO TRIBE.

Theobroma Cacao is a native of the West Indies and of Continental America. Its seeds (nuces cacao) when torrefied, and with various additions (sugar, and usually either cinnamon or vanilla), made into a paste, constitutes chocolate (chocolat), which furnishes a very nourishing beverage, devoid of the ill properties possessed by both tea and coffee, but which, on account of the contained oil, is apt to disagree with dyspepsies. Cocoa is another preparation of these seeds. It is said to be made from the fragments of the seed-coats mixed with portions of the kernels. It is somewhat astringent, and is adapted for persons with relaxed bowels.

Theobroma Cacao.

Page LXXIV.—MALVACEÆ, R. Brown.—THE MALLOW TRIBE.

Character.—Calyx of five (rarely three or four) sepals, more or less patent at the base, valvate in aestivation, often with bracts or external forming an involucel or outer calyx. Petals as many as these sepals, and alternate with them; hypogynous, equal; spirally contorted in aestivation, usually adnate to (but sometimes distinct from) the lower part of the ovary. Stamens equal in number, or more commonly a

Particulars respecting the manufacture of chocolate, see Cro, Diet. of Arts, 292; and Souvay de l'Her, l. 447.
multiple of the petals; generally indefinite (rarely definite), hypogynous. Filaments united into a tube, and unequal in length, the outer one being shorter. Anthers one-celled, uniform, dehiscing by a transverse chink. Ovary of many carpels, generally verticillated round the axis, and coherent (sometimes free). Styles as many as the carpels, either distinct or united. Stigma as many as the carpels, more or less distinct. Carpels either one or two seeded, and dehiscing inward by a chink, or polysperous, with a baccate dehiscence, or having a septum in the middle which bears the seeds on the inner side; in some cases nearly free, in others united into a many-celled capsule or an anomalous berry. Albumen none. Embryo straight. Radicle terminal. Cotyledons twisted like a chrysalis. Herbs, shrubs, or trees. Leaves alternate, generally petiolate, and with stipules (De Cand.)

Properties.—"The uniform character is to abound in mucilage, and to be totally destitute of all unwholesome qualities" (Lindley).

1. MALVA SYLVESTRIS, Linn. L. E.—common mallow.

   Sex. Syst. Monadelphus, Polyandria.

   (Herb, E.)

History.—According to Dr. Sibthorp¹, the Μαλάχη χρώσις of Dioscorides is the Malva sylvestris.

Botany. Gen. Char.—Calyx five-cleft, persistent, surrounded by an involucre of usually three, rarely one or two, or five or six, more or less oblong or setaceous bracteoles. Ovary with many cells each with one ovule. Styles as many as the cells. Carpels several (rarely only five), capsular, indehiscent, one-seeded, circularly arranged around the axis. Radicle inferior (Wight and Arnott).

Sp. Char.—Stem erect. Leaves five- to seven-lobed, acute. Petals and petioles hairy (De Cand.)

Root perennial, tapering, branching, whitish. Stem two or three feet or more high, branched. Leaves deep green, soft and downy. Flowers large, three or four together, axillary. Petals oblong, purplish-rose coloured, with deeper veins, combined by the back of their claws.

Hab.—Indigenous; hedges and road sides. Flowers from June to August.

Description.—Common Mallow (herba malva sylvestris) is odourless, and has merely a mucilaginous herbaceous taste. Its water infusion is deepened in colour by the sesquichloride of iron, and forms a precipitate with acetate of lead. Dwarf mallow (herba malva rotundifolia) possesses similar properties.

Composition.—I am unacquainted with any analysis of this plant. The constituents are probably similar to those of Althea officinalis (p. 1697). Mucilage is the prevailing principle. Extractive also a another constituent. The colouring matter of the flower is an exceedingly delicate test of alkalies, which render it green.

Physiological Effects and Uses.—Emollient and demulcent. Employed in the form of decoction, in irritation of the alimentary

¹ Prodr. Pl. Graec. ii. 45.
² Lab. ii. cap. 144.
COMMON MARSH-MALLOW.

... and of the pulmonary and urinary organs. In tenesmus the
action is used in the form of enema. In external inflammations,
client fomentations and cataplasms of mallow are sometimes
employed.

**Decoctum Malvae Compositum**, L. Compound Decoction of Mallow.
- Mallow, dried, 3; Chamomiles, dried 3ss.; Water, Qj. Boil for a
  quarter of an hour, and strain).—Employed for fomentations and
  cataplasms as above mentioned.

**Althæa Officinalis**, Linn. L. E. D.—COMMON MARSH-
MALLOW.

_Sex. Spet._ Monadelphous, Polyandria.

(Folia, Radix, L. D.—Leaves. Root, E.)

**History.**—According to Dr. Sibthorp¹ this plant is the 'Ἀλθαία of
scorides'.

**Botany.** _Gen. Char._—Calyx surrounded by a six- to nine-cleft
budcel. Carpels numerous, capsular, closely and circularly ar-
anged round the axis (Wight and Arnott).

_sp. Char._—Leaves softly tomentose on both sides, cordate or ovate,
shaped, undivided, or somewhat three-lobed. Peduncles axillary,
un-flowered, much shorter than the leaf (De Cand.)

Root perennial, tap-shaped, rather woody. Stem two or three feet
high. Leaves hoary green, peculiarly soft and downy, with a fine
pubescence. Flowers three or four together, on axillary stalks,
pale rose coloured.

**Fab.**—Indigenous; marshes, especially near the sea.

**Description.**—The leaves of Marsh-mallow (foliæ althæœ) are
more or less, and have a mucilaginous taste. The root (radix althæœ)
long, cylindrical, branched, about the thickness of the finger,
white, mucilaginous, white internally, and covered with a yellowish
rind. That which is imported from France has been deprived
of its epidermis, and is white (decorticated root of marsh-mallow).
Colour is feeble, its taste sweet and mucilaginous. Iodine colours
dark blue. Sesquichloride of iron forms with the concentrated
solution a brown semi-transparent gelatinous mass.

**Composition.**—Marsh-mallow root has been analysed by Bacon²;
L. Meyer³; by Wittstock⁴; and by Buchner⁵. The results of
the latter chemist are as follows:—Fatty oil 1·26, glutinous matter
1·4, uncrystallizable sugar and althæin 8·29, mucilage 35·64, starch
1·81, phosphate of lime 8·29, vegetable medulla 11·05, and woody
material 7·50 [excess 11·35].

¹ Prodr. Fl. Græc. ii. 42.
² Libr. iii. cap. 163.
⁴ Gmelin, Handb. d. Chem. ii. 1231.
⁵ Pharron, Central-Blatt für 1831, S. 277.
⁶ Ibid. für 1832, S. 511.
Asparagin.—Asparagine; Althein.—The substance which has been called althein is identical with asparagin. It is crystalline, odourless, and tasteless. It is soluble in water and alcohol, sp. gr. 0·837; but it is less soluble in absolute alcohol and in ether. It consists of $C_6H_7N_2O_4$. Acted on by strong watery solutions of the alkalis, it evolves ammonia, and is converted to aspartic acid ($C_6H_5N_2O_4$); hence it is called asparagine, as it is an aspartic acid. In addition to ammonia ($C_6H_5N_06H_2N$), it contains an atom of water. It has not the therapeutic properties of the root.

Physiological Effects and Uses.—Similar to those of marshmallow, already stated (p. 1696). On the continent it is a demulcent. The pastilles and pâte de guimauve are used as pastilles. The powder of marshmallow root is used in France to enemas.

"The simple decoction is recommended as an injection, to be introduced into the vagina, in cases of difficult labour, arising from imperfect dilatation of the soft parts."

1. Mistura Althææ, E. Decoctum Althææ, D. Marshmallow Mixture. (Root and herb, D.) of Althææ; raisins, c. [Boiling, E.] Water Ov. [Ov. wine measure, D.] Boil: three [five, D.] pints; strain [through linen or calico, E.]. Boil the rest of the preparation, and strain. If there is any sediment, let it subsist for a short time, then pour it off the clear liquor for use. It is a good diluent and demulcent. Used in vesical inflammation and irritation; as nephritis, calculous affections, gonorrhoea, &c. From one to three pints may be taken in the course of the day.

2. Syrupus Althææ, L. E. D. Syrup of Marshmallow: root, fresh and sliced, 3viij. [lb. ss., D.]; pure sugar, lb. i. D.; water [boiling, E.], Ov. [wine measure, D.]. Boil water with the root to one half [strain, E.]; and express through calico, $E.$ the liquor [when cold, L. D.]. Set aside for four hours, that the impurities may subside; then pour off and the sugar being added, boil down to a proper consistence. It has a demulcent, employed as an adjunct to cough mixtures, antiseptic for children. It readily ferments, and becomes rosy in colour.


Sex. Syst. Monadelphus, Polyandria.

(Hairs attached to the seed, E.)

History.—It is somewhat doubtful who first mentioned the use of cotton. It is mentioned by Homer, but he or his translators are in error, in stating that the early people made their early garments out of cotton. The Persians were the first to use it for this purpose. The Arabs are said to have introduced the use of cotton into Europe.

* Montgomery, Obs. on the Duh. Pharm.
* Thalha, e.v.
* Rutledge, hexvi.
* Dutrochet, in Jameson's Journal, vol. xiii. p. 290. This author suggests that of Herodotus was the flaxen weaver's matter which lint [flax] supplied.
the cotton plant (Gossypium) and of the cloth (Xylina) the woolly substance which envelopes the seeds.

**Gen. Char.** — Calyx cup-shaped, obtusely five-toothed, edged by a three-leaved involucel, with the leaves united and at the base, and deeply cut or toothed irregularly. Style marked with three or five furrows towards the apex. Stigmas free, sometimes five. Capsules three- to five-celled, three-valved at the apex, loculicidal. Seeds numerous, imbedded — Young branches and leaves more or less conspicuously rith little black dots; nerves below usually with one or two (Wight and Arnott).

**Sp. Char.** — Bi-tribenial; young parts hairy.

**314.** Leaves hoary, palmate, with sub-lanceolate, rather acute lobes. Stipules falcate-lanceolate. Leaves of the exterior calyx dentate. Capsules ovate pointed. Seeds free, clothed with firmly adhering white down under the long white wool (Roxburgh). — Petals of a lively yellow colour, with a purple spot near the claw. Dr. Roxburgh particularly distinguishes three varieties cultivated in India— viz. the Ducca, the Berar, and the China cottons.

**Hab.** — Asia. Cultivated in India, Syria, Asia Minor, the Mediterranean, and America.

**Description.** — The filamentous substance, cotton (gossypium), consists of tubular hairs, which arise from the of the seed-coat. By drying, they become flattened; in state, if they be immersed in water and examined by the eye, they appear like distinct, flat, narrow ribbons, with only 1 appearances of joints, which are indicated by a line at a e, or nearly so, to the side of the tube. Cotton is distin-

**tion.** — Cotton is a modification of lignin, and consists, of carbon, hydrogen, and oxygen; but the precise relative as of its constituents have not been ascertained. In all its chemical properties it agrees with ordinary woody fibre. Completes insoluble in water, alcohol, ether, oils, and vegetable strong alkaline leys dissolve it. The strong mineral acids dissolve it. With nitric acid it yields oxalic acid.

**Biological Effects and Uses.** — Raw cotton, or cotton-wool, employed with apparently good effect in the treatment of

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1 Historical details see Royle’s Illustr. p. 84, seq.
2 1841.
3 Interesting information regarding Cotton, but which is unsuited to this work, cons. cit.; M’Culloch’s Dict. of Comm.; and Ure’s Dict. of Arts.
repose of the part is necessary, the first dressing to remain as long as possible undisturbed. It has been used as a topical application in erysipelas.

Cotton-wool impregnated with nitre or chlorate of potash is employed as moxa (see p. 1352).

The well-known superiority of linen to cotton wounds and ulcers, is usually ascribed to the pretty softness of cotton fibres, the sharp angles of which are supposed to irritate the flesh. But this shape of the fibres is not the only cause of the injury. The imagination of those who have never examined the fibres under a microscope. Raspail ascribes the superiority of linen to the hollow condition of the tubular fibres of the cotton, which are enabled to absorb into their interior the blood oozing from the wound. The tubes of cotton, on the other hand, are empty, and do not contain the organizing substance, and, therefore, can imbibe nothing.

Order LXXV.—Linaceae, Landley.—The Liners, De Candolle.

Essential Character.—Calyx three- or four-lobed, general, separable only at the base, imbricate in aestivation, corymbose, and therefore persistent. Petals as many as the sepals, unguiculate at the base, slightly united together, a tube. Stamens; alternate with the sepals, twisted in aestivation, number, and alternate with the petals, cohering into a tube, and having an abortive filament, or tooth, biseriate, biseriate, bilocular, bi-rimose. Ovaries subglobose, with as many as the petals, are sepals, rarely fewer. Styles as numerous as the carpels, globose, crowned by the permanent bases of the carpels having induplicate margins and dehiscing at the base by an incomplete.
Linum usitatissimum, Linn. L. E. D.—Common Flax.

Sax. Syct. Pentandria, Pentagynia.

Dioecus seminibusb expressum, L. D.—Seeds. Meal of the seeds deprived of their fixed oil by expression. Expressed oil of the seeds, E.)

History.—From time immemorial flax has been employed in the manufacture of cloth; and it appears from our most ancient records, Egypt was celebrated for its production. Dutrochet asserts many cloths are made of flax.

NY. Gen. Char.—Sepales five, distinct, quite entire or serrated. Stamen five. Styles three to five, distinct from the combined to the middle or apex (Wight and Arnott).

Char.—Smooth, erect. Leaves lanceolate or linear. Panicle corymbose. Sepals ovate, acute, with membranous margins. Petals somewhat crenate, larger by three times than the calyx (De Cand.)—Annual. One or two feet high. Leaves distant. Flowers large, purplish-blue. Capsule globose, about the size of a small pea.

Hab. — Indigenous; corn fields; not unfrequent. Extensively cultivated in this, as well as in other European countries, both for its fibre for making thread, and for its oil obtained from the seeds.

Description.—The seed of the flax, commonly termed linseed or lintseed (semina lini) is small (about a line long), oval, oblong, flattened on the sides with acute edges, pointed at one extremity, smooth, glossy, brown externally, yellowish white internally, odourless, and has an oily mucilaginous taste. The seed coat is mucilaginous; the nucleus oily. The cake (placenta lini) left after the evaporation of the oil, is usually denominated oil cake; it forms, when ground to a fine powder, linseed meal (farina lini). The best oil for the preparation of linseed meal is the English fresh made cake of inferior quality. The colour of linseed meal is brown. It abounds in mucilage. The meal prepared by pressing the unpressed seeds, yields a considerable quantity of oil, a substance termed flour is prepared from the fibrous portions of the flax of the plant. The short fibres which are removed in constituting tow (stupa), which is employed both in pharmacy and surgery. Of flax is made linen (lenteum), which, when scraped, is called lint (lenteum carptum; linamentum), an important agent for surgeons.

Position.—Linseed has been analyzed by L. Meyer. Its

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4 Exod. ix. 31; Herodotos, Enterpe, cr.
6 See Ure’s Diet. of Arts, p. 482.
7 Gmelin, Handb. d. Chem. ii. 1251.
constituents he found to be as follows:—fat oil (in the nucleus) 11.26%, wax (in the husk principally) 0.146, acrid soft resin (in the husk principally) 2.488, resinous colouring matter 0.550, yellow extractin with tannin and salts (nitre and the chlorides of potassium and calcium) 1.917, sweet extractive with malic acid and some salts 10.84, gum (in the nucleus) 6.154, nitrogenous mucilage with acetic acid and salts (in the husk principally) 15.120, starch with salts (in the husk) 1.480, albumen (in the nucleus) 2.782, gluten (in the nucleus) 2.932, husk and emulsion (?) 44.382. The ashes contained oxide of copper.

1. Fixed Oil.—(See p. 1702.)

2. Mucilage of Linseed.—Has been examined by Bostock, by Varech, and by Guerin-Varry. Resides in the seed coats. Is extracted by heat. When the solution is mixed with alcohol, white mucilaginous flocks are precipitated. Diacetate of lead forms a precipitate in it. Neither infusion of nor chlorine have any effect on it. It is not coloured blue by iodine. It stains litmus (owing to the free acetic acid). It consists of two parts: one soluble, other insoluble in water. Its ashes contain carbonates of potash and phosphates of lime, chloride of potassium, sulphate of potash, oxide of alumina, and silica.

**Proximate Analysis.**

| Soluble part | 52.70 |
| Insoluble part | 22.90 |
| Ashes | 7.11 |
| Water | 10.30 |

| Mucilage of Linseed | 100.00 |

**Ultimate Analysis.**

| Carbon | 34.2 |
| Nitrogen | 7.2 |
| Oxygen | 35.7 |

**a. Soluble part (Arabine?)** soluble in cold water. Treated with nitric yields 14.25 per cent. of mucic acid, besides some oxalic acid.

**b. Insoluble part.** A nitrogenous substance, not soluble in water, and yielding mucic acid by the action of nitric acid. Properly speaking, then it is not a gummy substance.

**Physiological Effects.**—Linseed is emollient and demulcent also possesses nutritive qualities; for, in the form of a thick mucilage (or jelly, as it is termed), it is employed for fattening Linseed cake is also employed for a similar purpose. Linseed oil is a mild laxative.

**Uses.**—Employed, to allay irritation, in the form of infusion, tea, expressed oil, and meal.

**4. Infusum Linii Compositum, L. D.; Infusum Lini, E. Linx Tea.**—(Linseed; bruised, 5y. [3y. D.]; Liquorice-root, bruised, 5ss. D.); Boiling [distilled, L. Water, Oj. [Oij. D.]; Digest [the fire, L. E. ] in a lightly-covered vessel, and strain [through or calico, E.]—Employed as an emollient and demulcent in irritative inflammation of the pulmonary and urinary organs, and of mucous membranes generally; as gonorrhoea, dysentery, alvine irritation, and pulmonary affections. It is rendered more palatable at

\*Nicholson's Journal, xviii. 51.
\* Ann. de Chim. lxxx. 314.
tion of sliced lemon and sugar-candy.—Dose, fʒ of ʃʒiv. setum.

LINUM. L. E. D. Linseed Oil.—To prepare this oil, the first bruised or crushed, then ground, and afterwards under pressure in the hydraulic or screw press. Cold-drawn oil (oleum lini sive igne) is paler coloured, less odorous, and of taste, than linseed oil prepared by the aid of a steam heat of 300° F. (oleum lini, offic.) but, according to Mr. Brande, 1 it becomes rancid and more disagreeable than that extracted at a higher temperature. The seeds yield by cold 18 or 20 per cent. of oil; but by the aid of heat from 22 to 24 per cent. Linseed oil is usually amber-coloured; but it may be rendered quite colourless. For a fine sample of colourless oil I referred to Mr. Whipple. Linseed oil has a peculiar odour and is soluble in alcohol, but more readily so in ether. When exposed to the air it dries into a hard, transparent varnish. This is greatly accelerated by boiling the oil, either alone or with sugar of lead or with common white vitriol. The result is called drying oil or boiled oil. The efficacy of the process was described by Liebig 2 to the elimination of substances which oppose the coagulation of the oil. The ultimate composition of linseed oil, according to Saussure, is carbon 76.014, hydrogen 11.351, and oxygen 11.636. Its proximate constituents are oleic acid (chiefly), margaric acid, and glycerin. Rarely employed internally. Its most ordinary use is for the preparation of linimentum calcis, already (p. 581) mentioned.

LINUM E.; Linseed Meal.—(The meal of the seeds deprived of their fixed oil by expression, E.)—Emollient. Employed for the preparation of the linseed-meal poultice. It is a constituent of pro cataplasmate, D. already (p. 906) noticed. The farina pressed from linseed is preferred to the powder of linseed-cake, which is less oleaginous in quality. What is usually sold as such is prepared from recently pressed English oil cake.

APLASM LINUM, L.; Linseed Meal Poultice.—(Boiling Water, seed, powdered, as much as may be sufficient to make it of consistence. Mix.)—A valuable emollient poultice.

LI'NUM CATHARTICUM, Linn. E.—PURGING FLAX.

Sex. Syst. Pentandria, Pentagynia.
(Herb, E.)

History.—First mentioned by Thalius in the sixteenth century.

Gen. Char.—See Linum usitatissimum.

1 See Ure's Dict. of Arts, p. 899.
2 Diet. of Pharm.
3 Journ. de Pharm. xxvi. 103.
4 Sprengel, Hist. Rei Herb. 1. 35.
1704

ELEMEN TS OF MATERI A MEDICA.

Sp. Char.—Smooth, erect. Leaves opposite, obovate-hastate. Stem above dichotomous (De Cand.)

Annual. Stem slender, two to six inches high. Flowers before expansion, white, small.

Hab.—Indigenous; pastures: common.

Description.—Purging flax (herba lini cathartici) is odorous and has a very bitter taste.

Composition.—I am unacquainted with any analysis of it. Probably its purgative principle is bitter extractive.

Physiological Effects and Uses.—Cathartic and oc diuretic; but somewhat uncertain in its operation. Form in rheumatism. Now almost obsolete.—Dose, 3j. of the drug, or an infusion of a handful of the fresh plant may be employed.

ORDER LXXVI.—CARYOPHYLLACEÆ.—THE CH

WEED TRIBE.

CARYOPHYLLACEÆ, Jacobae; De Candolle.

ESSENTIAL CHARACTER.—Calyx generally persisting, of four or often five or more, which are continuous with the pedicel, and either free or coherent into a tube or five-dentate tube, imbricate in section. Petals as many as there are calyces, (very rarely none), inserted on the torus, which is more or less elevated above the pedicel (anthophorus), alternate with the sepals, ungulate, having sometimes a petaloid scale. Stamens as many as, or often more, number of the petals, inserted in the torus. Filaments bluish, subulate, submonadelphous at the base. Anthers two-celled. Ovary simple, five-valved, inserted at the apex of the torus, and crowned by an equal number of styles. Capsule of two to five valves, united at the base, dehiscing from the middle of the valves, incomplete or continuous to the apex, generally one-celled, sometimes two- to five-celled. Sepals from the middle of the valves, incomplete or continuous to the axis, central. Seeds numerous (very seldom few or definite); albumen in general central; embryo usually peripheral, more or less incurved or central and straight; radicle directed towards the hilum.—Herba shrubs, with opposite entire leaves. Stems jointed (De Cand.)

Properties.—Remarkable, for the most part, for their insipidity and inactivity.

DIANTHUS CARYOPHYLL'US, Linn. D.—CLOVE PINK; CARAMEL

OR CLOVE GILLYFLOWER.

Sex. Syst. Decandria, Diphylla.

(Flowers, D.)

History.—First noticed by Manfredus de Monte Imperia.

Botany. Gen. Char.—Calyx tubular, five-toothed, imbricate with two to four opposite scales. Petals five, with claws. Stamens ten. Styles two. Capsule one-celled. See

* Sprengel, Hist. Rei Herb. 1. 256.
MAILWORT TRIBE. 1705

se, convex on one side, concave on the other; peltate. Embryo
curled (De Cand.)
1. CHAR.—Stem branched. Flowers solitary. Scales of the calyx
very short, ovate, somewhat mucronate. Petals very broad,
dess. Leaves linear-awl-shaped, channelled, glaucous (De Cand.)
perennial plant; the origin of the fine carnations of the gardens.
thers pink, purple, white, or variegated; double, semi-double, or
n.
ch.—Indigenous. Cultivated in gardens.
escription.—The red or deep crimson gillyflowers (flores dianthi
phylli; flores caryophylli rubri; flores tunicae) were formerly em-
ed in medicine on account of their colour. They have a pleasant
atic smell, and a bitterish sub-astringent taste. They communi-
to water their smell and colour.
osition.—I am unacquainted with any analysis of them,
obviously contain a volatile oil, colouring matter, and an astring-
principle.
THERAL EFFECTS AND USES.—Formerly supposed to have
fluence over the nervous system, to raise the spirits, &c. Simon
l recommended them in various nervous and spasmodic affec-
s, and in malignant fever. The have also been used as flavouring
colouring agents; and a syrup of them was formerly contained in
British pharmacopoeias. Though still retained in the Dublin
pharmacopoeia, their medical use is obsolete.

4. LXXVII.—POLYGALE.E, De Candolle.—THE MILK-
WORT TRIBE.

POLYGALACE.E and KRAMERIACE.E, Lindley.

THERAL CHARACTER.—Sepals five, imbricate in asstivation, the two interior
erally petaliform, the three exterior smaller; two of them are interior and
etimes united, the third is posterior. Petals three to five, hypogynous,e or less united by means of the tube of the stamens (rarely distinct).
ents of stamens adherent to the petals, monadelphous, divided at the apex
two opposite equal phalanges. Anthers eight, one-celled, innate, dehiscing
ores at the apex. Ovary one, free, two-celled, rarely one- or three-celled.	le one. Stigma one. Pericarp capsular or drupaceous, two- or one-celled.
ess septigerous in the middle. Seeds pendulous, solitary, often with a
inate arillus at the base; embryo straight, generally in the axis of a
by albumen, (or rarely) exalbuminous, in which case the endopleura is
id.—Herbs or shrubs. Leaves entire, generally alternate, articulated on the

4 For horticultural information respecting them, consult Loudon's Encyc. of Gardening.
1 Lewis, Mat. Med.
like. Petals three to five, adnate to the tube of the
ferior one keel-shaped (perhaps composed of two un
compressed, elliptical, or obturate. Seeds pubesce
at the hilum, destitute of a coma (De Cand.)

Sp. Char.—Stems several, somewhat erect, simple:

ovate-lanceolate, the upper ones acuminate. Ra
spiked. Wings orbiculate. Capsule elliptical, emarg

Root perennial, branching. Stems annual, from
inches high, occasionally tinged at their lower p
purple. Leaves alternate, sessile, or on very she
beneath. Flowers small, white. Alae of the calyx v
veins. Capsule small, containing two blackish seed.

Hab.—United States of America: most abundant
and western parts.

Description.—Senega or Seneka root (radix sen
sometimes called the seneka-snakeroot or the rattles
ported from the United States in bales. It varies in
a writing-quill to that of the little finger; it is cont
number of eminences, and terminates superiorly in s
rosity, which exhibits traces of numerous stems:
extends the whole length of the root. The cortical
gated, transversely cracked, thick, of a grayish yell
central portion (medullarium) is woody and white. 'r
root is at first sweetish and mucilaginous, afterward
gent, exciting cough and a flow of saliva: its odor
nauseous.

Composition.—Senega root has been repeatedly 1
of chemical investigation. In the last century it w
Burckhard, by Keilhorn, and by Helmuthți. In 180
SENKA.

By Dulong d’Astafort, and by Folchi, in 1832 by Trommsdorff, and in 1836 by Quevénne. I subjoin three of these analyses:

<table>
<thead>
<tr>
<th>Trommsdorff</th>
<th>Dulong</th>
<th>Quevénne</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tile oil</td>
<td>Volatile oil, traces.</td>
<td>Polygalic acid.</td>
</tr>
<tr>
<td>I resin</td>
<td>Acid extractive.</td>
<td>Virginic acid.</td>
</tr>
<tr>
<td>Fish-butter extract</td>
<td>Yellow extractive</td>
<td>Tannic acid.</td>
</tr>
<tr>
<td>Acid</td>
<td>A substance reddened by sulphuric acid.</td>
<td>Pectic acid.</td>
</tr>
<tr>
<td>Resin</td>
<td>Pectic acid.</td>
<td>Cerin.</td>
</tr>
<tr>
<td>Wax</td>
<td>Resin.</td>
<td>Fixed oil.</td>
</tr>
<tr>
<td>As</td>
<td>Gum.</td>
<td>Yellow colouring matter.</td>
</tr>
<tr>
<td>Cy. fibre</td>
<td>Woody fibre.</td>
<td>Gum.</td>
</tr>
<tr>
<td>Sea, potash, and lime</td>
<td>Malates of potash and lime.</td>
<td>Albumen.</td>
</tr>
<tr>
<td></td>
<td>Mineral salts and iron.</td>
<td>Woody fibre.</td>
</tr>
</tbody>
</table>


Polygalic Acid, in the impure state, was first procured by Gehlen, who called megin. It is the active principle of the root, and resides in the cortical part of the root. When pure it is a white odourless powder, which is at first tasteless, but afterwards communicates an acid feeling to the mouth, and a sense of irritation to the fauces. It irritates the nostrils, and excites sneezing. It is soluble, and, when decomposed by heat in a glass tube, evolves ammonia, and contains no nitrogen. It is soluble in water and in alcohol, especially in a solution, with the aid of heat; but is insoluble in ether, acetic acid, and the oils. Its solution forms white precipitates (polygalates) with diacetate of lead and protocatechuic acid. Sulphuric acid has a characteristic effect on polygalic acid: it renders polygalic acid yellow, then rose-red, and afterwards dissolves it, forming a violet-coloured solution, which becomes decolorized in twenty-four hours. Alkaline polygalates are not crystallizable. Polygalic acid consists of carbon 74, hydrogen 7:529, and oxygen 30:767; or C₂₀ H₁₆ O₁₁. It has considerable resemblance to esculin acid. Given to dogs in doses of six or eight grains, it causes vomiting, embarrassed respiration, and death in three hours. Two grains given in the jugular vein caused vomiting, and, in two hours and a half, death.

Physiological Effects.—Senega possesses acid and stimulant properties. In small doses it is diaphoretic, diuretic, and expectorant; in large doses, emetic and purgative. Sundelin took a scrup of powdered senega root every two hours for six hours: it caused irritation of the back part of the tongue and throat, and gave rise to increased flow of saliva. These effects were soon followed by considerable burning in the stomach, nausea, and vomiting. The skin became warmer and more moist; there was gripping pain in the bowels, followed by watery evacuations; the secretion of urine was increased, and a feeling of heat was experienced in the urinary passages. For some days after there was gastric unceasing, with loss of appetite.

1 Journ. de Pharm. xiii. 567.
2 Journ. de Chim. Méd. iii. 600.
3 Pharm. Central-Blatt für 1832, S. 449.
4 Journ. de Pharm. xxiii. 370.
5 Handb. d. spec. Heilmittel. ii. 176, 3° Aufl.
In larger doses it caused burning pain in the stomach and bowels, violent vomiting, purging, anxiety, and giddiness.

It appears to excite moderately the vascular system, to promote the secretions (at least those of the kidneys, skin, uterus, and bronchial membrane), and to exert a specific influence over the nervous system. It has been principally celebrated for its expectorant effect.

In its operation on the nervous system it has considerable resemblance to Arnica (see 1355). But its influence over the secreting organs is much greater. It is somewhat analogous to Helonanthes (p. 1345) in its action.

Uses.—In this country Senega is comparatively but little employed. It is an exceedingly valuable remedy in the latter stages of bronchial or pulmonary inflammation, when this disease occurs in aged, debilitated, and torpid constitutions, and when the use of depletive is no longer admissible. It appears to re-establish a healthy condition of the secreting organs, to promote the resolution of the morbid deposits and to give strength to the system. I usually administer it in combination with ammonia, which appears to me to promote its beneficial operation. Frequency of pulse, and a febrile condition of the system are by no means to be regarded as impediments to the use of this medicine.

In chronic catarrh and humoral asthma it has also been used. It has been extravagantly praised by Dr. Archer, of Maryland, as a remedy for croup. He represents it as being capable, without aid of any other means, of removing this alarming disease. To practitioners, I suspect, would venture to trust it. Yet it might be a useful addition to emetics. As a stimulant and promoter of secretions, it has been used with advantage in the latter stage of fever accompanied with torpidity. It has also been used as an expurgative, and diaphoretic, in rheumatism, as a diuretic in dropsy, and as an emmenagogue in amenorrhea. It was introduced into practice as a remedy against the bite of venomous animals, as a rattlesnake.

Administration.—The dose of the powder is from grs. x. to Gr. ii. But the infusion or decoction is the best form of exhibition.

Decoction Senega, L. E. D. Decoction of Senega.—(Senega root, 5x. [3ijij. D.]; Water [distilled, L.], Oij. [Ojijss. wine measure L.; Boil down to a pint [3viij. D.], and strain).—Stimulating, expectorant and diuretic.—Dose, f5j. to f3ijj. three or four times daily. Ammonia is often a valuable addition to it.

Krameria Triandra, Ruiz and Pavon, L. E. D.—The Rhatia

(Radix, L.—Root, E.—Radix et extractum, D.)

History.—This plant was discovered by Ruiz and Pavon in 1779, in South America. It was introduced to notice into the

* Eberle, Mat. Med.
Rhantany.

Gen. Char.—Sepals four or five, irregular, coloured, ading, deciduous. Petals four or five, irregular, smaller than the x, the three inner unguiculate. Stamens one, three, or four, agynous, unequal. Ovary one-celled, or incompletley two-celled; terminal; stigma simple; ovules in pairs, suspended. Fruit green hairy and leathery, globose, covered with hooked prickles, abortion one-seeded, indehiscent.—Spreading many-stemmed shrubs. Leaves alternate, simple, entire or three-foliate, spreading.

Racemes simple, spiked (Lindley).

Char.—Leaves oblong, somewhat acute, villous-silky. Pedicels what longer than the leaf, bitracteate, forming a short raceme Cand.)

effrutoce. Root long, branching. Stem procumbent, branch-

Leaves sessile, covered on both surfaces with long, silky leaves.

ers solitary, lake-coloured. Stamens three. Drupe round, with stiff reddish hairs.

b.-Peru; growing abundantly in Huanuco, Huamalies, and PERU.

ESCRIPION.—Rhantany root (radix Kramerie seu rhatanthiae) is ght from Peru. It consists of numerous, woody, cylindrical, long ches, varying in thickness from that of a writing quill upwards. se pieces consist of a slightly fibrous, reddish-brown bark, having intensely astringent and slightly bitter taste,—and of a very hard, nous meditullium, of a yellowish or pale red colour. The largest tity of astringent matter resides in the bark, and therefore the ter branches (which have a larger proportion of bark) are to be resed.

reign or South American extract of rhantany (extractum Krameriae rhatanthiae americanum) is occasionally imported.

IMPOSITION.—Rhantany root has been analysed by Trommsdorff, 1, C. G. Gmelin, and Peschier 2.

<table>
<thead>
<tr>
<th>C. G. Gmelin</th>
<th>Peschier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dried watery extract</td>
<td>31:25</td>
</tr>
<tr>
<td>Insoluble matters</td>
<td>68:75</td>
</tr>
<tr>
<td>Rhantany root</td>
<td>100:00</td>
</tr>
<tr>
<td>Tannin</td>
<td>43:6</td>
</tr>
<tr>
<td>Gallic acid</td>
<td>0:3</td>
</tr>
<tr>
<td>Gum, extractive and colouring matter</td>
<td>56:7</td>
</tr>
<tr>
<td>Kramerie acid</td>
<td>0:4</td>
</tr>
<tr>
<td>Dried watery extract of rhantany root</td>
<td>100:0</td>
</tr>
</tbody>
</table>

TANNIC ACID.—To this, as well as in part to a minute portion of gallic acid, my root owes its astringent qualities. It is this acid which enables an
infusion of rhatany root to form, with a solution of gelatine, a precipitate (tannate of gelatine), and with sesquichloride of iron a brownish grey precipitate (tannate of iron). The properties of tannic acid have been already described (see p. 1080).

2. Krameria Acid.—Peschier ascribes the stypticity of rhatany to the properties of which are at present imperfectly known.

**Physiological Effects.**—A powerful astringent, and, like agents of this class, tonic also. (See the effects of astringent p. 188).

Uses.—Rhatany root is adapted to all those cases requiring employment of astringents; such as *profuse mucous discharge* (humid catarrh, old diarrhoeas, fluor albus, &c.), *passive hemorrhages* (especially metrorrhagia) and *relaxation and debility of the solids* is sometimes used as a *tooth powder* (as with equal parts of orris and charcoal). Dentists sometimes employ tincture of rhatany diluted with water as an *astringent mouth wash*.

Administration.—The powder may be given in doses of from x. to 3ss. The infusion or extract is more commonly employed.

**Compound tincture of rhatany** is prepared by digesting 5ij. of rhatany root, and 5ij. of orange peel, in Oj. of proof spirit. Some 3ss. of serpentery root and 5j. of saffron are added. It is an excellent astringent and stomachic.—Dose, f3j. to f5ij.


**Order LXXVIII.**—VIOLACEÆ, *Lindley.*—**THE VIOLET TRIBE.**

**Violarieæ, De Candolle.**

**Essential Character.**—Sepals five, persistent, with an imbricate aestivation usually elongated at the base. Petals five, hypogynous, equal or unequal, usually withering, and with an obliquely convolute aestivation. Stamens alternate with the petals, usually opposite them, inserted on a hypogynous disk, often unequal; anthers bilocular, bursting inwards, either separate or cohering, and lying close upon the ovary; filaments dilated, elongated in the anthers; two, in the regular flowers, generally furnished with a stigma or gland at their base. Ovary one-celled, many-seeded, or rarely single-seeded, with three parietal placenta; opposite the three outer sepals; stigma, usually decline, with an oblique hooded stigma. Capsule of valves, bearing the placenta in their axis. Seeds often with a tumor at base; embryo straight, erect, in the axis of fleshy alburnum.—Herbaceous or shrubs. Leaves simple, usually alternate, sometimes opposite, entire, with an involute vernalation. Inflorescence various. (Lindley.)

**Properties.**—Roots more or less emetic.
VIÔLA ODORÂTA, Linn. E. D.—THE SWEET VIOLET.

Sex. Syst. Pentandria, Monogynia.
( Flowers, E.—Flores, D.)

History.—According to Dr. Sibthorp, this is the "Ion porphyréov (purple violet)" of Dioscorides. It was employed in medicine by Pictorson.

Botany. Gen. Char.—Sepals five, unequal, prolonged into appendages at the base. Corolla unequal, two-lipped, of five petals, the outer calcarated. Capsule bursting with elasticity, many-seeded, 4-valved. —Herbaceous plants (Lindley).


a. ab.—Indigenous. Flowers in March and April. Cultivated on account of the odour and colour of the flowers.

Description.—Violets (Flores violae odoratae) should be gathered immediately they are expanded, as they subsequently become purplish. Their delightful fragrance is well known. The root of the violet (radix violae odoratae) has been used in medicine.

Composition.—In 1822, Pagenstecher detected the following substances in an infusion of the flowers:—odorous principle, blue colouring matter, sugar both crystallizable and uncrystallizable, gum, albumen, salts of potash and lime. Boullay obtained from the roots, flowers, and seeds, an acrid principle, which he has termed "violine."
Physiological Effects.—The odorous emanations of violet petals, which are said to have occasionally produced faintness and giddiness internally, violets act as laxatives. The seeds possess similar properties. The root, in doses of from 5 to 10, proves emetic and purgative.

Uses.—Violets are employed in the preparation of the syrup. They are useful as a test for acids and alkalis, much sought after for bouquets. The root might be employed as a substitute for ipecacuanha.

Syrup of Violets.—(Fresh Violet petals, D. lb. j. [lb. ij.]; Boiling Water, Ojss. [Ov. wine-measure]; Pure Sugar, lb. vijss. [lb. xij. and 3 j. D.]) Infuse the flowers for twenty-four hours in the water [in a covered glass or earthen vessel, E.]; strain through fine linen, D. without squeezing, dissolve the sugar in the filtered liquor. The colour of this solution is improved by making it in a tin or pewter vessel. No explanation of this has been offered. The Edinburgh Pharmacopoeia, I presume, of metallic impregnation, direct glass or pewter vessels to be employed.—Genuine syrup of violets is distinguished from any counterfeit by its being reddened by an alkali. Hence it is employed as a test.—As a mild laxative for new-born infants, the syrup is made up in oil of almonds and syrup of violets is often taken, in doses of one or two teaspoonfuls, for the purpose mentioned.

OTHER MEDICINAL VIOLETACEAE.

The roots of several species of Iodidium possess medicinal qualities, and have been employed as substitutes for the officinal ipecacuanha (Cepahelicis Ipecacuana).

The root of Iodidium Ipecacuana, a native of Brazil, is termed false Brazilian ipecacuanha. Pelletier found five per cent. of emetine. The dose of the root, 5 j., is 3 j. infused in water.

The root of the Iodidium Microphyllum, Cuichuchully, a native of Quito, possesses similar properties. Dr. Bancroft speaks favourably of it in Equisetum tuberculata. But the specimens which he sent to Sir W. Hooker to be compared with Iodidium Pavesiflorum Vent. Dr. Lindley received from the Hon. W. F. Strangways the "chully de Cuenca," which was the I. micropetala Humboldt.

1 Triller, quoted by Murray, App. Med. l. 778.
2 Fl. Med.
3 Comp. to Bot. Mag. l. 278.
4 Flora Moderna, p. 98.
CRUCIFEROUS TRIBE.

LXXIX.—CISTACEÆ, Lindley.—THE ROCK-ROSE TRIBE.


A substance called Ladanum is a resinous exudation from the Cistus creticus, as its name implies, in Crete. In the time of Dioscorides it was collected by combing the beards of the goats which browse on the plant. According to Tournefort and Sieber, it is now collected by a kind of whip or rake, with a double row of leathern thongs. With this the countrymen brush the plants, and when the whips are sufficiently laden with the juice, it is scraped off by knives, and made into cakes. Pure ladanum consists of resin and volatile oil 86, wax 7, aqueous extract 1, and earthy matters and hairs 6 (Guibourt). Pelletier found 72 per cent, of sand in it. It possesses stimulant properties, and was formerly a constituent of some plasters. Its use is now obsolete.

LXXX.—CRUCIFERÆ, Jussieu.—THE CABBAGE OR CRUCIFEROUS TRIBE.

Brassicaceæ, Lindley.

CHARACTER.—Sepals four, deciduous cruciate. Petals four, cruciate, alternate with the sepals. Stamens six, of which two are shorter, solitary, opposite the lateral sepals, and occasionally toothed; and four larger, in pairs, opposite the anterior and posterior sepals, generally distinct, sometimes connate, or furnished with a tooth on the inside. Disk with various green glands between the petals and the stamens and ovary. Ovary superior, unilocular, with parietal placenta usually meeting in the middle, and forming a spurious dissepiment. Stigmas two, opposite the placenta. Fruit a siliqua or silicule, one-celled, or sparsely two-celled; one- or many-seeded; dehiscing by two valves separating from the replum; or indehiscent. Seeds attached in a single row by a funicle to each side of the placenta, generally pendulous. Albumen none. Embryo with the radicle folded upon the cotyledons. Herbaceous plants, annual, biennial, perennial, very seldom suffruticosæ. Leaves alternate. Flowers usually yellow or white, seldom purple (Lindley).

PROPERTIES.—Pungent stimuli. They furnish nutritive condimentary, and antiscorbutic substances. Their pungency depends on an acid volatile oil, composed of carbon, nitrogen, hydrogen, sulphur, and oxygen. This oil becomes absorbed, and in some cases is detectable in the secretions. The nutritive properties of cruciferæ arise from their mucilaginous,
HORSE-RADISH.

Stems two

Cylindrical white, very pungent. Stems two

Extensively cultivated. Flowers in May.

Horse-radish root (radix armoraciae; radix radi
cavata) when scraped into strips, a highly pene
trating. Its taste is very pungent. It is coloured
blue by alcohol. An infusion of it is tinged reddish yellow by
sulphate of iron.

Horse-radish root was analysed by Gutret, who
found constituents to be—acrid volatile oil, bitter resin, extrac
tion, starch, woody fibre, vegetable albumen, acetic acid,
and sulphate of lime.

Oil (Oleum Armoraciae).—Obtained by distillation without water.

The oil is yellow, heavier than water, and very volatile. Its odour is exceedingly
strong, and like that of horse-radish. One drop is sufficient to infect a whole
room. Its taste is at first sweetish, then burning and acrid. It causes inflam
mation and vesication when applied to the skin. It is slightly soluble in water,
but is readily soluble in alcohol. The watery solution yields, with acetate of lead, a brown
precipitate (sulphuret of lead); with nitrate of silver, a black one (sulphuret of
silver).

Physiological Effects.—Horse-radish is a well-known pungent, stimulant, capable of producing vesication when applied to the
stomach. Its odorous emanations readily excite a copious

Flavum—Scraped in strips, it is used at the table as a condiment
and stimulant to roast beef. It is not much employed as a medicin
and, it serves as an excellent masticatory. Taken in this way, the
form of syrup, it may be serviceable in some forms of

Fusum Armoraciae Compositum, L. D. Compound Infusion
Horse-radish.—(Horse-radish, sliced; Mustard-seeds, bruised; Compo
Made Spirit of Horse-radish, f. 3); Boiling [distilled,

Macerate the root and seeds in the water for two
saccharine, and extractive constituents. **Cakile maritima** is purgative, *thus livides* is said to be dangerous to goats; while *Lepidium* are told stupefies fish. These statements, however, require it With these doubtful exceptions none of the cruciferæ are poisonous.

1. **CARDAM'INE PRATEN'SIS, Linn. L. D.—CUCKOO-FI**

Sex. Syst. Tetradygmanis, Siliquosea.

(Flores, L. D.)

**History.—** Brunfels and Tragus are the earliest writers who mention this plant. It appears in their works an undoubted notice of this plant appears.**

**Botany.** Gen. Char. — *Siliqua* linear, with flat, nervele which often separate elastically. *Seeds* ovate, not border *Umbilical cords* slender (De Cand.)

Sp. Char. — *Leaves* pinnatisect; segments of the radiate somewhat rounded,—of the cauline ones, linear or lanceolat *Style* very short, scarcely more slender than the *siliqua* capitate (De Cand.)

**Root** perennial. **Stem** about a foot high. **Flowers** lig thrush-coloured, or white.

**Hab.**—Indigenous; meadows and moist pastures. F April and May.

**Description.**—The flowers (*flores cardamines*) are som and pungent, and have a slight odour. By drying they lose their odorous and almost insipid. The *leaves* possess a flavour to, though less agreeable than, the common water-cress.

**Composition.—** I am unacquainted with any analysis of this plant worth quoting. The pungency depends on *volatile oil*, the *botanical* on extractive matter. A few experiments on this plant have been mentioned by Gronhert.

**Physiological Effects and Uses.**—The flowers of the plant are said to be stimulant, diaphoretic, diuretic, and nervy. They were formerly used in epilepsy, especially when it occurred in children, but have now fallen into almost total disuse. They are recommended by Sir George Baker in cholera and asthma. — Dose of the dried flowers, 1ij. or 3ij.

2. **COCHLEA'RIA ARMORAC'IA, Linn. L. E. D.—HORSE-L**

Sex. Syst. Tetradygmanis, Siliquosea.

(Radix recens, L.—Fresh root, E.—Radix, D.)

**History.**—Sprengel considers this plant to be the *Compsia* of Dioscorides; and Dierbach suggests that it was known to Hippocrates. But these opinions are by no means well e

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* Spec. Inst., Retsomonti, 1783.
* Med. Trans., i. 447.
* Lib. ii, 130.
* Aranem, d. Hippok. 125.
BOTANY. Gen. Char.—Silicule sessile, ovate-globose or oblong, with crenose valves. Seeds many, not bordered. Calyx equal, spreading. Petals entire. Stamens not toothed.—(O =). Flowers white. Fruits often somewhat fleshy (De Cand.)

Sp. Char.—Silicules ellipsoid. Radical leaves oblong, crenate; satellite ones elongated, lanceolate, dentate, or incised. Root fleshy. Seed (De Cand.)

Root perennial, long, cylindrical white, very pungent. Stems two or three feet high. Leaves much veined. Flowers white.

Hab.—Indigenous; extensively cultivated. Flowers in May.

Description.—Horse-radish root (radix armoracia; radix raphani rusticani) evolves, when scraped into shreds, a highly pungent, acrid vapour. Its taste is very pungent. It is coloured blue by tincture of iodine. An infusion of it is tinged reddish yellow by sesquioalts of iron.

Composition.—Horse-radish root was analysed by Gurtet, who found its constituents to be—acrid volatile oil, bitter resin, extractive, sugar, gum, starch, woody fibre, vegetable albumen, acetic acid, acetate and sulphate of lime.

Volatile Oil (Oleum Armoraciae).—Obtained by distillation without water. It is pale yellow, heavier than water, and very volatile. Its odour is exceedingly power, and like that of horse-radish. One drop is sufficient to infect a whole room. Its taste is at first sweetish, then burning and acrid. It causes inflammation and vesication when applied to the skin. It is slightly soluble in water and easily so in alcohol. The watery solution yields, with acetate of lead, a brown precipitate (sulphuret of lead); with nitrate of silver, a black one (sulphuret of silver).

Physiological Effects.—Horse-radish is a well-known pungent and stimulant, capable of producing vesication when applied to the skin, and of causing vomiting, when taken, in the form of infusion, to the stomach. Its odorous emanations readily excite a copious flow of tears. On the general system it operates as a stimulant, and promotes both urine and perspiration.

Uses.—Scraped in shreds, it is used at the table as a condimentary accompaniment to roast beef. It is not much employed as a medicine. When hewed, it serves as an excellent masticatory. Taken in this way in the form of syrup, it may be serviceable in some forms of debility. An infusion of it may be taken to excite vomiting, or to promote the operation of other emetics, as in poisoning by narcotic substances. As a general stimulant, diaphoretic, and diuretic, it has been used in palsy, chronic rheumatism, and dropsy. It is one of the old remedies deemed antiscorbutic.

Administration.—Dose, 3 ss. or more, scraped into shreds.

1. INFUSUM ARMORACII COMPOSITUM, L. D. Compound Infusion of Horse-radish.—(Horse-radish, sliced; Mustard-seeds, bruised, 1 g.); Compound Spirit of Horse-radish, 1 f. 3 j.; Boiling [distilled] Water, Oj. Macerate the root and seeds in the water for two
[six, D.] hours, in a lightly covered vessel, and strain. Then add
the compound Spirit of Horse-radish.—This preparation soon under-
goes decomposition. It is stimulant and diuretic, and has been em-
ployed in chronic rheumatism, paralysis, dropsies, and scurvy. —Dose,
\( \frac{f}{3} \). to \( \frac{f}{3} \).j.

2. SPIRITUS ARMORACIAE COMPOSITUS, L. D. Compound Spirit of
Horse-radish.—(Horse-radish, sliced; Dried Orange Peel, of each \( \frac{3}{4} \).;
Nutmegs, bruised, \( \frac{3}{4} \).; Proof Spirit, \( \text{Cong.} \) i.; Water, 0j. Mix
[macerate for twenty-four hours, \( D \).], and let a gallon distil. The
proportions of ingredients used by the Dublin College are not es-
tially different from those of the London College.)—Usually em-
ployed as a stimulating adjunct to other medicines, especially to di-
uretic infusions.—Dose, \( \frac{f}{3} \).j. to \( \frac{f}{3} \).iv.

3. COCHLEA'RIA OFFICINALIS, LINN. D.—COMMON SCURVY-
GRASS.

\text{Sex. Syst.} Tetradynamia, Siliculosa.
(Herba, D.)

\text{History.}—This plant does not appear to have been known to
ancients.


\text{Sp. Char.}—Silicules ovate-globose, twice as short as their petiole.
Radical leaves stalked, cordate; cauline ones ovate dentate.
(De Cand.)—\text{Annual. Stem} about a foot high. \text{Flowers pure white.}

\text{Hab.}—Indigenous; on the sea-coast, and in watering places on
Welsh and Scottish mountains. Cultivated in gardens. —Flowers
April and May.

\text{Description.}—Scurvy-grass (\text{herba cochlearia}) evolves, when
rubbed, a somewhat pungent odour. Its taste is penetrating and
acrid.

\text{Composition.}—The \text{inspissated juice} was examined by Brame
and the \text{fresh herb} by Gutter. The latter obtained the following
constituents: —volatile oil, bitter resin, bitter extractive, gum, gre-
cula, vegetable albumen, hydrochlorate and sulphate of ammonia,
nitrate and sulphate of lime.

\text{Volatile Oil (Oleum Cochlearia).}—This is yellow, heavier than water,
volatile, and soluble in alcohol. Its odour is strong, and its taste acrid.

\text{Physiological Effects and Uses.}—A gentle stimulant, aperitif
and diuretic. It has long been esteemed as an antiscorbutic; it
has also been used in visceral obstructions. It is occasionally
infused with bread and butter, like the water-cress.

\* \text{Journ. Phys. lxxiv.} 278.
\* \text{Gmelin, Handb. d. Chem.} ii. 1248.
\* See \text{Valentinus, Cochlearia curiosa,} by Shirley. 1676.
NI'GRA, Linn. L. E. D.—COMMON OR BLACK MUSTARD.


Mustard (μέτωρ) was employed in medicine by Hippo-

Gen. Char. — Silique somewhat terete; the valves nerv'd,
short, acute. Seeds in one row, somewhat globose. Cal-
g (De Cand.)

—Silique smooth, even, somewhat tetragonal, pressed
close to the peduncle. Lower leaves lyrate; upper ones lanceolate, quite entire, stalked.
—Annual. Stem three or four feet high.

Flowers yellow.

Hab. — Indigenous; hedges and waste
places. Cultivated in fields, especially in
Durham and Yorkshire.

Description. — Black mustard seeds
(semina sinapis nigrae) are small and round-

ish. Externally they are beautifully veined,
and of a reddish or blackish brown colour,
though sometimes whitish. Internally they
are yellow. They are inodorous, but have
an acid, bitter, oleaginous taste.

Manufacture of Mustard.—The follow-
ing method of preparing flour of mus-
tard (farina sinapis) was kindly furnished
me by a manufacturer:—The seeds of both
the white mustard are first crushed between rollers, and then
mortars. The pounded seeds are then sifted. The resi-
sieve is called dressings or siftings: what passes
—pure flour of mustard. The latter by a second sift-
ing flour of mustard, and a second quantity of dressings.

A flour of mustard of the shops is adulterated with flour
coloured by turmeric, and rendered hot by pod pepper.
The dressings or siftings yield a fixed oil (fixed oil of mus-
tard) is used for mixing with rape and other oils. The whole
never pressed. Mustard cake is employed as a manure, be-

for cattle.

Formation.—Black mustard seed was analysed by Thibierge a,
constituents have subsequently been examined by Henry
rot a; by Pelouze b; by Robiquet and Boutron c; by

a le Pharm. tom. v. p. 439.
b le Chim. Méd. i. 439 and 467; and Journ. de Pharm. xvii. 1.
c le Chim. Méd. vi. 577.
d le Pharm. xvii. 290.
Fauré; by Simon; by Bussy; and by Bouton and L. From their labours we learn that black mustard seed

\textit{myronate of potash, myrosyne, fixed oil, a pearly fatty matter, sugar, colouring matter, sinapisin, free acid, pectoral matter, and some salts.}

1. **Myronic Acid.**—So called by Bussy, its discoverer, from \textit{μύρων, oil}. It is an inodorous, non-volatile, bitter, non-crystallizable acid. It is soluble in water and alcohol, but not in ether. It is composed of carbons, hydrogen, nitrogen, and oxygen. The alkaline myronates are crystals. Myronate of potash yields no precipitate with nitrate of silver, nitrate of lead, dichloride of mercury, or chloride of calcium. The characteristic property of myronic acid is, to yield the \textit{volatile oil of mustard} when mixed with a solution of myrosyne.

2. **Myrosyne; Emulsion of black mustard.**—Bussy called it \textit{μύρων, odorous oil, and αὐτός, with}, because it yields, with myronic acid, the volatile oil of mustard. It has considerable resemblance to vegetable albumins, which are soluble in alcohol, but as it cannot be replaced by either of these substances, in the development of the volatile oil, it must be regarded as a substance sui generis, solubles in water; but is coagulated by heat, alcohol, and acids, and in this respect it loses the power of acting on the myronates, and of yielding the volatile oil of mustard. Bussy ascribes this last property to myrosine. It is highly improbable that two constituents of mustard should so Analogy would lead us to suppose that the oil is generated by non-acids, and Simon says sinapisin contains no sulphur.

3. **Sinapisin.**—This term has been given, by Simon, to a substance procured from black mustard seeds, and which he states possesses the following properties:—It presents itself in the form of white, brilliant, mica-like crystals, which are soluble in alcohol, ether, and the oils, but are insoluble in acids and alkalies. When mixed with the albumen of the mustard-seed, it coagulates the volatile oil of mustard. Bussy ascribes this last property to myrosine. It is highly improbable that two constituents of mustard should have Analogy would lead us to suppose that the oil is generated by non-acids, and Simon says sinapisin contains no sulphur.

4. **Volatile Oil of Mustard.**—This does not pre-exist in the seed, but is formed when water is added to the farina, by the mutual action of the myrosyne and myronate of potash (sinapisin?); just as the volatile oil of almonds is generated by the mutual action of emulsion, amygdalin, (see p. 354). Alcohol extracts from the farina no volatile oil; but by or with the myrosine, renders the farina incapable of developing the oil by the action of water. Sulphuric acid and the other mineral acids, as well as carbonate of potash, check the formation of the oil. But when the farina is formed, the acids have no power to prevent its effects. Volatile oil of mustard is colourless or pale yellow; it has a most penetrating odour, and a burning taste. Its sp. gr. at 69° F. is 1.013. It boils at 290° F. It is soluble in water, but readily so in alcohol and ether. By the action of the myrosine, it produces on this oil, an odourless, crystallizable substance (an \textit{amide}?) is produced. This consists of one atom of the oil and two atoms of ammonia. These are decomposed with the greatest facility by binoxide of mercury. Volatile oil of mustard consists of carbon 49:84, hydrogen 5:09, nitrogen 1:41, oxygen 20:48; or C₂₂ H₂₅ N⁺ O⁵ S₄. It is powerfully acid, rubefacient, vesicant. It has been proposed as a rubefacient in paralysis, and as a vesicant. The distilled water of mustard has been employed against the itch.

5. **Fixed Oil of Mustard.**—Usually procured from the dressing of mustard, above referred to. It constitutes about 28 per cent. of the

\textsuperscript{a} Ibid.
\textsuperscript{b} Ibid. xxv. 366.
\textsuperscript{c} Ibid. xxv. 39.
\textsuperscript{d} Ibid. p. 49.
\textsuperscript{e} Dumas and Pelouze, \textit{Journ. de Chim. Méd.} i. 619.
\textsuperscript{f} Robinet and Bussy, \textit{Journ. de Pharm.}, xxv. 119.
\textsuperscript{g} Julia Fontenelle, \textit{Journ. de Chim. Méd.} i. 131.
ar is reddish or brownish yellow: it has a faint odour of mustard, and a mild taste. It does not readily become rancid. It has been used as a purgative and emetic.

Physiological Effects.—Mustard is an acrid stimulant belonging to the group of the volatile pungent stimuli (see p 181). It holds an intermediate rank between horseradish and pepper. Its topical application is that of a powerful acrid, and depends on the volatile oil evolved by the action of water. The irritant operation, on the eyes, is vapour arising from a mixture of hot water and flour of mustard,熟知 known. Mustard cataplasms cause redness and burning, which, if the application be continued, becomes almost insupportable. A prolonged application causes vesication, with evaporation and gangrene. Compared with those of cantharides, the general effects of mustard on the skin sooner subside when the application is discontinued. When swallowed, mustard evinces the same irritant operation on the stomach and bowels. Taken in moderate quantities, with the food, it promotes the appetite, and assists the liberation of substances which are difficult of digestion. In some larger doses (as one or two tea-spoonfuls) it rouses the gastric secretions, and operates as an emetic. In excessive quantities it causes rise to vomiting, purging, and gastro-enteritis. The effects of mustard on the general system are those of a stimulant. It quickens the pulse, and promotes the secretions (especially the urine) and the intestinal motions.

Uses.—The dietetical uses of mustard are well known. It is well suited for cold, phlegmatic individuals, with a torpid or atonic condition of the digestive organs. It is an excellent condimentary unequal to heavy and difficultly digestible foods, as fatty matters.

As a medicinal agent, mustard is employed for several purposes. As an emetic it is useful where we want to rouse the gastric sensitivity, as in narcotic poisoning, malignant cholera, and some forms of ahyptosis.

As a stimulant to the digestive organs it is applicable in atonic or torpid conditions of these parts, with dyspepsia, loss of appetite, and atonic torpor. As a diuretic it has been employed with some benefit in dropsy. As a febrifuge in intermittents, it has been employed alone or in conjunction with cinchona. But the principal of mustard is as a rubefacient (see Cataplasma Sinapis). Flour of mustard is sometimes added to pediluvia.

Administration.—As an emetic the dose is from a tea-spoonful to a tablespoonful of the flour of mustard in a tumblerful of water. As a diuretic in dropsies, and for some other purposes, mustard whey (serum tis sinapinum) is a convenient form of exhibition. It is prepared by straining half an ounce of the bruised seeds or powder in a pint of milk, and straining: the dose is 8-14 times or thrice a day.

Cataplasma Sinapis, L. D.; Sinapismus. Mustard Poultice or...
Several experiments on this subject were made by Trouseau and Pidoux. They found that a mixture of mustard flour and water produced a more intense effect than one made with the flour of black mustard and water in fifty. Curiously enough, however, they state that the mustard flour diminished the activity of the flour of mustard, referable to the fact that common English mustard is less sensitive to the active principle (capsicin) of the mustard cataplasm. It readily excites inflammation, and, if applied sufficiently long, causes vesication. In various cases (as in the stupor and delirium of low fever, in apoplexy, by opium) it is a most valuable application to the chest in pulmonary and cardiac diseases. It is occasionally applied with excellent effects. Dr. Blackall speaks in high terms: cataplasm, quickened with oil of turpentine, in cases of asthma and whooping cough is a most valuable specific. Of course, in all these cases, it operates on the membrane, and over which its speedy effect gives it a great advantage. It is a spread on linen or calico. Great caution is necessary to persons who are insensible to pain; for if applied for too long it may occasion ulceration and sloughing. Hence its effects should be examined with caution. In one case death had nearly resulted from the application of a mustard cataplasm, and in another, the ears and nose became inflamed and ulcerated. In neither case did any manifestation of pain occur, the application was continued for three hours. Sloughing followed, which had nearly resulted in death.
form beak. Leaves lyrate, and, as well as the stem, nearly smooth
Cand.)

annual. Stem one or one-and-a-half foot high. Flowers large,

nur. Beak longer than the pod.

Indigenous; in waste places. Cultivated in both fields and

nurs. Flowers in June.

Description.—White mustard seeds (semina sinapis alba) are

in and somewhat less acrid to the taste than the black ones. They

vest of rounded-elliptical yellow grains, composed of a yellow

thus enveloped in a thin semi-transparent shell. The hilum is at

broadcast of the ellipse.

Composition.—According to the analysis of John 8, white mustard

consists of an acrid volatile oil, yellow fatty oil, brown mild resin,

active (very small quantity), gum (small quantity), woody fibre,

men, free phosphoric acid, and salts.

obiquet and Boutron 7, however, have proved that white mustard

ains neither volatile oil nor any substance capable of producing

but owes its activity to a non-volatile acrid substance which does

are-exist in the seeds, but is readily formed in them under certain

itions. Another chemical peculiarity of white mustard seed is,

it contains sulpho-sinapasin 9. Hence, while sesquichloride of

strikes a deep red colour in an infusion of white mustard, it

ly communicates an orange tint to the infusion of black mustard.

over, the thick mucilaginous liquor obtained by digesting the

of white mustard in cold water is peculiar to them 10. Simon

announced the existence of a new principle, which he calls

Sulphosinapisin.—It was at first supposed to be an acid, and was in con-

ence called, by Henry and Garot 9, sulphosinacic acid. But they subsequently

ished its non-acid properties. It is a white, crystallizable, odourless, bitter

ice, soluble in water, alcohol, and ether. Under the influence of various

es (acids, oxides, and salts) it readily yields hydrosulphoacetic acid. To

d is probably to be ascribed the red colour developed when a persal of

aid to an aqueous infusion of black mustard. Its aqueous solution

with nitrate of silver, a white precipitate. Boutron and Fremy state that

sin [sulphosinapisin] under the influence of emulsion, is converted into an

stance and hydrosulphoacetic acid. Sulphosinapisin consists of carbon

, hydrogen 7.735, nitrogen 4.940, sulphur 9.657, and oxygen 19.688; or

2 N S 2 O 7.

Non-volatile acrid principle.—This does not pre-exist in white mustard,

readily developed in it by cold water. As before mentioned, Boutron and

scribe its formation to the action of the emulsion of the seed on the sulphi

in, by which hydrosulphoacetic acid and this acrid matter are produced.

matter substance is an amuctuous, reddish, odourless liquid, which has the

net hot taste of horse-radish. It contains sulphur as one of its constituents.

Crucin.—A yellowish white substance, which is very soluble in ether, car-

of sulphur, and turpentine. It dissolves in boiling alcohol, but is insoluble

8 Gmelin, Handb. d. Chem. ii. 1247.

9 Journ. de Pharm. xviii. p. 579.

10 Henry and Garot, Journ. de Chim. Méd. i. 441.

11 Cadet, Journ. de Pharm. xii. 191.

12 Journ. de Pharm. xxv. 370.

13 Journ. de Chim. Méd. i. 430.

in water and solution of ammonia. It does not redden the salts of
contains no sulphur.

**Physiological Effects.**—Similar to, though milder than
produced by black mustard. Swallowed whole, the seed
stomachic, laxative, and diuretic. But their use, in the li-
titudes in which they have been recommended, is by no
means safe from danger. Gastro-enteritic inflammation of a fatal kind
induced by them. The danger of their accumulation in the
cæci is obvious. Mr. J. L. Wheeler has known them to
the bowels for seven weeks.

**Uses.**—Dr. Cullen first mentions the practice of giving
ounce, or an ordinary table-spoonful, of entire and unbruised
seeds. A few years ago it was again brought forward, and
it has been advocated in a long list of diseases atte-
tor or atony of the digestive organs; and at one time
fashionable and popular. Sir John Sinclair recommended
seeds for the preservation of the health of old people etc.
The seed-leaves of white mustard and of *Lepidium sativum*
at table under the name of mustard and cress or corn salad.

**Administration.**—From two or three large tea-spoonfuls
to a tablespoonful of the whole unbruised seed have been recommend
swallowed three or four times daily.

**Order LXXXI.—PAPAVERACEÆ, Jussieu.—The Papaver Tribe.**

**Essential Character.**—**Sepals** two, deciduous. **Petals** hypogynous,
or some multiple of that number, placed in a cruciate manner. **Stam-
gynous, either eight, or some multiple of four
very numerous, often in four parcels, one of
heres to the base of each petal; **anthers** two-
nate. **Ovary** solitary; **style** short or none, stigma-
nate with the placenta, two or many; in the
stellate upon the flat apex of the ovary. **Fruit**
either pod-shaped, with two parietal placenta,
lar, with several placenta. **Seeds** numerous
between fleshy and oily; **embryo** minute, straw-
base of the albumen, with plano-convex cotyledons
aceous plants or shrubs, with a milky juice
alternate, more or less divided. **Peduncles** 1
flowered; **flowers** never blue (Lindley).

**Properties.**—The plants of this order possess na-
aacid properties. At the head of the narcotic p
stands the genus *Papaver*, from which opium is
acquired. The acid papaveraceæ usually possess narcot
ies also. *Sanguinaria canadensis* is one of the b
acro-narcotics of this order. In doses of from ten to twenty grains
CORN POPPY.

ic. In larger doses it causes depression of pulse, faintness, dimness and alarming prostration of strength. Its active principle is an alkali unmarina. Chelidonium majus is another acid of this order.

A' VERS RHOE'AS, Linn. L. E. D.—COMMON RED OR CORN POPPY.

(Petala, L. D.—Petals, E.)

r. Theophrastus calls the red poppy phaç. Dr. Bibensiders the μήσυρ χρώματι of Dioscorides to be the red poppy.

r. Gen. Char. — Sepals two, convex, deciduous. Petals numerous. Style none. Stigmas four to twenty, sessile upon the disk crowning the ovary. Capsule obovate, composed of four to twenty carpels inclosed in numerous production of the thalamus, dehiscing by short inner the crown of the stigmas. Placentae between the valves, internally, forming complete dissepiments (De Cand.)—with a white juice. Peduncles inflat at the apex before.

r. Capsule smooth, obovate. Sepals hairy. Stem many-rough, with spreading setae. Leaves pinnatifid; lobes, incised-dentate, acute (De Cand.)

r. Petals rich scarlet. This plant is distinguished from dubium by, 1st, the wide spreading hairs of the flowered, a shorter capsule; 3rdly, its stigma of eight to ten


r. Petiole.—The petals of the red poppy (petala rhaedos seu verratici) have a rich scarlet colour, a slightly opiate odour, bitterish taste. By drying they become violet red and

r. Petiole.—The flowers of the red poppy have been analysed and Ludewig, and by Riffard. The latter chemist ob- fow fatty matter 12, red-coloured matter 40, gum 20, lignin, not improbable that this plant may contain morphia in very

r. Petiole.—Riffard obtained it, in the impure state, by first the petals in ether to remove a fatty matter, and then in alcohol. g the alcoholic tincture to dryness, a dark-red colouring matter was which in thin layers was bright red. It was deliquescent in the air, alcohol and in water, but insoluble in ether. Acids diminished the its colour. Chlorine decolorized it. The alkalis blackened it. By

r. Petiole.—It is distinguished from the colouring matter of the red cab-

1 Prod. Fl. Græc. i. 350.
3 Lab. iv. cap. 64.
6 Journ. d. Pharr. xii. 412.
**Corn Poppy.**—(Petals of the Red Poppy, lb. 3. Pure Sugar, lb. ijss. [lb. iij. D.]) Add the pet gradually to the water heated in a water-bath frequently stirring them; then, the vessels being twelve hours; afterwards [strain and, E.] expressicalico, E.], and [after the dregs have subsided and dissolve [with the aid of heat, E.])—Empli ingredient, especially in conjunction with it. It readily ferments and spoils.

2. **PAPAVER SOMNIFERUM, Linn. L. E. D.**—T

**WHITE POPPY.**

*Sex. Syst.* Polyandria, Monogynia.

(Capsule mature. Capsule immature Succus concretus, L.—Capsular juice from the unripe capsules, E.—Capsularum succus proprius c.

**History.**—This is one of the most anciently plants. Homer speaks of the poppy *poppy* (μικωρ) which it appears to have been in cultivation ever. It was employed in medicine by Hippocrates, Theophrastus, Dioscorides, and Pliny. Hippocrates—kinds—the black and white poppy: the former bowels more than the latter.

It is uncertain at what period opium was first into medicine. Hippocrates recommends the juice, in a disease of the uterus; and Dioscorides of Erasistratus, tells us that Diagoras (who was supposed, with Hippocrates) condemned the...
by Hippocrates, as well as from Diagoras condemning its use in
uses of the eyes, that its virtues were not known long before him.
Corides and Pliny mention that the expressed juice of the heads
leaves is termed Meconium, and that it is much weaker than opium.
Odore Zwinger, Sprengel, and others, have supposed that the
athes of Homer was opium. Dr. Royle, however,
suggested that the substance referred to by Homer may have been
paration of Cannabis sativa (see p. 1096), the remarkable effects
which have been recently pointed out by Dr. O'Shaughnessy.
He word opium is derived from σπόρος, the juice, and signifies that
the juice par excellence;—just as the flower of the rosemary has
a called anthis, or the flower, and the cortex cinchona, the

BOTANY. Gen. Char.—See Papaver Rhoas,

Char.—Capsules obovate or globose, and, as well as the calyces,
both. Stem smooth, glaucous. Leaves amplexicaul, cut-repand,
ate, somewhat obtuse (De Cand.)

An annual herb. Root white, tapering. Stem two to six feet high,
branched, leafy, glaucous green. Leaves alternate, sessile,
loblong, glaucous beneath. Peduncles terminal, leafless, with
ly hairs. Seeds numerous, small, roundish or reniform, oily,
and, and edible.

Here are two well-marked varieties, which, by some botanists, are considered
distinct species:—

nigrum. P. somniferum, Gmelin.—Capsules globose, opening by foramina
in the stigmas. Seeds black. Peduncles many. Flowers usually violet or
of different tints, though sometimes white.

album. P. officinale, Gmelin.—Capsules ovate-globose; foramina under the
either none or obliterated. Peduncles solitary. Seeds and petals white.

b.—Asia and Egypt. Grows apparently wild in some parts
England, but has probably escaped from gardens. Cultivated in Hindostan, Persia, Asia Minor, and Egypt, on account of
pium obtained from it. According to Dr. Royle, var. β. album
this plains of India; and var. a. nigrum in the
Alayas. In Europe the poppy is cultivated for the capsules,
as medicinal agents or for the oil (poppy oil) obtained from the
which is employed in painting. The London market is
ally supplied with poppy heads from the neighbourhood of
in Surrey.

DESCRIPTION. 1. Of Poppy Heads.—Poppy heads (Capsule secu-
eta Papaveris) are usually collected when quite ripe, as ordered
by London and Dublin Colleges, but they would be more active
medicinal agents if they were gathered while still green; and the
burgh College very properly directs the immature capsule to be

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9 Hist. Rel. Herb, i. 23.
10 Od. iv. 280.
11 Illustr. p. 334.
12 On the Prepar. of the Indian Hemp, Calcutta, 1839.
a certain extent, similar in all countries, and collisions into the half-ripe poppy capsules, and collected as a juice. According to Dioscorides, Kämpfer, and others, this juice is worked up into a homogeneous mass, and Olivier speaks of the juice being agglomerated granules. Now Guibourt, opium of commerce by means of a magnifier, observed that the Smyrna and Persian (or Trebizond) opium, with small agglutinated tears (opium with a grain); whereas König and I would add the Indian, opium, is a homogeneous mass, and therefore must have been worked up in the manner of Dioscorides, Kämpfer, and others. M. Ch. Texier of the process followed in Asia Minor, days after the flower has fallen, men and women go and cut the head of the poppy horizontally, and make incisions. The incisions do not penetrate the internal cavity of the flower, and substance immediately flows out, and collects in the cuts. In this state the field is left for two days, and on the following day the opium is collected by the peasants. Each head furnishes opium once only, and that is the first sophistication which it receives through the peasants who collect it, and who let it dry. Each head furnishes a kind of a glutinous and granular jelly. It is dried in earthen vessels, and beat up with saliva. When used as a medicine it is not employed in the place of saliva, the saliva causing it to spoil. It is afterwards enveloped in
of the methods practised in other parts of the East. Kämpfer in Persia the incisions are made crosswise by a five-edged Kerr states that in the province of Bahar "two longitudinal incisions" are made "upon each half-ripe capsule, passing from upwards"; care being taken that the internal cavity of the is not penetrated.

DESCRIPTION.—In commerce, several varieties of opium are

The principal kind, however, is that brought from Smyrna.

recent events, which have occurred in China, will probably a considerable quantity of Indian opium into European com-

Smyrna Opium (Opium Smyrnaeum).—This is the Turkey or Levant of commerce. It occurs in irregular rounded or flattened leaves, of various sizes, rarely exceeding two lbs. in weight, envelopes, and usually surrounded with the reddish capsules of species of Rumex (R. orientalis, according to Koch; but centia, according to Merat). Some of the flat cakes are without capsules, and somewhat resemble Constantinople opium. When opened, the masses are soft, and of a reddish brown colour; keeping, they become hard and blackish. Its lustre is waxy; is strong and unpleasant; its taste is bitter, acrid, nauseous, resistant. M. Guibourt regards the masses as being made up of burnt tears, and on this account as being the purest met it is, however, frequently met with largely adulterated. In sample, weighing 10 ounces, I obtained 10 drachms of stone and

Notwithstanding occasional frauds of this kind, Smyrna forms the best commercial opium.

Opium yields more morphia and meconic acid than either Constantinopelian. The quantity of morphia which can be obtained this kind of opium is, perhaps, on the average, about eight per cent. Pel- an operation on about two ounces of this opium, procured a quantity in equal to 7.08 per cent. From a pound he calculates eight or nine could be obtained. On an average, 12 per cent. of hydrochlorate of may be procured from it. Dr. Christison obtained two drachms of an half a pound of the best Turkey opium; hence we may estimate the at about four per cent. Hydrochlorate of morphia, prepared by Gre- procuss from Turkey opium, contains, according to Dr. Gregory, one-coda. Merck* examined five kinds of Smyrna opium: from the procured 3 to 4 per cent. of morphia; from the best 13 to 13.5 per cent. latter variety he found 0-25 per cent. of codeia.

Constantinople Opium (Opium Byzantium seu Constantinopoli-

—I am indebted to Professor Guibourt for an authentic sam-

his. His description of it is as follows:—"There are two it: one in very large irregular cakes, which are flattened Smyrna opium. This is of very good quality. The other is

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* T. W. C. Martius's Pharmacogn. S. 322.
* Berth. Journ. de Pharm. xxiv. 444.
* Ibid. xxi. 372.
* Ibid. xxi. 346.
* Pharm. Central Bllatt für 1836, S. 491.
in small, flattened, regular cakes, of a lenticular form, two and a half inches in diameter, and covered with the median nerves of which divide the disk into two parts; an odour similar to the preceding kind, but more feeble; and dries in the air. It is more mucilaginous than Smyrna. To this account I may add, that the cakes are never covered with Rumex capsules, as those of Smyrna opium are. Berthemat describes two kinds of it; one soft, the other hard and bristly. Constantinople opium is inferior to the Smyrna kind, but to Egyptian opium.

Professor Guibourt says that this kind of opium yields only half procureable from the Smyrna opium. Berthemat also states that the more morphia than the Egyptian opium. This, however, does not agree with the experience of Mr. Duncan, of who has never failed to obtain an extraordinary quantity of hydrochlorate of morphia from it. From an experiment of Dr. Christison's he obtained a quantity of hydrochlorate of morphia obtainable from it at 14 per cent. procured 15 per cent. of pure morphia, but scarcely a trace of codex, vious, therefore, that Constantinople opium is of unequal quality. It is a much inferior quality, and produced in several parts of empire, and being exported from the capital, and, being exported from the name of Constantinople opium.

3. Egyptian Opium (Opium Egyptiacum).—It occurs in flattened cakes of about three inches diameter, covered exter the vestiges of some leaf. It is usually very dry. It is dis from the two preceding varieties by its reddish colour, an that of Socotrine or hepatic aloes. Some very inferior qu sometimes offered for sale, and which appear to the sight to be largely adulterated. By keeping, it does not blacked other kinds; its odour is less strong, and somewhat musty. says, that by exposure to the air it becomes soft. Egypt is, for the most part, inferior to either of the preceding kind quality is by no means uniform. Some kinds become keeping.

Guibourt tells us it yields only five-sevenths of the morphia of Smyrna opium. Berthemat also states that it contains less morphia of the preceding kinds of opium, and that the morphia is more mixing. He further adds, that the morphia which it yields is purer. The watery effusion of Egyptian opium has a distinct odour. Dr. Christison obtained about 104 per cent. of pure white hydromorphia from it, which, he says, is about the quantity procured from Turkey opium. Merck procured only from 6 to 7 per cent. of much meconic acid.

4. Terebison Opium (Persian Opium).—Some years since a of opium was imported into this country from Terebison, in of cylindrical sticks, which, by pressure, have become somewhat. Their length is about six inches; their diameter;

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1 Journ. de Pharm. xxi. 517.
2 Pharm. Central Blatt für 1836, S. 491.
3 Up. supra cit.
inch, a little more or less. Each one is enveloped in a smooth paper, and tied with cotton: its colour is similar to that of aloe aloes. It has the opiate odour stronger than that of the Egyptian kind, but less than Smyrna opium, and mixed somewhat with a musty odour: its taste is intensely bitter. It is commonly termed Persian opium, but the specimens I received from Trebizond. It is a very inferior kind.

Merek could obtain no morphia from it by the ordinary mode of proceeding. However, afterwards succeeded in obtaining about 1 per cent. It gave only 3 per cent of naranina. There must, I suspect, be some error in these statements, as opium is certainly richer in morphia than is here stated.

- **Indian Opium** (*Opium Indicum*).—Three varieties of Indian opium known in commerce, viz. — *Malwa, Benares*, and *Patna Opium*. The two latter kinds are undistinguishable, I shall include them under one head of *Bengal Opium*.

- **Bengal Opium** (*Benares and Patna Opium*).—A few chests of this kind have been recently imported. Its preparation is fully described by Dr. Butter. I have been kindly furnished with samples of the Benares and Patna kinds, of the growth of the years 1833-36, 1837-38, by Mr. Maitland, of the India House.

Bengal opium is imported in balls, each weighing about three lbs. of a half, and packed in chests, each containing about forty balls. The balls are hard, round, like cannon-balls, and about the size of a dollar's head. Externally each ball is made of poppy petals, firmly intimated by a paste called *lewia*, to form a firm but laminted envelope weighing about 14 oz. On cutting through this, the opium had a soft, homogeneous, apparently quite pure, and to the consistence of a soft extract. Its colour is blackish brown. Odour and taste are strong and pure opiate. On exposure to the air, opium speedily becomes covered with mouldiness. Both *ar* or *Patna* and *Benares Opium* are exported from Calcutta, and Benares are the only districts of Bengal where opium is produced. Benares is most valued by the Chinese (Butter).

Further experiments are required ere we can speak with confidence as to the percentage quantity of morphia and naranina obtainable from Bengal opium. Smythten procured only 24 or 3 per cent of morphia. But from some experiments which I have made, I consider this quantity to be considerably below the truth. Mr. Morson informs me that Benares opium contains rather more than half the quantity of morphia contained in good average Turkey opium.

- **Garden Patna Opium**.—For a sample of this opium I am indebted to Dr. Christison. It is imported in square cakes (enclosed in thin sheets of mica), about three inches in length and breadth, and one inch thick. It has the appearance, as Professor Guibourt describes it, of a well-prepared, shiny, dry, pharmaceutical extract. Its colour is blackish brown. Its odour is less powerful than that of Smyrna opium.

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*Jena. Central Blatt für 1836, S. 493.*


In the first edition of this work I described this kind of opium as *fus opium.* The following extract of a letter, which I have recently received from Dr. Christison, will explain the cause of this error: — "The common opium of Patna and Benares (which are all but identical) was long known to be inferior in quality. During the inspectorship of Mr. Fleming of Mysore in this country, he instituted inquiries, along with his assistant Jeremie, as to the causes of its inferiority, and, among other reasons, he supposed it owed its softness, tarriness, and general low quality, to the storing the juice in bottles till it accumulated to a sufficient extent to form a gum, which the Indians used in making the wine. Mr. Fleming subsequently recognized the cakes in London's laboratory with his official stamp on them. Dr. Christison obtained a specimen of morphia (white) from it, a considerable portion of which I sent you one under the incorrect name of Malwa opium, the other which I got it." Mr. Fleming subsequently recognized the cakes in London's laboratory with his official stamp on them. Dr. Christison obtained a specimen of morphia (snow-white) from it, a considerable portion of which I sent you one under the incorrect name of Malwa opium, the other which I got it.

This I presume is the opium employed by Merck under the name *fus opium,* and which, he says, was enclosed in plates of mica. In 100 per cent. morphia 8, narcotina 3, codeine 0.5, thebaina 1, meconine traces, and poppy Another sample of Indian opium, in round balls of half a pound each, contained of Calabrian extract of liquorice, yielded him 10 per cent. of morphia.

β. *Malwa Opium.* — A few years since this ranked among the inferior kinds of Indian opium, but it has been gradually rising and is now highly esteemed. I have received two varieties under this denomination. They were brought me from former pupils of mine.

αα. One kind consists of a round flattened cake or ball, ten ounces. It seems to have been packed in a coarse kin composed of broken poppy petals. Its consistence is about moderately firm Smyrna opium. When cut into, it presents gneous texture. Its colour is dark brown; its odour similar to Smyrna opium.

ββ. The other kind (described in the first edition of the *inferior Malwa opium*) is in flattened cakes without any covering. It is dull, opaque, blackish brown externally; somewhat darker and soft. Its odour is somewhat like that of opium, but less powerful, and combined with a slight smoky

Guibout says it yields as much extract as Levant opium; but its residue wants the virous odour and glutinous consistence of the latter kinds; only one-third the quantity of morphia yielded by Smyrna opium. The common Malwa opium Dr. Smyttan procured only from 3 to 5 per cent. morphia; but, from fine samples, from 7 to 8 per cent.

Mr. E. Solly states that he found "occasional minute cavities pale yellow oil" in a specimen of Malwa opium. This opium yields 9 per cent. of solubie matter.

γ. *Cutch Opium.* — Under this name I have received from a small cake of opium, rather more than an inch in diameter,
ly enveloped by the remnants of leaves. Its odour is much o-erful than that of Smyrna opium.

**Kandesh Opium.**—In round flattened cakes, weighing about half each. It is nearly black, is hard, brittle, and presents a granular fracture. It yielded Mr. E. Solly 72 per cent. of the matter, and about 7 per cent. of morphia.

**English Opium (Opium Anglicum).**—It is in flat cakes or balls, spiced with leaves. It resembles fine Egyptian opium more than other kinds; its colour is that of hepatic aloes; it has a mode-
y strong opiate odour.

Hennell procured from 700 grains of English opium, prepared by Messrs.戃 and Stanes, 53 grains, or 7.57 per cent., of morphia; while from the quantity of Turkey opium he obtained only 48 grains, or nearly 7 per cent., of morphia. Mr. Morson, from 20 oz. avoid. of the same British opium, procured only 384 grains, or about 4.4 per cent. of morphia, and 222 grains, or about 4 per cent., of narcotina. Probably the morphia obtained by Mr. Hennell was freed from narcotina. Mr. Young declares British opium to be stronger than the commercial opium; six ounces of the former being equal to eight of the latter.

**French Opium (Opium Gallicum).**—I have not seen any samples of. Pelletier describes it as being deep reddish brown, and c when dry. Its taste was somewhat different to that of Smyrna. It left a less insoluble residuum than Eastern opium.

Pelletier procured more morphia from it than from Smyrna opium. In an extract on about two ounces of each he obtained 10.38 per cent. from the former, and only 7.08 per cent. from the latter. It contained no narcotina. He observed traces of codeia, but none of narcotina, morconia, or thebainum, perhaps because the quantity of opium experimented on was too small. The disappearance of one immediate principle (narcotina), and the augmentation of another, caused by climate, are interesting facts. Petit got from 16 to 18 per cent. of morphia; and Caventou (quoted by Christie) obtained from 22 to 23 per cent. from French opium; but I presume the morphia was very impure.

**German Opium (Opium Germanicum).**—I am unacquainted with.

, of Erfurt, got from indigenous German opium 164 and even 20 per cent. morphia, where the opium had been procured from the P. somniferum a.migrum; between 64 and 93 per cent. narcotina. But from opium made from P. somniferum a. he got conversely 6-8 per cent. of morphia, and 33 per cent. of narcotina.

**MERCE OF OPIUM.**—The quantities of opium on which duty were paid during the last six years, are as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Duty Paid (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1833</td>
<td>32,753</td>
</tr>
<tr>
<td>1835</td>
<td>30,453</td>
</tr>
<tr>
<td>1836</td>
<td>30,993</td>
</tr>
<tr>
<td>1837</td>
<td>30,833</td>
</tr>
<tr>
<td>1838</td>
<td>30,324</td>
</tr>
<tr>
<td>1839</td>
<td>30,174</td>
</tr>
<tr>
<td>1840</td>
<td>45,839</td>
</tr>
<tr>
<td>1841</td>
<td>37,400</td>
</tr>
</tbody>
</table>

*supra cit.*


*m. Soc. Arts, xiii. 37.

*J. l. 25.

*Suppl. to the Ed. Disp.* p. 81.

*m. de Pharm.* xxii. 370.

*m. xii. 183.

*Note.*
Since August 13, 1836, the duty has been 1s. per lb.; pre
that and from 1828 it was 4s. per lb. Of the above quanti
greater part was imported from Turkey.

The quantity of opium produced in Hindostan is enormo
Patna and Benares its cultivation is a monopoly in the b
government; and a revenue is derived from the Malwa opiu
system of passes on shipment from Bombay. Of the whole q
raised in Hindostan, it is calculated that about two-thirds ha
sent to Canton, and the remainder to the Eastern Islands.*
ollowing table is from Mr. R. Montgomery Martin’s Statisti
Colonies of the British Empire, Lond. 1839 (p. 306)—

Estimate of Quantity and Total Value of Indian Opium consumed in
during the years ending in 1832-33:

<table>
<thead>
<tr>
<th>Years</th>
<th>Patna</th>
<th>Benares</th>
<th>Malwa</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Chests</td>
<td>Chests</td>
<td>Chests</td>
<td>Chests (of one pecul, or about 134 lbs. assessed.)</td>
</tr>
<tr>
<td>1837-38</td>
<td>4005</td>
<td>1128</td>
<td>4401</td>
<td>9535</td>
</tr>
<tr>
<td>1838-39</td>
<td>4681</td>
<td>1180</td>
<td>7171</td>
<td>13132</td>
</tr>
<tr>
<td>1839-40</td>
<td>6564</td>
<td>1579</td>
<td>6257</td>
<td>14000</td>
</tr>
<tr>
<td>1840-41</td>
<td>5050</td>
<td>1576</td>
<td>7120</td>
<td>18750</td>
</tr>
<tr>
<td>1841-42</td>
<td>4442</td>
<td>1518</td>
<td>6565</td>
<td>14925</td>
</tr>
<tr>
<td>1842-43</td>
<td>4610</td>
<td>1580</td>
<td>8404</td>
<td>20604</td>
</tr>
</tbody>
</table>

All the world knows that these enormous quantities of opium were
to China (by the connivance of the local authorities) for the p
smoking. The vessels anchored at Lintin, about 70 miles from C
delivered the opium to the boats of the Chinese buyers. **Malwa opiu
sidered by the Chinese as having a higher touch, but not so mello
pleasant in flavour as the Patna opium. The smokeable extract, w
quantity of opium contains, is thus intimated by the Chinese. (what
as we do wine or spirits):—Patna and Benares opium 45 to 50 touch
48: Malwa 70 to 75: average 72%: Turkey 53 to 57: average touch 55
smokeable extract here referred to is an aqueous extract of opium p
the Chinese. A detail of the important events which have resulted
active and extraordinary steps taken by this remarkable people to p
the trade in opium, would be out of place in this work. Suffice it
that, in 1839, no less than 20,283 chests of opium, valued at nearly £
sterling, were delivered up to the Chinese, and by them destroyed by i
the opium in water with lime and salt, and, when the whole had been m
mud, allowing it to escape into the river?.

COMPOSITION.—Few substances have been so repeatedly s
chemical investigation as opium. The mere reference to f
ferent labours, which have been bestowed on it, would occu
space than I can devote to the subject. I must, therefore, m
myself with brief notices of the most important epochs in
ical history, and a reference to some of the analyses which
been made of it.

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* Evid. taken before the Committee of the House of Lords on the affairs of the East
por, No. 846, 1830, p. 25.
* R. M. Martin, op. supra cit. p. 306.
* See Asiatic Journal, vol. xxx. part ii. p. 310; also Parliamentary Reports on the
China, No. 339, 1840; and Corresp. relating to China, 1840.
1803 Derosne discovered *narcotina*. In 1804 Sertürner announced the existence of *meconic acid* and *morphia*. Seguin attempted to have discovered them about the same time. Robiquet formed these discoveries in 1814. In 1826 *meconine* was distillated by Dublanc jeune, and again in 1830 by Courbe. In Pelletier discovered *narcicin*: and, in the same year, Robiquet announced the existence of *codeia*. In 1837 Merck announced the existence, in opium, of a new substance, which he called *gynoecin*, but his statement requires confirmation.

### Mulder's Analysis

<table>
<thead>
<tr>
<th></th>
<th>Smyrna Opium</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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</thead>
<tbody>
<tr>
<td>Morphia</td>
<td>10.842</td>
<td>4.106</td>
<td>9.853</td>
<td>2.942</td>
<td>3.800</td>
<td></td>
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<tr>
<td>Morphia</td>
<td>9.878</td>
<td>0.834</td>
<td>8.818</td>
<td>6.858</td>
<td>6.620</td>
<td></td>
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<tr>
<td>Meconic acid</td>
<td>8.904</td>
<td>8.945</td>
<td>9.314</td>
<td>0.386</td>
<td>0.639</td>
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<tr>
<td>Oxycodein</td>
<td>5.124</td>
<td>3.968</td>
<td>7.620</td>
<td>7.352</td>
<td>6.644</td>
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<tr>
<td>Oxycodein</td>
<td>2.166</td>
<td>1.350</td>
<td>1.816</td>
<td>4.204</td>
<td>1.508</td>
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<td>Potassium</td>
<td>6.018</td>
<td>6.062</td>
<td>3.674</td>
<td>3.874</td>
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<tr>
<td>Nitrates</td>
<td>1.047</td>
<td>4.906</td>
<td>0.606</td>
<td>0.928</td>
<td>0.299</td>
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<tr>
<td>Acetate</td>
<td>19.085</td>
<td>17.089</td>
<td>21.068</td>
<td>18.465</td>
<td>19.022</td>
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<tr>
<td>Residue</td>
<td>2.118</td>
<td>2.902</td>
<td>0.568</td>
<td>2.734</td>
<td>3.332</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Smyrna Opium</th>
<th>100.000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smyrna Opium</td>
<td>100.000</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100.000</td>
<td></td>
</tr>
</tbody>
</table>

### Schindler's Analysis

<table>
<thead>
<tr>
<th>Smyrna Opium</th>
<th>ConstantanOpium</th>
<th>EgyptianOpium</th>
<th>Oriental Opium</th>
<th>Indigenous Opium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opiate</td>
<td>10.39</td>
<td>4.50</td>
<td>7.00</td>
<td>2.68</td>
</tr>
<tr>
<td>Narcotina</td>
<td>7.50</td>
<td>6.25</td>
<td>13.75</td>
<td>18.00</td>
</tr>
<tr>
<td>Bitter extractive</td>
<td>22.00</td>
<td>8.30</td>
<td>11.00</td>
<td>15.30</td>
</tr>
<tr>
<td>Deposit</td>
<td>22.00</td>
<td>4.75</td>
<td>3.20</td>
<td>4.75</td>
</tr>
<tr>
<td>Albumen</td>
<td>20.00</td>
<td>17.50</td>
<td>12.00</td>
<td>17.50</td>
</tr>
<tr>
<td>Balsamic matter</td>
<td>7.00</td>
<td>7.05</td>
<td>6.90</td>
<td>7.05</td>
</tr>
<tr>
<td>Caoutchouc</td>
<td>2.00</td>
<td>2.00</td>
<td>4.00</td>
<td>2.00</td>
</tr>
<tr>
<td>Gum with lime</td>
<td>1.25</td>
<td>0.85</td>
<td>1.10</td>
<td>0.85</td>
</tr>
<tr>
<td>Sulphate of potash</td>
<td>2.25</td>
<td>2.25</td>
<td>2.25</td>
<td>2.25</td>
</tr>
<tr>
<td>Lime, iron, alumina, &amp; phosphoric acid</td>
<td>1.85</td>
<td>1.85</td>
<td>1.13</td>
<td>1.85</td>
</tr>
<tr>
<td>Woody fiber</td>
<td>3.75</td>
<td>0.89</td>
<td>1.50</td>
<td>0.89</td>
</tr>
<tr>
<td>Ammonia, volatile oil, and loss</td>
<td>3.00</td>
<td>1.10</td>
<td>1.60</td>
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### Biltz's Analysis

<table>
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<th>ConstantanOpium</th>
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</tr>
<tr>
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<td>13.75</td>
<td>18.00</td>
</tr>
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<td>1.10</td>
<td>1.60</td>
<td>1.10</td>
</tr>
</tbody>
</table>

* Trommsdorff's Journ. 1803, Bd. xiv, 1, S. 47.
* Ibid. i. 337.
* Ibid. i. 362.
* Ibid. ii. 299.
* Pharm. Central Blatt für 1837, S. 342.
1. *Volatile Odorous Principle* (Volatile Oil?)._—The  has the peculiar odour of this drug, and by keeping deep. Hitherto, however, all attempts to isolate the volatile odor have failed, and its nature, therefore, is as yet unknown. Two ounces of the distilled water without any sensible effect a like quantity of it into the jugular vein of a dog without any inconvenience to the animal. The volatile principle possess much activity; but Nysten concludes that "the dog strongly saturated with the aromatic principle, is capable of knowing and sleep, when taken in a strong dose."

2. **Morphia.**—(Will be described hereafter.)

3. **Codeia (Codeine).**—So called from κόδων, a poppy head. Codeia is a crystalline solid, slightly soluble in cold, and still more soluble in ether. It is insoluble in a cold weak solution; codeia be added to boiling water than this liquid can dissolve and forms an oily layer at the bottom of the vessel; and line mass is obtained. It reacts as an alkali on test papers; it acids to form crystalline salts.

From morphia, codeia is distinguished by its not becoming of sesquichloride of iron. It is also said not to redden nitric acid. All the specimens of codeia, which I have met with, be the addition of nitric acid. Moreover, ammonia does not form a very diluted solution in hydrochloric acid, on account of the agreeable odor, and this affords a means of separating morphia from codeia, may be more easily effected by ether, which readily dissolves morphia, but leaves codeia. It is distinguished by its aqueous solution possessing a pungent taste, as manifested by its action on test papers. It produces a copious precipitate (tannate of codeia) in solutions.

*Anhydrous codeia* consists of $\text{C}_{35} \text{H}_{60} \text{N}_{1} \text{O}_{5}$. It, therefore, loses three atoms of water.

Crystallized in ether it contains no water. But crystallizes, the tannate is insoluble in water. The double hy
Opium.

Codice is the salt at one time sold as hydrochlorate of morphia, by those who red it by Gregory's process. Hence it has been termed by the French pharmacologists sel de Gregory.

The effects of codeine and its salts have been imperfectly examined by Kunkel, 

Barbier, and Magendie, but the results are very contradictory. Kunkel 

states it is a local irritant, becomes absorbed, excites the circulation, and produces 

stupifed or paralyzed. Magendie, however, says it causes sleep, and, 

exhibited in large doses, stupor. He considers one grain of codeine equi-

to half a grain of morphia: two grains excite nausea and vomiting. 

Dr. W. Gregory says that, in doses of 

six grains, it causes an excitement like that of intoxication, followed in a 

hours by depression, nausea, and sometimes vomiting.

Magendie proposes to use it as a substitute for morphia, to procure sleep and 

pain, in doses of from one to three grains. A syrup of codeine (composed 

codeine, grs. xxiv.; distilled water, f.qiv.; sugar, g.viii.) has been used in hoop-

ough. The dose for a child, of about seven years of age, is a tea-spoonful.

as been given in irritation of the gastric mucous membrane.

Narcotina (Narcotine).—So called from ναρκωτικός, narcotic. The greater 

of the narcotina of opium is in the free state, as it is removable by ether 

the aid of either acids or alkalises. It is a white, inodorous substance, 

lalizing in prisms,—distinguished from morphia by being insipid, very 

le in ether, insoluble in alkalises, by its not becoming blue on the addition of 

esquichloride of iron, by its not decomposing iodie acid, and, when quite 

by its not yielding a brown colour when treated by chlorine and ammonia.

ond on paper over a candle, it gives a greasy-looking stain to the paper.

ic acid dissolves it, and acquires an orange tint. It does not affect vegetable 

rs, and by this character is readily distinguished from both morphia and 

ice it is insoluble in cold water, but dissolves in 400 parts of boiling water, 

0 parts of cold alcohol,—or in 24 parts of boiling alcohol. The volatile 

do dissolve it. It consists of C_{16}H_{24}N_{4}O_{15}. Its atomic weight, thereis 

446. The salts of narcotina have been but little examined. They are 

bitter than those of morphia, redden litmus, and are precipitated from their 

ons by infusion of nutgalls and by the alkalises. The hydrochlorate is crys-

able. Both this and the sulphate are very soluble in water.

Narcotina is extracted from the residue of the opium which has been sub-

d to the action of cold water. This is treated with water acidulated with 

etic or hydrochloric acid, and to the filtered solution ammonia is added. 

cipitate treated with boiling alcohol yields narcotina, which deposits as 

or cools. Narcotina may be separated from morphia by ether, which 

es the narcotina, but leaves the morphia, or by a solution of potash, which 

es the morphia, but leaves the narcotina, or by the cautious addition of 

etic acid, which dissolves the morphia, and, unless the acid be greatly in 

does not dissolve the narcotina.

hen narcotina was first discovered, it was said to be the stimulant principle 

and Magendie states a grain of it, dissolved in olive oil, produced the 

of a dog in twenty-four hours, while twenty-four times this quantity was 

dissolved in acetic acid, with impunity. Oralia, at one time, declared it 

ert, then that it acted like morphia, and subsequently that its operation 

remarkable and peculiar. Bally asserts that, in a solid state, it is inert; for 

ains may be given, at one dose, without exciting any obvious effect. The 

s, I believe, that narcotina possesses but little activity; and I presume, 

ore, that the first experimenters with it employed an impure substance. 

oots gave gradually increased doses of it, up to a scruple, without the least

* Formulaires, 87, 2me ed.
* Journ. de Pharm. xxiv. 144.

L. II.
injury. The bitterness of its sulphuric solution led him to employ it as intermittent, as a substitute for dia sulphate of quina. More recently attention has been drawn to it in India, by Dr. O'Shaughnessy, as an Indian indigenous substitute for quina; and nearly 200 cases of intermittent and remittent fever, treated by it with success, have been published.

3. Narceine (Narceina).—So called from saper, stupor. It is a white, inodorous solid, crystallized in long, fine, silky needles, with a slightly bitter, and somewhat metallic, taste. It dissolves in 230 parts of boiling water, 5 parts of water at 60°. It fuses at about 195°, and at a higher temperature it decomposes.

Narceine has several very striking properties by which it is distinguished from other substances. The first of these deserving of notice is the action of mineral acids on it. Thus the sulphuric, nitric, and muriatic acids, if mixed with water that they cannot alter the elementary composition of narceine, for this substance a fine light-blue colour, immediately on coming in contact with it. This alteration of colour does not appear to depend on any change in the elementary composition of narceine, since, by saturating the acids with ammonia, the narceine is precipitated unchanged. When much water is added, the blue colour disappears.

Another peculiar trait of narceine is, that it forms a bluish compound (sulphur of narceine) with iodine: heat and alkalis destroy the colour. So that iodine is not an absolute test for starch.

The characters now mentioned are sufficient to distinguish narceine from all other known substances. In addition, I may add, that it does not form a blue colour with the sesquichloride of iron, as morphia does.

Narceine was at first supposed to be a vegetable alkaloid; but as it does not affect vegetable colours, nor combine with nor saturate acids, it is now regarded as a neutral principle. Narceine is composed of C\(^{11}\) H\(^{15}\) O\(^{\text{2}}\), N O\(^{\text{2}}\).

Two grains have been several times thrown into the jugular vein of a horse without producing any appreciable effect. It is presumed, therefore, to be inert.

6. Meconine.—So called from aknor, a poppy. It is a white, crystalline, odorless solid. Its taste, which at first is scarcely perceptible, is afterwards acrid. The crystals are six-sided prisms, with dinedral summits. It fuses at 194°, and becomes a colourless, limpid fluid. At a higher temperature it is distilled. It dissolves in 265 parts of cold water, or in eighteen parts of hot water. It is soluble in alcohol and in ether. It is distinguished from morphia and codeia by its not possessing alkaline properties. From morphia it is further distinguished by its great fusibility, its greater solubility in water, and its becoming blue on the addition of sesquichloride of iron. Cold sulphuric acid neutralizes meconine, the solution being limpid and colourless. If heat be applied the liquid becomes dark. If the quantity of sulphuric acid be small in proportion to that of meconine, the liquid assumes a green colour. If chlorine be passed over fused meconine, the latter becomes blood-red, and on cooling forms crystals. The compound thus formed is composed of chlorine and an organic base: if the first be removed by oxide of silver, a white acid is obtained which Couperus calls mechiolic acid (C\(^{11}\) H\(^{7}\) O\(^{10}\)). By the action of nitric acid meconine we obtain hypnomitromenonic acid, composed of one atom of meconine and half an atom of hypotoninous acid. Meconine is remarkable for not containing nitrogen. Its composition is C\(^{10}\) H\(^{15}\) O\(^{9}\).

A grain dissolved in water, and injected into the jugular vein of a horse, produced no remarkable effect. Further experiments, however, are required before we can positively declare it to be an inert substance.

7. Paramorpha (Paramorpha).—So called from Thebes, an ancient city of Egypt. It is a white, crystalline, fusible solid, having an acrid, styptic taste, very soluble in alcohol and ether, but hardly at all soluble in water. It possesses all the properties, and dissolves in weak acids. From these solutions it is prepared.

\footnote{Brit. and For. Med. Rev. vol. viii. p. 263.}
alkalis. An excess of alkali cannot dissolve it, unless, indeed, the alkaline ion be very concentrated. It fuses at 302°, but does not volatilize at any temperature. It is distinguished from morphia by not becoming blue on the action of the perchloride of iron, and by not forming crystallizable salts with it. From codeia it differs in not crystallizing in large crystals, and in not forming crystallizable salts. With meconine and narcinee it has no analogy, from them it is distinguished by the want of the peculiar properties which characterize these bodies. It resembles nacotina more than any other substance, is distinguished by the crystals being shorter or granular, and wanting the brilliant possession by those of nacotina; by its acid taste; by its fusibility at 302°; by its greater solubility in alcohol; and by nitric acid when dropped on it converting it into a substance like a soft resin, before dissolving it. Pelletier considered it isomerous with morphia;—hence he called it paramorphia. According to Dr. Kane's analysis it consists of C₂₇ H₁₄ N O₃; and its atomic weight is 390. Conerbe's analysis gives another atom of oxygen. The last-mentioned must says that, by fusion, the crystals lose two atoms of water. Magendie says that one grain injected into the jugular vein, or placed in the pleura, acts like strychnia, and causes tetanus and death in a few minutes.

3. Pseudomorphia.—This is a substance which Pelletier has occasionally met with in opium. It is a whitish solid, which, like morphia, dissolves in caustic alkalis, is reddened by nitric acid, and made blue by contact with the sesquioxide of iron. But it does not decompose iodic acid, and cannot form salts with acids. It consists of C₂₇ H₁₄ N O₃. It is not poisonous; at least, nearly like grains, given to a rabbit, produced no effect. Pelletier thinks that pseudomorphia must be some combination of morphia, in which this substance has lost its poisonous properties.

4. Porphyrin?—This name has been given by Merek to a supposed new principle found in Bengal opium. It is described as crystallizable, fusible, soluble in alcohol, ether, and weak acids. Alkalis precipitate it from its acid solution. Other experiments are required to determine its existence and precise nature.

10. Resin.—Brown, insipid, inodorous, softened by heat, insoluble in water but soluble in alcohol and in alkaline leys. Nitrogen is a constituent of it.

1. Extractive.—The substance usually denominated the extractive of opium, probably a heterogeneous body. It is brown and acid, and has been supposed to be one of the active principles of opium. The reasons for this opinion are the following:—In the first place, it has been asserted that after the morphia has been separated from an infusion of opium by magnesia, the filtrate or by evaporation an extract which produces the same kind of narcotic effect that opium does. Secondly, the effects of the known active principles of opium are not sufficiently powerful to authorize us to refer the whole of the properties of opium to them. Thus on an average 100 parts of opium yield a 8 to 10 parts of morphia (the most active of the known constituents of opium), and, therefore, if this alkali were the only active principle, it ought to 10 or 12 times as powerful as opium is. Now we know that morphia is but one, if at all, more active than opium, and, therefore, this last-mentioned substance either contains some other active principle, or the activity of morphia is arisingly increased by the principle or principles with which it is naturally in combination. Butter says the insoluble residuum possesses considerably narcotic qualities.

2. Pappy Matter.—Yellow or brownish. Probably colourless when pure. Reddened litmus, and unites with alkalis to form soaps, from which acids dissolve it apparently unchanged.

3. Meconic Acid.—Hitherto found in the poppy tribe only. It is usually cured from meconine of lime by acting on it, in hot water, with hydrochloric acid. The meconic acid crystallizes on cooling. The formula of the anhydrous

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* Pharm. Central Blatt für 1837, S. 343; and Brit. Ann. of Med. ii. 82.
* Op. supra cti.
copper). Slightly. It yields white precipitates (meconates) with acid, with acetate of lead, nitrate of silver, and chloride of which, like meconic acid, reddens the sesquisalts of iron, a confounded with it, do not occasion precipitates with the barium. 4thly. It is not reddened by chloride of gold, phosphocyanic acid and the sulphocyanides.

It deserves especial notice that many substances enjoy in acid the power of communicating a red colour to the solution; following are some of them:—the acetates, hydrosulphocyanides, the saliva of man and of the sheep, the urine, infusion of white mustard, kome, pyromeconic, and indigotain, obtained by the action of hydrochloric acid on detonating a Cetraria islandica (p. 379) and of Gigartina Helminthocorys Meconic acid is an inert substance. Sertürner swallow without observing any effect. Sömmering gave ten Feneglio and Blengini eight grains to dogs, crows, grains to various men; in all cases no effects were bined with bases; it doubtless modifies their action; however, is not active, as Sertürner asserted. It is supposed the morphia in opium is modified by its combination with; already mentioned that this acid is said to be an antidote by bichloride of mercury (see p. 754). If, however, the fact is of little practical value, on account of the scarcity other opium nor laudanum can be given in quantity suff effect of this salt, without proving deleterious. Moreover, and easily accessible antidotes. Anthelmintic properties the acid and some of its salts.

Chemical Characteristics. —Litmus paper watery infusion of opium (or tincture of opium owing to a free acid (meconic). Sesquichloride deep red colour (meconate of iron). Acetate and occasion a copious grey precipitate (meconate and with colouring matter), which, treated by sulphured hydrogen, yields free meconic acid. Chloro
<table>
<thead>
<tr>
<th>Test</th>
<th>Very bitter</th>
<th>...</th>
<th>...</th>
<th>Bitter</th>
<th>Insipid; the salts bitter</th>
<th>Rather acid and metallic</th>
<th>Slightly bitter</th>
<th>Rather acid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fusibility</td>
<td>Fusible</td>
<td>...</td>
<td>Infusible?</td>
<td>Infusible</td>
<td>Fusible at 302°</td>
<td>Fusible at 338°</td>
<td>Slightly bitter</td>
<td>Fusible at 198°</td>
</tr>
<tr>
<td>Ditto in Boiling Water</td>
<td>Infusible</td>
<td>...</td>
<td>...</td>
<td>Fusible</td>
<td>Fusible at 338°</td>
<td>Fusible at 225°</td>
<td>Slightly bitter</td>
<td>Fusible at 194°</td>
</tr>
<tr>
<td>Solubility in Cold Water</td>
<td>Insoluble, or nearly so</td>
<td>Soluble in 100 pts</td>
<td>Soluble in 40 pts</td>
<td>Soluble in 80 pts</td>
<td>Soluble in 17 pts</td>
<td>Soluble in 80 pts</td>
<td>Slightly bitter</td>
<td>Fusible at 194°</td>
</tr>
<tr>
<td>Solubility in Boiling Alcohol</td>
<td>Soluble</td>
<td>...</td>
<td>Less soluble than in water</td>
<td>Very soluble</td>
<td>Insoluble, or nearly so</td>
<td>Three soluble, unless the ley be very concentrated</td>
<td>Slightly bitter</td>
<td>Fusible at 194°</td>
</tr>
<tr>
<td>Solubility in Cold Ether</td>
<td>Soluble</td>
<td>...</td>
<td>Insoluble in the cold ley</td>
<td>Very soluble</td>
<td>Insoluble, or nearly so</td>
<td>Three soluble, unless the ley be very concentrated</td>
<td>Slightly bitter</td>
<td>Fusible at 194°</td>
</tr>
<tr>
<td>Basic Action on Test paper</td>
<td>Alkaline</td>
<td>...</td>
<td>Not salifiable</td>
<td>Alkaline</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Slightly bitter</td>
<td>Neutral</td>
</tr>
<tr>
<td>Quality of Sulphate</td>
<td>Salifiable</td>
<td>...</td>
<td>Salifiable</td>
<td>Salifiable</td>
<td>Salifiable</td>
<td>Salifiable</td>
<td>Neutral</td>
<td>Neutral</td>
</tr>
<tr>
<td>Action of Nitric Acid</td>
<td>Reddened</td>
<td>...</td>
<td>Solution not red</td>
<td>Solution not red</td>
<td>Solution yellow</td>
<td>Solution yellow</td>
<td>Neutral</td>
<td>Neutral</td>
</tr>
<tr>
<td>Coloured blue by Hydrochloric Acid</td>
<td>Not</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>Not</td>
<td>Not</td>
</tr>
<tr>
<td>Ditto by Sesquichloride of Iron</td>
<td>Not</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>Not</td>
<td>Not</td>
</tr>
<tr>
<td>Coloured blue by Iodine</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>Not</td>
<td>Not</td>
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<tr>
<td>Decomposes Iodide acid</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>Not</td>
<td>Not</td>
</tr>
<tr>
<td>Precipitated by Infusion of</td>
<td>Not</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>Not</td>
<td>Not</td>
</tr>
<tr>
<td>Nitrate</td>
<td>C₅₈ H₂₀ N₁ O₂</td>
<td>...</td>
<td>306</td>
<td>284</td>
<td>446</td>
<td>202</td>
<td>Not</td>
<td>C₁₀ H₅ O₄</td>
</tr>
<tr>
<td>Composition</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Blood-red.</td>
</tr>
<tr>
<td>Equivalent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C₁₀ H₅ O₄</td>
</tr>
<tr>
<td>Water of Crystallisation</td>
<td>2 atoms</td>
<td>...</td>
<td>2 atoms</td>
<td>3 or 4 per cent.</td>
<td>Poisonous</td>
<td>Poisonous</td>
<td>Inert ?</td>
<td>Inert ?</td>
</tr>
<tr>
<td>Poisonous</td>
<td>Not poisonous</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>Not</td>
<td>Not</td>
</tr>
</tbody>
</table>

**I have had no opportunity of verifying the statements in this column.**
blue precipitate (iodide of starch). This last test does not always succeed. Chloride of gold causes a deep fawn-coloured precipitate.

**APPLICATION TO MEDICO-LEGAL PURPOSES.**—On examining the alimentary canal of persons destroyed by opium, it not unfrequently happens that no trace of the poison can be obtained. I have met with several instances of this sort, and others are referred to by Dr. Christison. Either, therefore, opium is not fully absorbed, and its unassimilated parts thrown out of the system by the intestines, or the constituents of this substance are digestible and assimilable.

The characters available for the detection of opium are two-fold, physical and chemical.

1. **Physical Characteristics.**—Whether in the solid state or dissolved in water or spirit, opium possesses three physical properties, by one or more of which it may be frequently recognized. These are, a more or less brown color, a remarkable and peculiar odour, and a bitter taste. Of these the odour is the most characteristic one. In the alimentary canal it is strongest when the stomach is just opened, or when the opiate liquor is just reaching the boiling point. Odours, however, frequently mask it. The analogy between the odours of hemlock and opium deserves notice.

2. **Chemical Characteristics.**—The chemical tests of opium are those of meconic acid and morphia above mentioned. In a case of suspected poison in the stomach and duodenum (cut into small pieces), with their contents, are be digested in distilled water, and the solution filtered successively through sieve, muslin, and paper. A little acetic acid added to the water coagulates the caseum, and is thought to facilitate the solution of the morphia. Its presence objectionable, on account of the red colour produced by the action of the test on the ferruginous salts, and which simulates that developed with these salts of meconic acid.

   a. **Application of trial tests.**—To a small portion of the filtered liquid the following tests:

   1. A few drops of tincture of chloride of iron, which produces a red color (meconate of iron) in an opiate solution.—The fallacies of this test have been stated (see pp. 1736).
   2. Apply excess of strong nitric acid, which also reddens (oxidizes) most opiate liquors.—The fallacies of this are pointed out at p. 1776.
   3. Add basic acid and starch, and set aside for twenty-four hours. Iodide of starch is sometimes formed if morphia be present (unless, indeed, quantity be very minute).—The fallacies of this are stated at p. 1778.

The success or failure of these tests is not to be considered as absolutely decisive as to the presence or absence of opium.

b. **Separation of the Morphia and Meconic Acid.**—Add to the filtered liquor a considerable excess of a solution of acetate of lead, and set aside in a cold place for the precipitate (meconate and sulphate of lead, with colouring matter) to separate, leaving a clear liquor (acetates of morphia and lead, &c.). Pour off the clear liquor and collect the precipitate on a filter. Before adding the acetate of lead, it may be sometimes necessary to evaporate the liquor, in a water-bath, to the consistency of syrup, which is to be dried and boiled in alcohol, and the alcoholic tincture evaporated, and the resids dissolved in water. To the filtered solution add the acetate of lead. This evaporation of the process is not usually necessary. Furthermore, by boiling water, meconic acid is decomposed.

The above-mentioned clear liquor and the lead precipitate are then to be treated (the first for morphia, the second for meconic acid), as follows:
OPiUM.

Proceeding with the lead precipitate (meconate and sulphate of lead, and colouring matter).

suspend the lead precipitate in water, and warm in a conical glass (see fig. 111, p. 29), and pass a stream of sulphured hydrogen through it, to convert lead into a sulphuret, which is to be removed by filtration. The clear liquor is then to be gently heated (to prevent the excess of sulphuretted hydrogen), and, if necessary, concentrated by evaporation. Or add a few drops of diluted sulphuric acid to the meconate lead, by which an insoluble sulphate lead is formed, and meconic acid left in solution. Boiling decomposes the meconic acid. The tests for meconic acid (p. 1738) are then to be applied, viz:—

a. Tincture of chloride of iron.

b. Ammoniacal sulphate of copper.

c. Chloride of gold.

d. Acetate of lead.

2. Proceeding with the clear liquor (solution of the acetates of morphia and lead).

Place the clear liquor in a conical glass (see fig. 111, p. 629), and pass through it a stream of sulphuretted hydrogen, to precipitate the lead, and then filter. Then boil the filtered liquor, and, if necessary, concentrate by evaporation. To the clear liquor apply the tests for morphia, (see p. 1770), viz:—

a. Strong nitric acid in excess.

b. Iodic acid and starch (several hours may be necessary for the success of this test).

c. Tincture of chloride of iron (this test will only succeed with solid morphia, or very concentrated solutions).

d. Ammonia.

e. Infusion of nutgalls (this test will not answer if much free acid be in the liquor).

f. Chlorine, and afterwards ammoniac.

Dr. Christison observes, that "it will often happen, in actual practice, that the only indication of opium to be procured by the process consists in the deep red colour struck by permuricate of iron with the meconic acid. Now, will this alone constitute sufficient proof of the presence of opium? On the whole, I am inclined to reply in the affirmative." I regret I cannot agree with him in this conclusion, since several other substances produce the same colour, and three of these are very likely to be met with in the alimentary canal, namely, the acetates, (thus acetate of ammonia or acetate of potash administered medicinally,) mustard, and saliva. In regard to the latter substance, he remarks, "it is seldom possible to procure a distinct blood-red coloration from the saliva, except by evaporating a large quantity to dryness, and redissolving the residue in a small quantity of water; and I question whether it can be separated at all after the saliva is mixed with the complex contents of the stomach." I am sorry again to be at issue with so high an authority, but our results being discordant, it is but right I should state my experience. In a large majority of cases I find saliva is distinctly and unequivocally reddened by the persalts of iron. In some few cases only have I observed this test indistinct. I have several times obtained from the stomach of objects in the dissecting-room a liquor which reddened the salts of iron.

Estimation of the Purity and Strength of Opium.—Opium brought into the market of very unequal degrees of purity, in consequence of its having been subjected to adulteration; and partly, perhaps, from the employment of different methods of preparation. Moreover, its consistence is by no means uniform; that of some kinds being quite soft (as the Patna and Benares), and of others quite hard as some of the Egyptian opium). As this diffimority depends on the presence of unequal quantities of water, an obvious variation of strength is the consequence. Moreover, the quantity of morphia in good opium of different or even of the same localities is by no means constant. Furthermore, opium, from which the morphia has been extracted, has been fraudulently introduced into commerce. It is
Bn. The tincture in which could not be rendered clear the addition of opium, when cold, should not give a blue precipitate if it do, the presence of iodine is obvious.

3. Of the estimation of the quantity of morphia. This is a subject of no slight difficulty. A recent paper, which deserves notice, is, that there is no constant ratio between morphia in a given sample of opium and that of any other material, however, is of opinion that it is in the ratio of three to one. The correctness of this opinion is not borne out by my own observations, which positively deny it. Robiquet, it follows, therefore, that morphin is the only true morphonmetrical method of process of effecting this have been proposed.

a. Process of the Edinburgh Pharmacopia. A solution of morphia, narcotine, and resin, in two fluids ounces of water, filtered, and evaporated. If precipitated by a cold solution of half an ounce of sulfuric acid in two waters, and heated till the precipitate shrinks to a solid mass on cooling, which weighs, when dry, at least one ounce, dissolves entirely in solution of oxalic acid, it is a modification of the process for procuring disulphated morphia. I have made this process, I am inclined to think, of its value. Morphia is soluble in a solution of carbonic acid, variations in the degree of heat applied to the liquid during which it is subjected to heat, will affect the results. Nay, if the heat be maintained constant, the morphia will be dissolved! Hence, therefore, a process requires more precautions than the directions of one to imagine.

b. Thibonmary's process. Prepare an aqueous extract, examined, and dissolve it in water. Add ammonia to it, being careful not to add much excess, and, when cool, filter on the filter first with cold water, then with proof spirit. Then boil it with animal charcoal in rectified spirit, and then pour off the liquor, by which crystals of morphia are procured. Variations of the process will be found valuable. After the
OPium.

Berthemot's process.—To a filtered infusion of opium add chloride of calcium, filter (to get rid of the meconate and sulphate of lime), and evaporate to the ste renc of syrup. The residuum should form a granular crystalline mass, especially hydrochlorate of morphia), which is to be separated from the mother- and purified by resolution in water. This is an application of Gregory's process hereafter to be described. It appears to be an objectionable method; as a considerable portion of the morphia will be left in the mother-liquor.

Couver's process.—Boil an infusion of opium with lime (which dissolves morphia) and filter through paper. Saturate the filtered liquor with an acid, precipitate the morphia by ammonia. This, perhaps, is the most speedy process for the detection of opium.

Physiological Effects. a. On Vegetables.—The effects of opium plants have been principally examined by Marcet® and Macaire.' The latter writer states, that the stamens of the barberry (Berberis quinis) and the leaves of the sensitive plant lost their contractility, I soon died, when the stems of these vegetables were immersed in a solution of opium. But I have tried this experiment in a different result. I immersed a flowering stem of the barberry in water, to which tincture of opium had been added. In thirty minutes I could not perceive any effect on the plant. The stamens, in the overblown flowers, still retained their contractility. Arret states that he watered a sensitive plant with a moderately strong infusion of opium forty-eight days, without effecting the irritability of the plant. By immersing a portion of Chara in a solution of opium the circulation of this plant becomes slower, is soon suspended, and is ultimately stopped.

b. On Animals generally.—The effect of opium on animals has hitherto been the subject of physiological investigation. An abstract of a considerable number of experiments made by various individuals has been published by Wibmer®. The most complete and extended series of experiments is that made by Charvet®, on the different classes of animals, for the purpose of determining its comparative action. While on all it has been found to act as a poison, its effects are observed to vary somewhat, according to the degree of elopment of the nervous system (see p. 99). in the invertebrate animals opium causes weakness or paralysis of the contractile tissues, with gradual sinking, and death. Thus in the annelida and the arachnids, it first accelerates the animal movements, but afterwards paralyses them. Now in the lower invertebrata, a central nervous apparatus is altogether wanting; while in the higher animals of this class, it is not sufficiently developed to exercise influence over the whole individual which we observe it to possess in the vertebrate classes.

In the vertebrate animals we have a high development of the central organs of the nervous system, and a consequent increase in the
some of the lower mammals, as the ruminants, and even in the carnivora, as dogs, it is very striking how the stupor is more manifest in mammals. Moreover it is not undeserving of mention that opium on the different races of man is noticed (see p. 138). On the negro, the Malayan, and other races, it is frequently acts as an excitant, causing delirium and convulsions. Are we to ascribe the prevalence of these symptoms in the Caucasian development of his brain? In conclusion, the effects of opium on the animal kingdom have a decided influence on the nervous system.

γ. On Man.—I propose to examine the effects of opium under three heads or subdivisions:—first, the effects of opium employed medicinally; secondly, the effects of the internal administration of opium, either by chewing or smoking; thirdly, the effects on the different systems of organs.

1. Effects of one or a few doses.—We may consider these effects under three degrees of operation.

First degree of operation.—In small doses of opium, even a half-grain to one grain, opium generally acts as an excitant, and in this respect the symptoms are not uniform. The digestive system is somewhat excited, and a sensation of heat is felt about the head. Dr. Crumpe took one grain of opium, and the alteration in the number of the respiration was at 70, and the alteration in the number of the pulse beats.

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OPIUM.

Opiate, with a tendency to sleep. While these effects are
place, the mouth and throat become dry, and hunger is dim-
thought the thirst is increased; and slight constipation usually
Such are the ordinary effects of a small dose of opium on
an unaccustomed to its use. By repetition, however, its influ-
ences considerably diminished; and those, therefore, who
of the purpose of producing a pleasurable excitement, are
augment the dose to keep up an equal effect (see p. 136).

**Degree of operation.**—Given in a *full medicinal* dose (as
to to four grains), the stage of excitement is soon followed by
depression. The pulse, which at first is increased to fulness
frequencies, is afterwards reduced below the natural standard.
est of two grains and a half on Dr. Crumpe (when his pulse
ating at 70) were as follows 4:

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in becomes hot; the mouth and throat dry; the appetite dim-
the thirst increased; and frequently nausea, or even vomiting,
uced. The symptoms of excitement soon pass away, and a
Torpor succeeds: the individual seems indisposed to exertion,
scural system appears enfeebled; the force of external impres-
on the organs of the senses is diminished; and the ideas
confused. This state is followed by an almost irresistible
of sleep, which is frequently attended by dreams—sometimes
ec, at others of a frightful nature.
ese effects are usually succeeded by constipation (which may
be for several days), by nausea, furred tongue, headache, and

**additional degree of operation: poisonous effects of opium.**—Dr.
on has so briefly summed up the effects of a poisonous dose
m, that I cannot do better than quote his statement:—"The
oms of poisoning with opium, when it is administered at once
dangerous dose, begin with giddiness and stupor, generally
any previous stimulus. The stupor rapidly increasing, the
becomes motionless and insensible to external impression; he
very slowly, generally lies quite still, with his eyes shut and
pils contracted; and the whole expression of the countenance
of deep and perfect repose. As the poisoning advances, the
become ghastly, the pulse feeble and imperceptible, the
exceedingly relaxed, and, unless assistance is speedily pro-
death ensues. If the person recovers, the sopor is succeeded
longed sleep, which commonly ends in twenty-four or thirty-six
and is followed by nausea, vomiting, giddiness, and loathing of

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opium is used in the first instance, and its use afterwards chronic coughs, in which opium is also used as a popu drunkards also frequently have recourse to opium as a new have abjured wine in some fit of repentance. Persons he dignities in the state also have recourse to opium, when the character forbids them the use of wine; some very str opium as a restorative in cases of great exertion, as the The travel with astonishing celerity.

Opium-eaters generally begin with doses of from half and gradually increase the quantity till it amounts to two or more a day: they usually take the opium in pills, but avoid after having swallowed them, as this is said to produce vit more palatable, it is sometimes mixed with syrups or this form it is less intoxicating, and resembles mead; it spoon, or is dried in small cakes, with the words 'Mas God,' imprinted on them.

The effect of the opium manifests itself one or two hours taken, and lasts for five or six hours, according to the dose crasy of the subject. In persons accustomed to take it, degree of animation, which the Theriaki (opium-eaters) regard happiness.

The habitual opium-eater is instantly recognised by total attenuation of body, a withered, yellow countenance ing of the spine, frequently to such a degree as to ass and glossy, deep-sunken eyes, betray him at the first g organs are in the highest degree disturbed, the sufferer ca and has hardly one evacuation in a week: his mental and destroyed,—he is impotent. By degrees, as the habit bec his strength continues decreasing, the craving for the sa greater, and, to produce the desired effect, the dose augumented.

When the dose of two or three drachms a day no beatific intoxication so eagerly sought by the Opiophagi with [corrosive] sublimate, increasing the quantity till it r day; it then acts as a stimulant.

After long indulgence the opium-eater becomes subhensive and, when it is half his life for a
OF THE EFFECTS PRODUCED ON ENGLISH OPIUM-EATERS.

For an account of the effects produced on English opium-eaters I may refer to the well-known confessions of Mr. De Quincey and of the late Mr. S. T. Coleridge. Numerous instances of the enormous quantities of opium which, by habit, may be taken with impunity, have been published. One of these I have already referred to (see 136). Dr. Chapman tells us that he knew a wine-glassful of laudanum to be given several times in the twenty-four hours. "But that is still more extraordinary," says this author, "in a case of cancer of the uterus, which was under the care of two highly respectable physicians (Drs. Monges and La Roche) of Philadelphia, the quantity of laudanum was gradually increased to three pints, besides a considerable quantity of solid opium in the same period." Pincions mentions a lady who required 120 grains of opium to give her ease of the uterus.

Some doubt has been entertained as to the alleged injurious effects of opium-eating on the health, and its tendency to shorten life; and must be confessed that in several known cases which have occurred in this country no ill effects have been observable. Dr. Christison, given abstracts of eleven cases, the general result of whose histories "would rather tend to throw doubt over the popular opinion." A few years ago, a Life-Assurance Company, acting on this general opinion, resisted payment of a sum of money, on the ground that the assured (the late Earl of Mar) had concealed from them a habit which tended to shorten life. But the case was ultimately compromised. Dr. James says that the natives of Cutch do not suffer much from opium-eating.

In those cases of disease (usually cancerous) in which enormous quantities of opium are taken to alleviate pain, I have usually observed constipation produced. But Dr. Christison says, "constipation is no means a general effect of the continued use of opium. In some cases mentioned above, no laxatives have been required; in others, a gentle laxative once a week is sufficient."

In 1841 an opium-eater, aged 26, was admitted into the London Hospital. He was accustomed to take two or three and a half drachms of solid opium daily, originally began its use to relieve the attacks of Angina Pectoris. He was most anxious to leave off this habit; though the difficulty of doing so was great. It did not diminish, but, according to his assertion, augmented his desire; for, after each dose, he ate voraciously. At first when he commenced

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1 Confessions of an English Opium-eater.
3 Elem. of Therap. ii. 199.
4 Treat. on Poisons.
its use it caused dryness of the mouth and throat, and constipation, but his bowels were regular as before he commenced the use of this drug. His temperature ranged from 88 to 96. His urine was somewhat less than natural. The colour of his skin varied; in general it was dry, but occasionally was covered with perspiration. He described the effect of the opium on his mental and physical state as those of calmness, comfort, and serenity. Under its influence he was able to sustain great bodily and mental fatigue. He never experienced the exhilarating, pleasant sensations described by De Quincey. His feelings, when on the influence of opium, were most distressing. Mr. Davies (an intelligent observer) described his condition at this time as follows:—eyes hollow, dark, and bloodshot; features haggard; hands trembling; voice and manner agitated; mouth parched; appetite wanting; sleeplessness. Unable to sleep for want of his accustomed dose, he used to pace the ward of the hospital at night almost frantic, though sensible of his miserable condition, and anxious to abandon the practice.

Opium-smoking.—I have already referred to the enormous quantities of opium consumed in China and the islands of the Archipelago by smoking. The smokeable extract, called "raw opium," (see p. 1732) is made into pills about the size of a pea. These being put into the small tube that projects from the side of the opium-pipe, that tube is applied to a lamp, and the pill being consumed at one whiff or inflation of the lungs, attends to the whistling noise. The smoke is never emitted by the mouth; it usually receives vent through the nostrils, and sometimes, by the passage of the ears and eyes. The residue is called "t'ye-chandoo," or facet opium, and is used by poor people and servants.

![Chinese Opium Pipe and Apparatus](image)

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*a Marsden, Hist. of Sumatra, p. 270, 3rd ed.
*The Times newspaper for Dec. 3rd, 1844.
In the first edition of this work I stated that though the immoderate use of opium-smoking must be highly detrimental to health, yet I believed the statements of Medhurst and others applied in which this practice was carried to excess; and I observed an account of the effects of opium-smoking by an unbiased and professional witness was a desideratum. My opinion was founded on the statements of Botta and Marsden. The latter, a moderate writer, observes that "the Limun and Batang Assei goliaths, who are an active and laborious class of men, but yet indulge freely in opium as any others whatever, are, notwithstanding, the healthiest and vigorous people to be met with on the island."

This desideratum has been recently supplied by Mr. Smith, of Pulo Penang, whose statements fully confirm my opinion, though the practice is most destructive to those who live in poverty and distress, and who carry it to excess, yet it does appear that the Chinese, in easy circumstances, and who have the comforts of life about them, are materially affected in respect to longevity, by the private addiction to this vice. "The great many persons," observes Mr. Smith, "within my own observation, have attained the age of sixty, seventy, or more, and who are all known as habitual opium-smokers for more than thirty years past. The first effect of this drug on the Chinese smokers is to render them more loquacious and animated. Gradually the conversation is protracted, laughter is occasionally produced by the most trifling cause, and these effects succeed vacancy of countenance, pallor, shrinking of the features, so that the smokers resemble people convalescing from fever, followed by deep sleep for half an hour to three or four hours; inordinate quantity causes headache, vertigo, and nausea. Travais are rendered outrageous and quarrelsome by the opium-pipe. It is extremely difficult to discontinue the vice of opium-smoking there are many instances (among which is the present Emperor of China) of its being done. The continuance of this destructive practice deteriorates the physical constitution and moral character of the individual, especially among the lower classes. Its powerful effects on the system are manifested by stupor, forgetfulness, deterioration of the mental faculties, emaciation, debility, sallow complexion, lividity of lips and eyelids, languor and lacklustre of eye, appetite either destroyed or depraved, sweetmeats or sugar-eating, the articles that are most relished. "In the morning the features have a most wretched appearance, evincing no symptoms of refreshed or invigorated by sleep, however profound. There is remarkable dryness or burning in the throat, which urges them to repeat the opium-smoking. If the dose be not taken at the usual time, there is great prostration, vertigo, torpor, discharge of warm sweat from the eyes, and in some an involuntary discharge of semen, even

1 China, 1838.
2 Froriep's Nativet, xxvi.
4 Lancet, February 19, 1842.
spinal functions, as already stated. This state, however, is like that of depression. The effect of opium-eating on the intellectual faculties has been already noticed. In the latter stage of poisoning the leading symptom is so analogous to profound sleep, from which the patient awakens with difficulty. In the latter stage of poisoning, the patient is succeeded by coma—that is, profound sleep, from which cannot be roused. Sopor is usually accompanied by paralysis of the muscular fibres, or with a diminution of the sense of touch, amounting to it; both of which states doubtless exist in the condition of the cerebro-spinal system which produces this state. The pupil is usually contracted,—a circumstance which is noticed.

But in some cases we have delirium in the place of coma, and convulsions instead of paralysis. These are exceptions to the general rule, and are accounted for by supposing they depend on a state of irritability in the nervous centres, and which usually, terminates in congestion.

Another effect of opium is diminished sensibility. The body becomes less susceptible of painful impressions, and in fatal cases, the eyes are insensible to light. This state has been accounted for by supposing the sensitive nerves are diminished or suspended in the condition of the brain.

From these effects of opium on the cerebro-spinal system, the following consequences may be drawn:—

1. That it is an objectionable agent in apoplexy, phosphatism, and other diseases.
hunger, checks the digestive process (for in some animalsorne by opium, food which they had taken previously has been 
ined in the stomach unchanged): and in some cases it excites 
ting. Mr. Kerr\textsuperscript{j} tells us, that in the famine which prevailed in 
East Indies, in the year 1770, opium was purchased by the un-
puy sufferers, at extraordinary prices, to allay the cravings of 
ter, and to banish the dreadful prospect of death. The Tartar 
riars, who travel immense distances in a short period of time, take 
um only during the journey, to support them. It diminishes the 
sibility and contractility of the digestive organs: hence the 
sity, in severe cases of poisoning, of producing vomiting. The 
ipation which follows the use of opium depends partly on the 
cause, and in part also on the diminished excretion of bile, and 
iminished secretion from the gastro-intestinal mucous membrane. 
Prægel\textsuperscript{k} found the choledic ducts of animals, to whom opium had 
given, filled with bile; yet it had not passed into the intestines, 
the faeces were scarcely tinged by it, but had the same appearance 
which we observe them to have in jaundiced patients.

From these effects of opium on the digestive organs, we may draw the follow-
ingferences:

That in diminished secretion from the gastro-intestinal membrane, in ex-
se thirst, in loss of appetite and weak digestion, in obstinate costiveness, and 
iminished excretion of bile, opium is an objectionable remedy.

That under proper regulations, opium is an admissible remedy for the 
ng purposes:—To diminish excessive hunger; to allay pain, when unac-
paied by inflammation; to diminish the sensibility of the digestive organs, 
eses of acid poisoning, and in the passage of biliary calculi; to produce 
ration of the muscular fibres of the alimentary canal (in colic and diarrhoea), 
of the gall ducts (in the passage of calculi), and to diminish excessive secre-
from the intestinal canal, in diarrhoea.

By continued use (as by opium-eaters) this drug frequently ceases 
use dryness of the mouth, to pall the appetite, or to confine the 
els, as I have already mentioned.

\textbf{On the Vascular System.}—Opium certainly influences the move-
ents of the heart and arteries; but the effect is by no means uniform, 
e in some cases we see the pulse increased, in others diminished 
eyquency; and a like variation is noticed in its fulness. Moreover, 
variations occur in the same case at different stages. From 
rumpe’s experiments, before referred to, it appears that, after the 
of a moderate dose of opium, the frequency of the pulse is first 
ased, then decreased. The diameter of the artery, and the force 
regularity with which the pulsations are effected, are properties 
 pulse readily, but by no means uniformly, affected by opium. 
 a certain extent we perceive a relation between the condition of 
pulse and that of the cerebro-spinal functions. Thus, when con-
ions occur, we usually have a hurried pulse,—whereas, when 
or coma supervenes, the pulse becomes weaker or slower, or
both, than natural. But these conditions are by no means form. A frequent pulse, with a feverish condition of the body common consequences of the use of small or moderate doses of opium; and in poisoning by this drug, a quick pulse, even the convulsive movements are observed, is by no means rare. A pote dose of opium usually enfeebles the pulse, sometimes makes it often renders it irregular, and towards death always renders it and often imperceptible. We can easily believe that the fibres of the heart must experience, from the use of a large dose of opium, a diminution of power in common with other muscles and hence the contractions become weaker. It is also probable the contractile coat of the arteries and capillaries equally. Now Wirtensohn\(^1\) supposes that the fulness of the pulse observed in poisoning by opium, arises from the insufficient heart to propel the blood through this paralysed or capillary system. The accumulation of blood observed in venous trunks and cavities of the right side of the heart, is to arise from the obstruction experienced to its passage the pulmonary vessels.

In attempting to lay down indications and contra-indications of opium as a remedy for morbid conditions of the circulation, to present themselves:—first, the same condition of the vascular system induced by various and even opposite causes, for some of which an appropriate remedy, while for others it may prove an injurious, secondly, the effects of opium on the circulation are not uniform, and to be relied on. The following conclusions, therefore, are submitted with considerable hesitation as to the universality of their application:—

1. That in increased activity of the vascular system with considerable or with diminished secretions and exhalations, and in morbid concomitant vascular system with a tendency to sopor or coma, opium is an effective remedy.

2. That in vascular excitement with great diminution of pulmonary hemorrhage; and in various morbid conditions of the pulse attend pain, spasm, or profuse secretion and exhalation, but without visceration, opium often proves a serviceable agent.

3. On the Respiratory System.—In studying the effect on the respiration, we must remember that the mechanical function is effected by muscular agency; and as the co-operation of the muscular fibre is powerfully influenced by opium, respiratory movements are also necessarily modified. Occasional primary effect is a slight increase in their frequency; but any effect is almost always of an opposite kind, the respiration being slower than usual; and when coma is present, the breath usually gentle, so as scarcely to be perceived; but in some cases stertorous. In fact, a paralytic condition of the respiration takes place, in consequence of which inspiration becomes more and more difficult, until eventually asphyxia is induced is usually the immediate cause of death.

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\(^1\) Quoted by Barbier, *Traité Elém. de Mat. Med.* t. ii. 2e éd.
Another effect ascribed to opium is, that it checks the arterialization of the blood, by diminishing the supply of nervous agency, through which the decarbonization or oxygenization of this fluid cannot take place. It is difficult, however, to distinguish the consequences of this effect from those of asphyxia produced by paralysis of respiratory muscles.

The third point of view under which we have to examine the influence of opium on the respiratory system is, its effect on the membrane lining the trachea and bronchial tubes and cells. In the 1st place, it diminishes the sensibility of this, in common with other parts of the body; and, secondly, it checks exhalation and mucous secretion.

A knowledge of these effects of opium on the organs of respiration leads to the following conclusions:

1. That this agent is contra-indicated in difficulty of breathing arising from a deficient supply of nervous energy, as in apoplectic cases; that it is improper where the venous is imperfectly converted into arterial blood; and, lastly, that it is improper in the first stage of catarrh and peripneumony, both from its checking secretion, and from its influence over the process of arterialization.

2. That in cases of poisoning by opium, artificial respiration is indicated, to prevent asphyxia.

3. That opium may, under proper regulations, be useful to diminish the contractility of the muscles of respiration, or of the muscular fibres of the air tubes, in spasmodic asthma; to diminish the sensibility of the bronchia, in the 3rd stage of catarrh, and thereby to allay cough by lessening the influence of cold air; and lastly, to counteract excessive bronchial secretion.

4. On the Urinary System.—Authors are not agreed as to the effect of opium on the kidneys; some asserting that it increases, others that it diminishes, the quantity of urine secreted. Thus, Dr. Michaelis n asserts, that in giving opium in venereal cases, he has sometimes found the secretion of urine exceeding in quantity all the rides drank. It cannot, however, be doubted, that in most cases a moderate quantity of opium diminishes the excretion, while at the same time it makes this fluid turbid and thick. This does not, however, prove the kidneys to be the part affected. Sprögel n tells us, at he gave two scruples of opium to dogs, no urine was passed for two days; and, under the influence of two drachms of this medicine, the urine was retained for three days. But dissection showed that the kidneys had not ceased to secrete urine, since the bladder was found distended with this secretion, and its parietes without the least sign of contractility on the application of nitric acid; so that it would appear the non-evacuation of the urine was terrible to the insensible and paralysed condition of the vesical muscles, and not to the diminished urinary secretion. Charvet n has noticed in dogs, cats, and hares, that the urinary bladder was distended. As, however, in man opium usually increases the cutaneous exhalation, while in other mammals this effect was not ob-

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Cited by Christen, op. supra cit. p. 68.
Besides the observations of Sproégel, before re-
other evidence of the paralysing and benumbing of
the bladder. In some cases of poisoning by the
bladder has been found to be unable to contract on
some other instances the sphincter of the bladder has
and in consequence the urine was voided involun-
has also noticed the same thing, and quotes the
Bally to the same effect. The effect of morphia
more marked than that of opium.

These remarks on the effect of opium on the urinary or
lowing conclusions:—
1. That in diminished sensibility or contractility, or be
bladder, the use of opium is objectionable.
2. That, under proper regulations, opium may be a val-
the sensibility of the pelvis of the kidney, in cases of re-
pain and produce relaxation of the ureters when calculi are
are tubes; and, lastly, to diminish irritation of the bladder,
kantharides or other causes.

2. On the Sexual System. aa. Of men.—Opium
celebrated as an aphrodisiac; and we are told by
Chinese, Indians, Persians, Egyptians, and Turk.
Among other symptoms of excitation produced by
of large doses of opium, it is not improbable that the
heightened condition of the venereal feelings, in case
increased determination of blood to that part of the
be devoted to the sexual function, which part
assert it to be the cerebellum. Moreover it is said
ition; and in support of this statement the following
told:—“Turcae ad Levenzinum, 1664, contra Comi
The effect alluded to, if it really do take place, is probably to refer to the accumulation of blood in the erectile tissues, arising from a disordered state of the circulation. Impotence is ascribed to opium-eating, and is a more probable effect. I am unacquainted with any facts on which to ground any well-founded opinion as to the power of opium to diminish or increase the spermatic secretion.

β. Of women.—We have little positive information as to the effects of opium on the reproductive organs of women. It is said that the catamenia, lochia, and secretion of milk, are unaffected by opium. But that it causes intumescence of the nipples. Under its use the milk acquires a narcotic property (see p. 108). Furthermore, at times it has appeared to have an injurious effect on the fetus in utero. Opium appears to act on the uterus as on most other erectile parts of the body; that is, it diminishes the contractility and sensibility of this viscous.

From these observations it follows:—

That wet nurses and pregnant women must employ opium with great caution, as its use by them may endanger the life of the child.

That opium may be employed to allay pain, spasm, and morbid irritation of sexual organs in either sex; and that its use in the female is not likely to be changed with retention of the uterine or mammary secretions.

That the influence of opium on the venereal appetite is not sufficiently and satisfactorily determined to permit us to make any practical application of it.

η. On the Cutaneous System.—Considered as an organ of sense, the cutaneous system is affected by opium in an analogous way to other organs of sense; that is, its sensibility is diminished. But the skin has another function—that of excretion, and which does not seem to be at all diminished, nay, to be increased, by the use of opium; one of the usual effects of this medicine being perspiration, which is in some cases attended with a pricking or itching of the skin, and occasionally with an eruption. In fact, taken medicinally, opium is a powerful sudorific, and often proves so even when acting as a poison. "In a fatal case, which I examined judicially," says Christison, "the sheets were completely soaked to a considerable extent round the body."

From these remarks it follows:—

That opium is not likely to relieve loss of feeling or excessive perspiration; nor, on the other hand, under some conditions of the system, prove injurious.

That opium is adapted to the relief of pain or excessive sensibility of the skin, and for provoking perspiration; but the propriety of its use for these purposes must be determined by reference to the condition of the system generally. Experience proves that when the skin is very hot, and especially if it be also tender, opium is seldom beneficial, but often hurtful.

Epiphenal effects.—The local effects of opium are, compared with other ones, very slight. Applied to the eye, internal mem-

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brane of the nose, urethra, cutis vera, wounds or ulcers causes pain, a sense of heat, and inflammation; but if subsided, and are followed by a weakened or a paralytic of the sensitive and motor nerves. Several physiologists have shown that opium causes a local paralysis of the nerves; and it is shown that the narcotic action is not propagated from the nerve to its branches. Crumpe* showed, that, at the ex minutes, the eye to which opium had been applied was less susceptible of the action of alcohol. Scarcely any other results from the application of opium to the ordinary integument of the barrier presented by the cuticle. Employment of the effects are much more powerful.

Post-Mortem Appearance.—The most important are those observed in the nervous system; such as turgid vessels, effusion of water or of coagulable lymph, and oedema, though rarely, extravasation of blood.

Whenever redness of the digestive canal is observed, it is referrible to the use of some irritants (such as spirits, atemetics) taken either with, or after the use of, opium.

Modus Operandi.—Under this head I propose to examine points not hitherto noticed, and which involve the theory of action of opium on the system.

1. The Odorous and Active Principles of Opium are such asserton is proved by the following facts:

a. The odour of opium is sometimes recognizable in the secretions: thus it is well known that the opiate odour is frequently breathed by persons poisoned by this drug; and Barbier* states, it noticed in the urine and sweat.

b. The secretions, in some cases, appear to possess narcotic properties. In the case of an infant who was thrown into a state of several hours' duration, in consequence of having sucked a nurse previously swallowed a dose of laudanum, to relieve a cramp of the stomach.

c. Barruel asserts that he detected morphia in the blood and urin. As, he results have not been obtained by Dublanc or Lassaigne, the statement be absolutely relied on.

2. The Constitutional Effects of Opium depend in great way, on the absorption of its active principles.—In which this assumption rests, are:

a. The active principles of opium are absorbed.

b. The constitutional effects of it are found to be proportionate to the part.

c. The effect of opium, when thrown into the jugular vein, is though more powerful than, that produced by its application to the body.

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1 Phys. by Baly, vol. 1. p. 630.
2 Op. supra cit.
3 Traité élém. de Med. Méd. ii. 733, 3rd éd.
4 On one occasion I at first supposed that I had detected morphia and meconic acid of a man poisoned by opium; for both nitric acid and the sesquioxide of iron gave this secretion. I have since found, however, that the urine of healthy individuals of some results.
The narcotic action does not re-act from a particular point of a nerve on
brain.\textsuperscript{4}\\n
3. The Essential and Primary Operation of Opium is on the Nerv-
ous System (the Brain and Spinal Cord chiefly).—This axiom is
proved by reference to the already-described effects of opium. An
amination of them shows that—\textsuperscript{5}

- The most important effects of opium are direct and obvious lesions of the
  nervous functions.
- The other effects of opium appear, for the most part, to be secondary,—that
  they arise out of the nervous lesions just referred to.

4. Opium acts on the Nervous System as an Alterative.—There are
three kinds of changes, compatible with life, which medicines
in effect the vital actions of an organ,—viz. an increase, a diminu-
ption, or an alteration of activity. A change in the intensity or
ergy merely of the vital actions of the nervous system, would not
be a satisfactory explanation of the effects of opium. We are
liged, therefore, to assume that opium changes the quality of the
ions. This is what is meant by the term alterative.

The inquiry into the nature and kind of influence exercised by opium over
system, presents an extensive field for speculation and hypothesys. Galen\textsuperscript{7}
clared opium to be cold in the fourth degree, and his authority long prevaled
the schools. It was first opposed by the intro-chemists, who declared opium
be of a hot nature. Some, however, adopted a middle course, and asserted
it possessed both hot and cold particles. The intro-mechanists endeavoured
eplain the operation of opium on mechanical principles. By some expan-
s, by others condensation, of the blood, was supposed to be produced by the
chelical properties of the opiate particles acting on the nerves\textsuperscript{8}. Dr. Cullen\textsuperscript{9}
lered opium to be a sedative, and referred its effects to its power of "dim-
ishing the mobility, and in a certain manner suspending the motion, of the
ous fluid." Several later writers, Barbier\textsuperscript{4} for example, also call opium a
active. Brown\textsuperscript{10} declared it to be a stimulant, and his opinion has been
pted by Crumpe\textsuperscript{11}, Murray\textsuperscript{12}, and Dr. A. T. Thomson\textsuperscript{13}, in this country, and
course by the continental Brunonians, as well as by the partisans of the Ita-
thony of contra-stimulus. Fontana\textsuperscript{1} ascribed the operation of opium to
ages which it induces in the blood. Mayer\textsuperscript{4} declared opium to be both
ulant and sedative,—viz. stimulant to the nerves and vascular system, but
ative to the muscles and digestive organs. Lastly, Orfila\textsuperscript{15} asserts that
pium, employed in strong doses, ought not to be ranked among the narcotics
stimulants; it exerts a peculiar mode of action which cannot be design-
ed by any of the terms at this moment employed in the Materia Medica.\textsuperscript{16}
c examples, selected out of many opinions, will be sufficient to prove how

\textsuperscript{4} Müller, \textit{Phys.} by Baly, i. 631.
\textit{Nedalosus, Opisthagia}, cap. vi. p. 25. 1682.
\textit{See an account of these opinions by Tralles, \textit{Usus Opii}, Sect. i. 1757.}
\textit{Mem. Med.} ii. 223.
\textit{Traite Elém. de Mat. Méd.} ii. 2\textsuperscript{e} ed. 1757.
\textit{Elémenta Medecins.}
\textit{Op. supra cit.}
\textit{Syst. of Mat. Med. and Therap.} Edinb.
\textit{Bews. of Mat. and Therap.}
\textsuperscript{5} Some remarks on the \textit{modus operandi} of opium, by Mr. Ward, in the \textit{Lond. Med. and Phys.}
\textsuperscript{6} \textit{vols. vii. viii.} & ix.
\textit{Gent. on the Venom of the Viper}, iii. 199.
\textsuperscript{7} Extracted by Orfila, \textit{Toxicol. Gen.}
\textit{Op. supra cit.}
These are the general characteristics of the opiate; but there are exceptions to this. I have already pointed out the distinguishing effects of belladonna (p. 1239), and stramonium (p. 1239). The fact that these effects can be obtained by aconite distinguishes its operation from that of opium. Tobacco and foxglove enfeebles the vascular system, can also produce gastro-intestinal irritation. Furthermore, the effects of opium are not equally available as antispasmodics, as the operation of hydrocyanic acid. Indian opium and conium are in a different state. Vinous liquids cause their well-known peculiar effects in small doses agree, to a certain extent, with those of opium; but they are not equally available as antispasmodics.

Uses.—Opium is undoubtedly the most important remedy of all the Materia Medica. We have medicines, one or more substitutes; but for opium there is at least in the large majority of cases in which its use is required. Its good effects are not confined to those that some valuable medicines, remote and contingent, immediate, direct, and obvious; and its operation on pain or discomfort. Furthermore, it is applied, with success, to the relief of maladies of every day’s occurrence, which are attended with the most acute human suffering. In some circumstances, with others not necessary here to mention, to give to opium an interest not possessed by any other Materia Medica.

We employ it to fulfill various indications; and have already noticed. Thus we exhibit it, under the following indications:—to mitigate pain, to allay spasm, to promote sleep, to relieve restlessness, to produce perspiration, and to abate fever.
is peculiar difficulties. Though certain symptoms which occur in the course of this disease, are, under some circumstances, most advantageous, if properly treated by opium, yet, with one or more of these symptoms present, opium may, notwithstanding, be a very inappropria-
remedy. The propriety or impropriety of its use, in such cases, must be determined by other circumstances, which, however, are exceedingly difficult to define and characterise. It should always be employed with great caution, giving it in small doses, and carefully watching its effects. The symptoms for which it has been resorted to are, watchfulness, great restlessness, delirium, tremor, and 

When watchfulness and great restlessness are disproportionate, from first to last, to the disorder of the vascular system or the constitution at large; or when these symptoms continue after excitement of the vascular system has been subdued by appropriate agents, opium frequently proves a highly valuable remedy: nay, safety of the patient often arises from its judicious employment. The same remarks also apply to the employment of opium for the delirium; but it may be added, that in patients who have addicted to the use of spirituous liquors, the efficacy of opium in allaying delirium is greatest. Yet I have seen opium fail to relieve the delirium of fever, even when given apparently under favourable circumstances; and I have known opium restore the consciousness of a delirious patient, and yet the case has terminated fatally. The skin has been damp and the tongue moist, it rarely, I think, proves furious. The absence, however, of these favourable conditions by no means precludes the employment of opium; but its efficacy is more doubtful. Dr. Holland suggests that the condition of the pil may serve as a guide in some doubtful cases; where it is connected, opium being contra-indicated. A similar suggestion with respect to the use of belladonna was made by Dr. Graves (see p. 34), to which I have offered some objections. When sopor or slumber supervenes in fever, the use of opium generally proves injurious. Recently the combination of opium and emetic tartar has strongly recommended in fever with much cerebral disturbance,

Dr. Law, and Dr. Graves.

2. Inflammatory diseases.—Opium has long been regarded as a

jectable remedy in inflammation; but it is one we frequently

ort to, either for the purpose of palliating particular symptoms, or

as a powerful auxiliary antiphlogistic remedy. The statement of Dr. Young, "that opium was improper in all those diseases in which bleeding was necessary," is, therefore, by no means correct in a very considerable number of instances. The objects for which opium is usually exhibited in inflammatory diseases, are to mitigate

**, some interesting observations on this subject, by Dr. P. M. Latham, Lond. Med Gaz.**

**\[footnote text \]**

**\[footnote text \]**
is best adapted for the disease when it affects, and is much less beneficial in inflammation of the structure of organs. In gastritis and enteritis it has been strongly recommended by the late Dr. ... bleeding the patient to syncope, a full opiate of the tincture, or three grains of soft opium) is given, and if the stomach reject it, we may give it by inserting into the skin, induces quiet and refreshing sleep, a reaction called the hemorrhagic reaction. If the urge to defecate occurs when the patient awakes, the same mode of treatment is followed, but combining calomel with the opium. In peritonitis, the same plan be adopted; but warm moist applications are omitted. Of the great value of opiates in puerperal fever, evidence has been adduced by Dr. Ferguson. Opium preceded and accompanied by blood-letting and calomel is a valuable remedy; it relieves the scalding pain, and diminishes the sensibility of this viscus to the presence of the bacteria of the pelvis of the kidney, and also of the ureter, as brought on by the presence of a calculus, opium is a valuable remedy; it diminishes the sensibility of these structures, and diminishes the spasm; furthermore, it relaxes the ureters, and thus facilitates the passage of the calculus. In inflammation of the appendix, opium is likewise serviceable. In the last-mentioned case, blood-letting and the warm applications are employed simultaneously with it. In inflammation of the branes, attended with increased secretion, opium is a valuable remedy. Thus, in pulmonary catarrh, when the disease has passed by, and the mucous secretion...
the commencement of the disease, Dr. Holland* says, that thirty drops of landanum will often arrest it altogether. In opium, in mild cases, is often sufficient of itself to cure the diminishes the increased muscular contractions and increased (thereby relieving pain), and at the same time checks excretion. Aromatics and chalk are advantageously combined. In violent cases blood-letting should precede or accompany it. Mild or English cholera, the disease which has been known in this country, and which consists in irritation or inflammation of the mucous lining of the stomach, is generally most strongly treated by the use of opium: two or three doses will, in cases, be sufficient to effect a cure. When opium fails, the use of acid is occasionally most effective. In dysentery, it only be used beneficially in the latter stages, and then with caution: it is best given in combination with either ipecacuanha or calomel. I have already stated that in inflammation of the mucous tissue of organs the use of opium is less frequently beneficial, but often injurious. Thus in inflammation of the mucous tissue of organs the use of opium is less frequently beneficial, but often injurious. Thus in inflammation of the substance it is highly objectionable, since it increases the secretion of blood to the head, and disposes to coma. In pneumonia it is for the most part injurious; partly by its influence on the febrile symptoms, partly by its diminishing the bronchial and probably also, by retarding the arterialization of the lung thereby increasing the general disorder of the system. It is admitted, however, that there are circumstances under which blood-letting has been carried as far as the safety of the patient will admit, but without the subsidence of the disease, and the repeated use of opium and calomel of essential advantage: in the advanced stages of pneumonic inflammation the difficulty of breathing has abated, opium is sometimes beneficially employed to allay painful cough, and produce sleep. In inflammation of the substance of the liver, opium is seldom useful: it checks the excretion, if not the secretion, of bile, and produces constiveness. In rheumatism, opium frequently evinces its effects. In acute forms of the disease it is given in combination with calomel, as recommended by Dr. R. Hamilton,—blood-letting usually premised. From half a grain to two grains should be given at a dose. Dr. Hope* recommends gr. x. of calomel to be combined with each dose of opium. This is necessary, or even proper, in ordinary cases, to affect the podophyllum; though to this statement exceptions exist. Mercury may even, in some cases, be objectionable; and Dover's powder will be found the best form of exhibition. In treatment is well adapted for the diffuse or fibrous acute rheumatism; but it does not prove equally successful in

the synovial forms of the disease. It is also valuable in chronic rheumatism.

3. In Diseases of the Brain and Spinal Cord.—In some cerebro-spinal diseases great benefit arises from the use of opium; while in other cases injury only can result from its employment. The latter effect is to be expected in inflammation of the brain, and in apoplectic cases. In other words, in those cerebral maladies obviously connected with, or dependent on, an excited condition of the vascular system of the brain, opium acts injuriously. But there are many disordered conditions of the cerebro-spinal functions, the intensity of which bears no proportion to that of the derangement of the vascular system of the brain; and there are other deviations from the healthy functions in which no change in the cerebral circulation can be detected. In these cases opium or morphia frequently evinces its happiest effects. In insanity its value has been properly insisted on by Dr. Seymour. He, as well as Messrs. Beverley and Phillips, employed the acetate of morphia. Its good effects were manifested rather in the low, desponding, or melancholic forms of the disease, than in the excited conditions; though I have seen great relief obtained in the latter form of the disease by full doses. Opium is sometimes employed by drunkards to relieve intoxication. I know a medical man addicted to drinking, and who, for many years, was accustomed to take a large dose of laudanum whenever he was intoxicated and was called to see a patient. On one occasion, being more than ordinarily inebriated, he swallowed an excessive dose of laudanum, and died in a few hours of apoplexy.

In delirium tremens the efficacy of opium is almost universally admitted. Its effects, however, require to be carefully watched; for large doses of it, frequently repeated, sometimes hasten coma and other bad symptoms. If there be much fever, or evident marks of determination of blood to the head, it should be used with great caution, and ought to be preceded by loss of blood, cold applications to the head, and other antiphlogistic measures. Though opium is to be looked on as a chief remedy in this disease, yet it is not to be regarded as a specific. Dr. Law speaks in high terms of its association with emetic tartar. I have before noticed the use of opium in alleviating some of the cerebral symptoms which occur during febrile states.

In spasmodic and convulsive diseases opium is a most important remedy. In local spasm produced by topical irritants, it is a most valuable agent, as I have already stated: for example, in spasm of the gall ducts or of the ureters, brought on by the presence of calculi in colic, and in painful spasmodic contractions of the bladder, or rectum, or uterus. In spasmodic stricture opium is sometimes used. In genuine spasmodic asthma, which probably depends on a spasmodic condition of the muscular fibres investing the bronchial tubes, a full dose of opium generally gives temporary relief; but the recurrence of the paroxysms is seldom influenced by opium. There are

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OPPIUM.

There are several reasons for believing that one effect of narcotics in dyspnoea is to diminish the necessity for respiration. Laennec\(^1\) states, that when given to relieve the extreme dyspnoea of mucous catarrh, it frequently produces a speedy but temporary cessation of the disease; and if we explore the respiration by the stethoscope, we find it the same as during the paroxysm,—a proof that the benefit obtained consists simply in a diminution of the necessity for respiration. That the necessities of the system for atmospheric air vary at different periods, and from different circumstances, is sufficiently established by the experiments of Dr. Prout\(^2\); and it appears that they are diminished during sleep, at which time, according to Dr. Edwards\(^3\), the transpiration is increased. Moreover, the phenomena of hibernating animals also bear on this point; for during their state of torpidity, or hibernation, their respiration is proportionally diminished.

In the convulsive diseases (chorea, epilepsy, and tetanus,) opium has been used, but with variable success: in fact the conditions of the system under which these affections occur, may be, at different times, of an opposite nature; so that a remedy which is proper in one case is often improper in another. In tetanus, opium was at one time a favourite remedy, and is undoubtedly at times a remedy of considerable value. But it is remarkable that the susceptibility of the system to its influence is greatly diminished during tetanus. I have already (p. 137) referred to the enormous quantities which may, at this time, be taken with impunity. In 128 cases of tetanus noticed by Mr. Curling\(^4\), opium in various forms, and in conjunction with other remedies, was employed in eighty-four cases; and of these, fifty-five recovered. Notwithstanding, however, the confidence of the profession in its efficacy is greatly diminished.

Lastly, opium occasionally proves serviceable in several forms of headache, especially after loss of blood. I have seen it give great relief in some cases of what are commonly termed nervous headaches; while in others, with apparently the same indications, it has been injurious. Chomel\(^5\) applied, with good effect, opium cerate on a blistered surface of the scalp, to relieve headache.

4. In Diseases of the Chest.—In some affections of the heart and the organs of respiration opium is beneficial. I have already alluded to its employment in catarrh, peripneumonia, and spasmodic asthma. In the first of these maladies caution is often requisite in its use. “In an aged person, for example, suffering under chronic osteitis or catarrhal influenza,—and gasping, it may be, under the difficulties of cough and expectoration,—an opiate, by suspending these struggles, may become the cause of danger and death. Here effort here is needed for the recovery of free respiration; and if depressed too long, mucus accumulates in the bronchial cells, its

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\(^1\) Treat. on the Diseases of the Chest, by Forbes, pp. 77 and 99. 1827.
\(^2\) Ann. of Phil. ii. 330; and iv. 331.
\(^3\) De l‘Inf. des Agens Physiq. p. 331. 1834.
\(^4\) Treat. on Tetanus, p. 151. 1836.
tharides, all the drastic purgatives, when taken in
(as elaterium, colocynth, gamboge, scammony, a
seeds) and Arum maculatum, may be mentioned as
substances alluded to. Besides the above-men
tionation, opium allays the spasmodic contractions of the
pain, and checks inordinate secretion and exhalation.

In poisoning by corrosives (the strong mineral as for example,) diminishing the sensibility of the aliment
the use of opium, cannot, of course, alter the chemi
the poisons, yet it may prove useful by allaying the
inflammation.

As meconic acid is said to be an antidote in case
of corrosive sublimate, opium, in full doses, may per
tered with some advantage, when other antidotes can

In poisoning by the preparations of arsenic, of less
opium is sometimes found useful.

6. In Maladies of the Urino-genital apparatus
valuable remedy. It mitigates pain, allays spasmod
copious mucous secretion, and diminishes irritation.
or more of these purposes in nephritis, cystitis, the p
calculi, and spasmodic stricture, has been already
irritable bladder it is an invaluable remedy, especially
with liquor potassae (see p. 486). In irritation an
affections of the uterus, and in phimosis, the value of
known. In the treatment of the phosphatic dittie
remedy that can be employed, according to Dr. P
the unnatural irritability of the system.

Of all remedies for that hitherto intractable
opium has been found to give the most relief. I
ing this disease. Dr. Prout has also found it serviceable when there is an excess of urea in the urine.

1. As an anodyne.—To relieve pain by dulling the sensibility of the body, opium is, of all substances, the most useful, and the most be relied on for internal exhibition. We sometimes use it to alleviate the pain of inflammation, as already mentioned; to diminish and the sensibility of the part in calculi of the gall ducts, in ureters, and even when in the urinary bladder; to relieve pain in various forms of scirrhus and carcinoma, in which diseases opium our sheet-anchor; to allay the pain arising from the presence of foreign bodies in wounds; to prevent or relieve after-pains; to diminish the pain of menstruation; and, lastly, as an anodyne in neuralgia. As a benumbing or topical anodyne it is greatly inferior to opium. Hence in neuralgia the latter is much more successful than the former. (See Aconitum.)

2. In hemorrhages.—Opium is at times serviceable to obviate certain effects of hemorrhages; as when there is great irritability ended with a small and frequent pulse, and also to relieve that painful throbbing about the head so often observed after large evacuations of blood. In or immediately after uterine hemorrhage the use of opium has been objected to, on the ground that it might prevent the contraction of the womb; but where the employment of opium is otherwise indicated, this theoretical objection deserves no weight. In bronchial hemorrhage it is at times a valuable remedy, may be associated with acetate of lead (notwithstanding the chemical objections to the mixture) with good effect.

3. In mortification.—When mortification is attended with excessive pain, opium is resorted to. In that kind of mortification called graena senilis, which commences without any visible cause, by a small purple spot on the toes, heels, or other parts of the extremities, which sometimes arises from an ossified condition of the arteries, Pott strongly recommended opium, in conjunction with a stimulating plan of treatment, and experience has fully proved its great efficacy.

4. In venereal diseases.—Opium is frequently employed in venereal diseases to prevent the action of mercurials on the bowels during evaporation; also to allay the pain of certain venereal sores, and venereal diseases of the bones. By some it has in addition been employed as an anti-venereal remedy; and, according to Michaelis and others, in success. Moreover, it is stated by Dr. Ananian, who practised Constantinople, that those persons who were in the habit of taking opium rarely contracted the venereal disease. But opium possesses specific anti-venereal powers. It has appeared to me, on several occasions, to promote the healing of venereal sores.

5. In various forms of ulcers, and in granulating wounds, the effi-
cacy of opium has been satisfactorily established by Mr. Richter*; and others$, had already noticed its good effects; statements had attracted little attention. Mr. Grant$, pointed out the efficacy of opium in the treatment of foul attended with a bad discharge, and much pain. He ascribes symptoms to "morbid irritability," which the opium remission use is prejudicial in ulcers attended with inflammation, in or sanguineous temperament, and in childhood. But in ther or callous ulcer, in the so-called varicose ulcer, in recent new wounds) in which granulation proceeds slowly, or in other efficacy of opium, administered in small doses, (as ten laudanum three times daily), is most manifest, especially in persons, and in those whose constitutions have been debilitated by disease, labour, spirituous liquors, &c. It appears to promote genial warmth, to give energy to the extreme areas, whereby to maintain an equal balance of the circulation through every part of the body, and to anoint the dormant en healthy action.

12. The external application of opium is comparatively resorted to, and for two reasons: in the first place, its topical effects are slight; and, secondly, its specific effects on the brain and system are not readily produced through the skin. Aconite and morphia greatly exceed opium in their topical effects. The are some of the local uses of opium:—In ophthalmia, the is dropped into the eye when there is excessiveVinum Opii). In painful and foul sores, opiates are used with good effects. Mr. Grant* applied the tincture twice as an oatmeal poultice, to irritable sores. Opiate frictions are employed as topical anodynes, and to affect the general. Thus, in chronic rheumatism and sprains, the opium liniment a useful application. In maniacal delirium, as well as some cerebral disorders, Mr. Ward* employed, with apparently beneficial effects, opiate frictions; for example, 3ss. of opium, mix erad, and 3j. of olive oil. In affections, an opiate cerate, or finely powdered hydrochlorophia, applied to a blistered surface, occasionally gives relief. trodynia, it may be applied in the same way to the epigastrium (Holland). In gonorrhoea and gleet, opium injections are used. In spasmodic stricture, diseases of the prostate gland, gonorrhoea to prevent chordee, an opiate suppository is a use of employing opium, especially where it is apt to disagree in stomach. In nervous and spasmodic affections (as some asthmata), the endermic application of opium or morphia, along the course of the spine, is often singularly beneficial.

* On a new Method of Treatment employed in the Cure of various forms of Ulcer and Wounds. Lond. 1837.
* See Pluquet's Lit. Med. iv. 214. 1809.
methods of depletion and counter-irritation have proved utterly unsatisfying (Holland). In tooth-ache, opium is applied to the hollow of various tooth. Dr. Bow4 speaks in the highest terms of the efficacy of the external application of opium in inflammatory diseases, especially bronchitis and croup.

Administration.—Opium is given, in substance, in the form of pill, powder, lozenge, or electuary. The dose is subject to great variation, depending on the age and habits of the patient, the nature of the disease, and the particular object for which we wish to employ it. In a general way, we consider from an eighth of a grain to half a grain a small dose for an adult. We give it to this extent to persons unaccustomed to its use, when we require its stimulant effects, and in mild catarrhs and diarrhoeas. From half a grain to two grains we term a medium dose, and employ it in this quantity as a ordinary anodyne and soporific. From two to five grains we denominate a full or large dose, and give it to relieve excessive pain, violent spasm, in some inflammatory diseases after blood-letting, in tanus, &c. These are by no means to be regarded as the limits of the use of opium. Opium pills (pilulae opii) may be prepared either in crude or powdered opium. The latter has the advantage of a more speedy operation, in consequence of its more ready solution in the gastric liquor. Employed as a suppository, opium is used in larger doses than when given by the stomach. Five grains, made into a cylindrical mass with soap, may be introduced into the rectum, to alleviate irritation in the urino-genital organs.

Antidotes.—In a case of poisoning by opium, the first indication to remove the poison from the stomach, the second is to neutralize it which may be retained in the system, and the third is to mitigate its injurious effects.

1. Use of evacuants.—Until other and more powerful evacuant means be obtained, we should have recourse to tickling the throat with the fingers, or with a feather dipped in oil. As domestic emetics, mustard or salt may be exhibited. A dessert-spoonful of flour of mustard, or a table-spoonful of salt, may be taken, stirred up in a sufficient of water. The stomach-pump is, however, the best means of evacuating the contents of the stomach, and when it can be proved, should always be preferred. The emetics usually resorted to are the sulphates of zinc and copper: the first is preferred. It should be given in doses of from one to two scruples. The dose of sulphate of copper is less,—from five grs. to fifteen. Ipecacuanha or tartar emetic may be resorted to when the other means are not at hand. Clysters, containing fifteen or twenty grs. of tartar emetic, may be administered; or, in extreme cases, a solution of one or two grains of this salt may be injected into the veins, taking care to prevent introduction of air.

2. Use of chemical antidotes. — There are no known agents which completely destroy the activity of opium by their chemical proper-

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4 Lancet, March 18, 1837.
ties, and which can be resorted to in these cases. Infusion of galls, however, is regarded as the best, though an imperfect antidote. Magnesia, as well as iodine and chlorine, have also been recommended.

3. Use of therapeutic means to obviate the effects.—The following are the principal means which have been found efficacious:

a. Rousing the patient, by exercising him up and down a room between two men. It may sometimes be necessary to continue this for several hours. b. Cold affusion.—Dashing cold water over the head and chest is an exceedingly valuable agent. It oftentimes assists the operation of emetics. Dr. Boisragon recommends the alternation of impression, with hot or cold water, and at different parts of the surface of the body. c. Irritants.—The application of irritants to the body is also sometimes a useful practice: thus blisters and simples to the feet. d. Venesection.—Blood-letting is sometimes necessary, but it can be only safely practised after the opium has been drawn from the stomach. Orfila says, that under these circumstances it never increases, but in most cases materially relieves the symptoms. e. Stimulants.—Ammonia, camphor, musk, coffee, and other stimulants, are sometimes used with advantage. f. Vegetable acids, Orfila has found the vegetable acids to be the best anti-narcotic. For this purpose, drinks of vinegar and water, lemon juice, or of tartar and water, should be given every ten minutes. These agents, however, should not be resorted to till the poison has been evacuated from the stomach. g. Artificial Respiration.—As a resource this is on no account to be omitted. Death has on some occasions been apparently averted by it. An interesting case, which it was successfully practised, was published many years ago by Dr. Whately. Natural respiration was extinct when it began. In another successful case, related by Mr. Smith, artificial respiration was kept up for four hours and a half (with an interval of an hour). When it was commenced there was no pulse at the wrist, and only a slight irregular action of the heart, indicative of life was not quite extinct. A third case, also successful, is that of an infant ten days old, who had taken twenty-five or thirty drops of laudanum intended for the mother, and had lost the power of respiration, was comatose, and had several convulsions. Artificial respiration was sustained for two or three hours.

Preparations.—In noticing the preparations of the poppy employed in medicine, I shall arrange them under three heads:—

1. Preparations of Poppy Heads.

1. DECOCTUM PAPAVERIS, L. E. D.; Decoction of Poppy: Poppy-Fomentation. — (Poppy-heads, sliced, 3 dr.; Water, 2 oz.)
PREPARATIONS OF POPPY HEADS.

wine-measure, D.)—Boil for a quarter of an hour, and strain.)—seeds contribute, by their oleaginous properties, to the emollient of the decoction. This preparation forms a common fomentation, ch is applied to bruised, inflamed, excoriated, tender, or swollen s; to the eye in ophthalmia, to the abdomen in enteritis, perito-c, &c., to tender ulcers, &c. In cancer and other painful affections of the uterus, it is thrown into the vagina as a soothing remedy.

SYRUPUS PAPAVERIS, L. E. D.; Syrup of White Poppies. (Poppy is [without the seeds, E.; dried, bruised, and deprived of seeds, lb. iij. [lb. jss. E.; 3xvij. D.]; Sugar [pure, E. D.], lb. v. [lb. E.; 3xxix. D.]; Boiling Water, Cong. v. [Oxxv. E.; Cong. ii. measure, D.]) Boil down the capsules in the water to two gals., and strongly express the liquor while hot. Again boil down strained liquor to four pints and filter while hot. Set it by for hours that the dregs may subside; then boil down the clear liquid to pints, add the sugar and dissolve it, L.—Both the Edinburgh Dublin Pharmacopoeias direct the poppy heads to be first macerated water for some [twelve, E.; twenty-four, D.] hours. Then boil n [to five pints E. two pints, D.], and strain while hot, D. and ess strongly through calico, E.] Again boil [the defecated or, D.] down [to Oij. E.; Oj. D.], add the sugar, and dissolve it (the aid of heat.)—Syrup of poppies, especially if too thin, is liable to ferment, and then contains spirit or acetic acid, or s, and is of course ill adapted for medicinal use. To check these s, it should be carefully made according to the directions of College, taking care that it has the proper consistence, and ing it in a cool place. Occasionally a mixture of treacle and anum, or of syrup and extract of poppies, has been substituted; this fraud is highly dangerous, and has on several occasions fatal to children.4 Syrup of poppies is narcotic, sedative, and lyne, and is commonly employed as the infant's opiate. It mitis pain, allays spasm and troublesome cough, and promotes sleep. n the adult it is sometimes used for these purposes. It forms sald adjunct to pectoral tinctures. Over ordinary opiates it has positive advantages of a less disagreeable taste, and the supposed of being less likely to create nausea and headache. Even when ney prepared its administration to infants requires the greatest ion, on account of their known susceptibility to the influence of es. “I have been informed,” says Dr. Montgomery, “of more one instance in which a tea-spoonful has been known to prove to a healthy child.”—The dose of it, for an infant of three or four us old, is f3ss.; for adults from f5ij. to f3iv.

EXTRACTUM PAPAVERIS, L. E.; Extract of Poppy. (Poppy- without the seeds, bruised, 3xv.; Boiling [distilled, L.] r, Cong. j. Macerate for twenty-four hours; then boil down to pints, and filter the liquor while hot: lastly, evaporate to a

See the cases referred to by Dr. Montgomery, in his Obs. on the Dublin Pharm. 472.
part: beat them into a proper mass, which is to be
grain pills.—It is to be observed that this pill
much opium as the opiate pill of the last Latin ed
macopelis, E.)—Employed as an anodyne and sop;
or two pills (i.e. gr. v. to gr. x). The sulphate c
divide the opium. One pill of five grains cont
opium.

2. PILULÆ SAPONIS COMPOSITÆ, L.; Pilulae Sap
Compound Soap Pills. (Hard Opium, powdered
3ij. Beat them together until incorporated.—
anodyne and soporific.—Dose, gr. iii. to gr. x 1;
one grain of opium. The soap enables the pills
in the juices of the stomach. From gr. v. to 3ij. 1
as a suppository.

3. PILULÆ CALOMELANOS ET OPII, E. See p. 7

4. PILULÆ PLUMBI OPIATÆ, E. See p. 810.

5. TROCHISCHI OPII, E.; Opium Lozenges. (Op
of Tolu, 3ss.; Pure Sugar, in fine powder, 3vi.;
Arabic, and Extract of Liquorice, softened with
each 3v. Reduce the opium to a fluid extract by
for extract of opium]; mix it intimately with
iously reduced to the consistence of treacle;
spinkle the gum and sugar into the mixture, and t
mass, which is to be divided into lozenges of ten g
the manufacture of lozenges is practised as a di
opium lozenges of the shops usually contain each a
PREPARATIONS OF OPium.

1771

redd in diarrhoea.—Dose for adults, ʒj. to ʒj.; for children, grs. o grs. x according to their age. Forty grains of this powder, pared according to the London or Dublin Pharmacopoeia, or ty-seven of the Edinburgh Pharmacopoeia, contain one grain of opium.

CONFECTIO OPII, L. D.; Electuarium Opii, E.; Confection of um; Philonium ° Londdense; Philonium Romanum. (Hard um, powdered, ʒj.; Long Pepper, ʒj.; Ginger, ʒj.; Caraway, ; Tragacanth, powdered, ʒj.; Syrup, fąxvįj. [lb. j. D.]. Rub the m with the syrup previously heated, then add the other ingređients to powder, and mix, D.—The London College directs the dry edients to be kept mixed in the form of a very fine powder, and syrup to be added when the confection is to be used. The hospital College adopts the following formula:—"Aromatic dder, ʒj.; Senega, in fine powder, ʒj.; Opium diffused in a little rry, fss.; Syrup of Ginger, lb. j. Mix them together, and beat an electuary."—Aromatic and narcotic. Employed in flatulent c and diarrhoea; in the latter complaint usually as an adjunct to chalk mixture.—Dose, gr. x. to ʒj.—The Dublin preparation contains gr. j. of opium in about twenty-five grains of confection. The don preparation is somewhat weaker, and contains gr. j. of opium perhaps thirty-six grains. The Edinburgh preparation is still ker; forty-three grains of it containing about one grain of opium.

EMPLASTRUM OPII, L. E. D. Plaster of Opium. (Hard Opium, dered, fss.; Resin of the Spruce Fir, powdered, ʒij.; Plaster of d, lb. j.; Water, fąviįj. Add the Resin of the Spruce Fir, the m, and the Water, to the melted Plaster, and with a slow fire down until all unite into a proper consistence, L.—The Edinburgh Dublin Colleges omit the water, and, for the Resin of Spruce Fir, substitute Burgundy Pitch.)—Employed as a topical anodyne in imatism, lumbago, and neuralgia. Its powers are very light, or equivocal.


The ancient philonium was a famous electuary of the opiate kind. It was called Philo’s antidote. Philo, of Tarsus, its inventor, who lived, it is supposed, in Augustus’s time. The composition of philonium, described in Greek elegiac verses, is preserved and explained by Galen, Ise med. e. c. loc. Lib. ix. 4. The terms of the recipe are enigmatical, and may amuse some readers; in the substance:—"Take of the yellow and fragrant hair of the divine Crocus, whose blood is in the fields of Mercury, as many drachms as a man has senses; of the Euboan Nauphan, sm.; of the slayer of Minotæus, as preserved in the bowels of sheep, the like quantity; add drachms of white flame, and twenty of the bean of the wild animal of Arcadia; a drachm of alasly so called) which grows in the land famous for the Pisan Jove; take twelve five sand, written with the masculine article prefixed; and mingle all with the production, letters of the bulls of Athens.” Galen interprets this curious medico-poetical farrago, out his aid, would certainly be not a little obscure, as implying the admixture of saffron, euphobium, white pepper, hyoscyamus, spikenard, opium, and Athenian honey. It is, stated in the verses, that the pains for which this μέγας ἱππεύς was most serviceable were colic, of the liver, dysuria, and stone.—(Dr. Wm. Cummin, Lond. Med. Gaz. vol. xvii.
solution. By concentration, the odorous principi of the resin and the oil combined with, and in narcotina, are separated. These matters would get rid of by re-dissolving the extract in water, these inert principles, as well as the impurities consequent concentration of the active constituents must, of course, render the extract a more powerful ordinary opium. Good opium yields more than 60 to 70 per cent.) of extract, which, therefore, one-third more active than crude opium. It is operate with less disturbance to the general system preparations of opium. It is employed as an anes soporific, in cases where crude opium or its tinct dose of it is from gr. 1/4 to gr. iij. or gr. iv.

Liquor Opii Sedativus.—Mr. Battley, some years since, used only ingredients employed in the preparation of his 3/4 opium, water, and heat. It appears to contain something like the ordinary tincture of opium. Probably this and sea opium are got rid of by successive evaporations and aqueous solution of the watery extract of opium, with spirit to preserve it, would be a convenient substitute.

10. Tinctura Opii, L. L. D. Tincture of Opium
(Hard Opium, powdered, 3iij.; Proof* Spirit, fourteen days, and filter, L.—The proportions of Edinburgh College are 3x. of Opium and Oj. [wine-measure] Oj. and f3vij.; Water, f3xiiij. Digest the opium, temperature near 91° for two hours, break d.
PREPARATIONS OF OPIUM. 1773

erate in fourteen fluidounces of the mixture for twelve hours, and break it down thoroughly with the hand; pour the whole pulp and fluid into a percolator, and let the fluid part pass through, the rest of the spirit without packing the opium in the cylinder, continue the process of percolation till two pints are obtained."

The percolation process of the Edinburgh College is unnecessary troublesome, and will, I suspect, be rarely, if ever, adopted by anum preparers. Tincture of opium is of a deep brownish red or, with the peculiar odour and taste of opium. Its sp. gr., according to Mr. Phillips, is 0:952. Nineteen minims of it contain one grain of opium. Proof spirit dissolves the same constituents later does (see p. 1772), but it takes up a large proportion of otina, resin, and oil. I have repeatedly prepared morphia from insoluble residue left behind in the preparation of the tincture of opium is a powerful and valuable anodyne and soporific. Employment is to be preferred to that of solid opium where immediate effect is required. Moreover, in administering es to children, the facility of adjusting small doses of it presents an advantage over solid opium.—The dose of it, like that of solid m, must vary according to several circumstances. For an adult tries from $\frac{1}{30}$ to $\frac{1}{5}$ To children it must be given with the test caution. I have seen a powerful effect produced in a very ag infant by one drop.

1. ENEMA OPII. L. D. Enema Opii vel Anodynum, E. Opium ster. (Decoction of Starch, $\frac{1}{3}$iv.; Tincture of Opium, $\frac{1}{4}$xxx. L.—The Dublin College employs 3vi. of water instead of the ech Mucilage, and $\frac{1}{2}$ of Tincture of Opium.—The Edinburgh College uses 5ss. of Starch; $\frac{1}{2}$ss. to $\frac{1}{3}$ of Tincture of Opium; and of Water. The starch is boiled in the water, and the tincture ed when the mucilage is cool enough for use.—The formula of the don College is, in my opinion, to be preferred to those of the other british colleges; but it may be sometimes necessary to double or the quantity of tincture employed. In the passage of renal a, in nephritis, irritation or inflammation of the bladder, uterus, prostate gland, in dysentery, and painful affections of the large tine, the opium elster is most valuable.

2. LINIMENTUM OPII, L. E. Linimentum Saponis cum Opio vel mentum Anodynum D.; Liniment of Opium. (Soap Liniment, [by measure four parts, D.]; Tincture of Opium, $\frac{3}{5}$ij. [by sure three parts, D.] Mix, L.—Castile Soap, 3vj.; Opium, 3ss.; phor, 3iij.; Oil of Rosemary, $\frac{1}{2}$vj.; Rectified Spirit, Oij. erate the soap and opium in the spirit for three days; filter, add oil and camphor, and agitate briskly, E.)—Employed as an yne in rheumatism, neuralgic pains, sprains, &c.

* Transl. of the Pharm.
18. VINUM OPHI, L. E. D. Laudanum Liquidum Sydenham 1720. Tinctura Thebaica, Ph. L. 1745. Wine of Opium. 5ij. E. [5j. D.]; Purified Extract of Opium, 3ij. L.; C bruised; Cloves, bruised, of each, 5ij. L. [3jo D.]; Shen Oij. [Oj. wine-measure, D.] Macerate for fourteen [seven, 1 D.] days, and filter.—Its effects are similar to those of the opium, but its taste and smell are more agreeable. It is recommended by Mr. Ware as an application to the eye in ophtalmia and experience has fully proved its efficacy where there scalding pain, lachrymation, and intolerance of light W applied it causes a sharp pain and a copious flow of tears, the effects soon subside, and are followed by a considerable abatement of the former sufferings.—For internal use the dose is gtt. x. to

14. TINCTURA OPHI AMMONIATA, E. Ammoniated Tincture of (Benzoic Acid; and Saffron, chopped, 5vj. of each; Opium, 3j. Oil of Anise; 3j.; Spirit of Ammonia, Oij.; Digest for seven days and filter.)—Employed as a powerful diffusible stimulant and a spasmodic in hooping-cough and other spasmodic affections. Drachm and a quarter contains about a grain of opium.—Dose f3j.

15. ACETUM OPHI, E. D. Vinegar of Opium. (Opium, distilled Vinegar, f3xvj. "Cut the Opium into small fragments rate it into a pulp with a little of the vinegar, add the rest vinegar, macerate in a closed vessel for seven days, and agitate tionally. Then strain and express strongly, and filter the li Vinegar dissolves all the principles of opium soluble in water better adapted for holding in solution the narcotica and the matter of opium. It cannot, of course, effect any change in phate of morphia contained in opium. Whether any activ morphia is formed at the expense of the meconate of morphia been satisfactorily proved. The effects of vinegar of opium appear to be precisely those of ordinary opium. It is bel possess the anodyne, sedative, and soporific qualities of without being apt to excite the disagreeable effects (nausea, constipation, and general disorder of system,) which so result from the ordinary preparation of this drug. Hill st Le Mort observed a very odd effect from this preparation, was, that it often brought on suppressions of urine." Dr. gomery has seen one instance of this effect; and Dr. ' Beattie has remarked the same result from the Black Drop paralyzing effect on the bladder is doubtless referrible to the a which seems to acquire, in this preparation, increased

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1774 ELEMENTS OF MATERIA MEDICA.

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* Remarks on Ophthalmia, p. 29. 1780.
* Hist. of the Nat. Med. p. 784. 1751.
MORPHIA.

negr of opium is employed as an anodyne, sedative, and soporific.

Montgomery observes, that he has found this preparation of am decidedly superior to every other in relieving the agony of cancer, and procuring rest at night." The same authority states, that ucty drops are equivalent to thirty of the common tincture of um.—Dose, gtt. vi. to gtt. xxx.

BLACK DROP.—Acetum Opiii may be regarded as the officinal substitute for a prated quack medicine called the Black Drop, or The Lancaster, or Quakers' ick Drop, the method of preparing which has been described by the late Dr. nstrong. In this preparation serjuice (juice of the wild crab) is employed lead of vinegar. But there are several sources of uncertainty in the process.

Dr. Porter's solution of opium in citric acid has never come into general use.

16. UNGUENTUM GALLE COMPOSITUM. See p. 1083.
17. TINCTURA CAMPHORÆ COMPOSITA. See p. 1160.
18. PILULÆ STYRACIS COMPOSITÆ. See p. 1327.
19. PULVIS IPECACUANIL COMPOSITUS. See p. 1431.
20. PILULÆ IPECACUANIL COMPOSITÆ. See p. 1433.
22. ELECTUARIUM CATECHU. See p. 1592.

C. Morphia and its Preparations.

1. MORPHIA, L. Morphia, Morphine, Morphium.—So called from φρεν, the god of sleep. Wedelius, Fr. Hoffman, and Neumann, formed no correct notions of its nature. The magistry of opium, sied by Ludwig, in 1688, may, perhaps, have been morphia.

Morphia is peculiar to the poppy tribe. It exists in opium in combination with meconic and sulphuric acids. Doubts, indeed, expressed with respect to its existence in opium, someists having suggested that it was a product rather than educt; the accuracy of these views has been satisfactorily disproved.

The following are the directions for preparing morphia, given in the London Pharmacopeia:

Take of Hydrochlorate of Morphia, ½.; Solution of Ammonia, f3v.; Distilled water, 0j. Add the Hydrochlorate of Morphia, first dissolved in a pint of ter, to the solution of Ammonia with an ounce of water, shaking them ether. What is thrown down wash with distilled water, and dry it with a alie heat.

In this process the ammonia unites with the hydrochloric acid, d the morphia being set free is precipitated.

Pure morphia presents itself under the form of transparent crystals,
whose primary form is the right rhomb.

On turmeric paper, as well as on redder paper, morphia has an alkaline reaction withstanding that it is insoluble, or nearly so, in cold water, it has a distinctly bitter taste. Water dissolves a little more than one part of morphia. It dissolves in 40 parts of anhydrous alcohol, and 30 parts of boiling but it is insoluble, or nearly so, in cold water in the oils (fixed and volatile), in of potash and soda, and also, but in much quantity, in solution of ammonia: lastly, dissolves in sulphuric, hydrochloric, and acids. When heated, the crystals lose their water of crystallization; a strong heat causes they enter into fusion, in which state they form a yellow liquid; melted sulphur, and which becomes white and crystalline on Heated in the open air, it burns like resin, and leaves a carbonic residuum.

The following are the chief characteristics of morphia:—

1st. Nitric acid reddens morphia or its salts (the chloride excepted, to Dumas), and forms with them an orange-red solution, which is generated by excess of ammonia, and which becomes yellow after a little prolonged digestion of morphia in nitric acid, we obtain oxalic acid cies. Nitric acid produces a red colour with several other bodies, as commercial strychnia, several volatile oils (as oil of pimento and oil of some resinous substances, infusion of cloves of or of pimento, &c.

2nd. Iodic acid is deoxidized by morphia, iodine being set free. when this alkali is added to a solution of iodic acid, the liquor becomes brown, and forms a blue compound (iodide of starch) with starch.— Sulphuretted hydrogen, sulphurous acid, phosphorous acids, and so agents, have a similar effect on iodic acid.

3dly. Sesquichloride of iron dropped on crystals of morphia renders the same effect is produced on the acetate and oxalate, and slightly on phate of morphia. No obvious effect is produced on the hydrochlorate phia until an alkali is added. The nature of the blue compound is not understood. Possibly, part of the morphia is oxidized, and the compound produced, unites with some oxide of iron (morphite of iron). If water or acids, or alkalis, be added to the blue compound, the colour is dest.

Fallacies. Tannic and gallic acids with a little water, and infusion of of pimento, also form blue compounds with sesquichloride of iron.

4thly. The alkaline carbonates occasion a white precipitate (carbonate phia) in solutions of the soluble morphitic salts.

5thly. Solution of ammonia precipitates morphia from its solution in a considerable excess of ammonia redivides the precipitate. In very dilutions, ammonia occasions no precipitate until heat be applied to drive excess of alkali.

6thly. Infusion of nutgalls, or a solution of tannic acid, causes a p (tannate of morphia) in neutral solutions of the morphitic salts. The p is soluble in acetic acid.

7thly. An alcoholic solution of carboxylic acid causes no precipitate alcoholic solution of morphia.

8thly. If a solution of chlorine be mixed with a solution of morphi salts, and then ammonia added, a dark brown colour is developed.

The composition of morphia is, according to Regnault, ¹¹ as fol

¹¹ Pharmacausche Centralblatt fur 1836, S. 406.
MORPHIA.

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<th>Eq. Wt.</th>
<th>Per Cent</th>
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<td>210</td>
<td>71.91</td>
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<tr>
<td>29</td>
<td>20</td>
<td>6.83</td>
</tr>
<tr>
<td>14</td>
<td>14</td>
<td>4.14</td>
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<tr>
<td>6</td>
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<table>
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<th>Atoms</th>
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<th>Per Cent</th>
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</thead>
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<td>222</td>
</tr>
<tr>
<td>Water</td>
<td>2</td>
<td>18</td>
</tr>
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| Cryst. Morph. | 1   | 310 | 100.00 |

**Morphitic salts** are, for the most part, crystallizable. When they are colourless. They have a bitter taste.

The following characters of morphia are given in the *London Accopæia*:

Little soluble in cold water, little in boiling water, but very readily in

This solution exhibits alkaline properties when tried with turmeric; then the spirit is distilled from it, it yields crystals, which are totally dissolved by heat. On the addition of Nitric acid, morphia becomes first red, afterwards yellow. Tincture of sesquichloride of iron gives it a blue colour. and [afterwards] ammonia being added to its salts, they are rendered a dirty white colour, which is destroyed when more chlorine is added. Morphia is precipitated from its salts by solution of potash, which, added in excess, dissolves it.

A precise relation which the effects of this alkaloid and its salts to those of opium, is a point on which the profession is by no means agreed. Some recent writers declare that, after having compared the effects of the morphia salts with those of opium, they can discover no difference between them; but my own observation of the effects of these salts induces me to agree with those who admit the similarity, but not the identity, of the effects of these substances. Charvét could observe no difference in them in their action on the *invertebrata*. But on the higher forms of the *vertebrata* there were obvious differences. The effects of morphia on man are in several respects different from those of opium, but they appear to want uniformity; that is, the same results have not yet been arrived at by different experimenters. This may in cases, at least be ascribed to the employment of morphia contaminated with some other principles of opium. In small doses, as a quarter of a grain to one grain, acetate of morphia causes a sense of distension or fulness about the head, some disturbance of the bowels, sometimes headache, giddiness and somnolency, or actual dizziness, which, however, differs from ordinary sleep, and is often more disturbed. The pupils are usually contracted. Orfila says it occurs in nineteen out of twenty cases. However, in some cases dilatation has been observed, and in others the pupil was small. The pulse is generally slow and small, though sometimes more frequent, and occasionally is soft and full. Itching of the skin is frequently noticed, or even a cutaneous eruption is by no means uncommon. Grain doses readily excite gastric uneasiness, and vomiting. One remarkable symptom often caused by the use of morphia, especially in men, is a difficulty in voiding the


* De l'Action Comp. de l'Opium.* 1826.
urine, and which appears to depend on a weakened or paralytic condition of the bladder. Bally lays great stress on this last-mentioned symptom, especially when a full dose of morphia has been taken. When these effects subside, loss of appetite, muscular feebleness, and constipation, are left behind. When the dose is increased, the effects become somewhat alarming. Great cerebral excitement is produced, vision is disordered and obscured, there is singing in the ears, and the patient, when lying horizontally, experienced sudden convulsive movements, like those produced by the electric shock. When a fatal dose has been swallowed, the stomach sometimes manifests irritation, but this is soon followed by great disorder of the cerebrospinal system, which ultimately assumes an apoplectic character. The sight becomes dim, excessive weakness is experienced, gradually all consciousness is lost, and coma supervenes, attended usually with contracted, though sometimes with dilated pupils, coldness of the surface, frequent and small pulse, hurried stertorous respiration, and occasionally with convulsions. Before insensibility comes on, as well as when it is subsiding, there is itching of the skin. Difficulty in passing the water is also experienced, in consequence of the paralysed state of the bladder. Not unfrequently, lividity of skin is observed.

The effects of morphia and its salts appear to be identical in their nature. The soluble salts (as the hydrochlorates) are more constant and certain in their operation than uncombined morphia, in consequence probably of the difficult solubility of the latter.

In comparing the morphitic salts with opium, we observe that they are less stimulant, and less disposed to cause sweating, constipation, headache, and dryness of the tongue. The feelings which they excite are less agreeable, and hence they are not adapted to be substituted for opium by the eaters of this drug. They more readily affect the bladder than opium.

Uses.—We employ morphia or its salts in preference to opium when our object is to make applications to the denuded dermis (dermic medication, see p. 149). They are employed in this way for the purpose of alleviating violent neuralgic pains, and to relieve the excessive endermic operation of strychnia, (see p. 1306-11). Gastralgia and obstinate vomiting are sometimes relieved by the endermic application of morphia to the epigastrium; and violent headache by the application of this remedy to the temples. Occasionally the mode of administration is adopted, when we wish to bring the general system under the calming and sedative influence of morphia, and where from some cause its exhibition by the mouth is objectionable. Some cases of maniacal delirium may be treated with advantage this way.

The morphia salts are given internally in cases where we wish to obtain the anodyne, soothing, sedative, soporific, and spasmodylic qualities of opium, and where this drug is objectionable on account of its tendency to excite certain injurious effects already
referred to (see p. 1774) In all cases where both opium and the morphia salts are equally admissible, I prefer the former, its effects being better known and regulated: moreover, opium is to be preferred as a stimulant and sudorific, and for suppressing excessive mucous discharges.

Administration.—The salts of morphia are given internally, in substance or solution, in doses of from one-eighth to one-fourth of a grain, or, beyond this. I have given in insanity two grains of muriate of morphia at a dose. For endermic use they are to be finely powdered, and applied to the extent of a grain or a grain and a half at a time.

2. Morphie Acetas, L. E. Acetate of Morphia.—This salt is thus directed to be prepared by the London College:—

Take of Morphia, 3/4; Acetic Acid, 1/2; Distilled Water, 1/4. Mix the acid with the water, and pour them upon the morphia to saturation. Let the liquor evaporate with a gentle heat, that crystals may be formed.

In this process the acetic acid saturates the morphia, and the solution by evaporation yields crystallized acetate of morphia.

The following are the directions of the Edinburgh College:—

"Take muriate of morphia, any convenient quantity. Dissolve it in fourteen times its weight of warm water, and, when the solution is cool, add aqua ammonia gradually, and with constant agitation, until there is a permanent but faint smell of ammonia in the fluid. Collect the precipitate on a calico filter, wash it moderately with cold water, and dissolve it by means of a slight excess of pyroxylic acid, in twelve parts of warm water for every part of muriate of morphia that was used. Concentrate the solution over the vapour-bath, and set aside to crystallize. Drain and squeeze the crystals, and dry them with a gentle heat, and acetate of morphia may be obtained on concentrating the mother liquor."

In this process the ammonia decomposes the muriate of morphia, and the precipitated morphia is afterwards dissolved in diluted rognous (acetic) acid.

Acetate of morphia is usually prepared by evaporating its solution dryness by a gentle heat. Obtained in this way it is amorphous. It is difficult to obtain pure, as it readily undergoes decomposition, when its solution is evaporated, and is converted into a mixture of morphia, neutral acetate, and the super-acetate of morphia. Hence, met with in commerce, it is imperfectly soluble in water, unless a few drops of acetic acid be added. It is usually slightly coloured, and crystals, when pure, are colourless and radiating. The following is the composition of this salt:—

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<tr>
<th>Atom</th>
<th>Eq. Wt.</th>
<th>Per Cent.</th>
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<tbody>
<tr>
<td>Morphia</td>
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<td>99.95</td>
</tr>
<tr>
<td>Acetic acid</td>
<td>1</td>
<td>14.59</td>
</tr>
<tr>
<td>Water</td>
<td>1</td>
<td>2.55</td>
</tr>
<tr>
<td>Acetate of Morphia</td>
<td>1</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Crystallized acetate of morphia is,—

Very readily dissolved in water. Its other properties are such as have been noted of morphia, Ph. L.

It is less soluble in alcohol than in water.
Take of Opium, sliced, lb. j.; Crystals of Chloride of Lead may be sufficient; Purified Animal Charcoal, 3ijss.; Distilled Water; Solution of Ammonia, each as much as may be required, the opium in four pints of distilled water for three hours, afterwards digest for twenty hours more, and press it. Again, and a third time, in water, that it may become fluid. If necessary, bruise and press it. Evaporate the mixed liquor, and adjust the consistence of syrup. Then add three pints of chlorid of lead, when all the impurities have subsided, pour off the supernatant liquid, allow to cool, then add to this two ounces of chlorid of lead, or as much as shall be precipitated in four pints of boiling distilled water, until precipitation occurs. Pour off the liquor, and wash what remains for a second time with water. Then evaporate the mixed liquors as before, with a little water. When crystals may be formed. Press these in a cloth, then dissolve in distilled water, and digest, with an ounce and a half of animal charcoal, and strain. Finally, the charcoal being washed cautiously, that pure crystals may be produced. To the crystals first separated, previously mixed with a pinch of free s<ul> <li>Water extracts from opium the meconate and sulphate of meconate, and of the codeia; a part of the narcotine, of the meconine and of the thebaine; the brown acid extractive; resin, and of the fat oil. When chloride of lead is added to the opium, meconate, with a little sulphate of lead, and the brown acid extractive, are precipitated, while the hydrochloride of morphia and of codeia are left in solution. A solution of these crystals is then decomposed by ammonia, by which the hydrochloride of an</li> </ul>
MURIATE OF MORPHIA.

1781

ttle; pour off the liquid; wash the sediment with a little water, adding the
shings to the liquid. Evaporate the liquid sufficiently in the vapour-bath for
to solidify on cooling. Subject the cooled mass to a very strong pressure in a
bath; redissolve the cake in a sufficiency of warm distilled water; add a little
water of white marble, and filter; acidulate the filtered fluid with a very little
muratic acid; and concentrate a second time in the vapour-bath for crystalliza-
tion. Subject the crystals again to very strong pressure in a cloth. Repeat the
process of solution, clarification by marble and muratic acid, concentration and
 crystallization, until a snow-white mass be obtained.

On the small scale, trouble and loss are saved by decolorizing the solution of
muratic acid of morphia by means of a little purified animal charcoal after two crys-
tallizations. But on the large scale it is better to purify the salt by repeated crys-
tallizations alone, and to treat all the expressed fluids, except the first, in the
same way with the original solution of impure muratic acid of morphia. An ad-
ditional quantity of salt may often be got from the first dark and resinous fluid
obtained by expression, on merely allowing it to remain at rest for a few months,
then a little muratic acid of morphia may be deposited in an impure condition.

The opium which yields the largest quantity of precipitate by carbonate of
alkali, according to the formula in p. 1742, yields muratic acid of morphia not only
in the greatest proportion, but likewise with the fewest crystallizations."

This process the changes are analogous to those before described
in the process of the London Pharmacopoeia, except that meconate
alkali sulphate of lime, instead of meconate and sulphate of lead, are
excluded.

Another, and, as it is believed, a greatly improved, method of ob-
taining morphia, has been recently suggested by Mohr*. It consists in
adding, to a concentrated infusion of opium, milk of lime pre-
cipitated with a quantity of dry lime, equal to the fourth part of the
weight of the opium. The mixture is heated till it boils, and is fil-
tered while hot through linen. The filtered liquor has a light brown
brownish colour. While still hot it is mixed with pulverized sal amm-
noniac; the lime is saturated with the muriatic acid of the sal
moniac, and the ammonia of the latter is set free, and the morphia
is precipitated. In this way crystallized morphia may be obtained
without the use of alcohol.

Pure hydrochlorate of morphia crystallizes in plumose, acicular
prisms. It is colourless, odourless, bitter, soluble in from 16 to 20
parts of cold water, but less of boiling water. When its saturated
solution is allowed to cool, it congeals to form a crystalline
mass. It is soluble in alcohol. By heat it is decomposed and totally
converted. Nitric acid reddens it. Sesquichloride of iron with an
alkali colours it blue.

The air-dried crystals are thus composed:

<table>
<thead>
<tr>
<th></th>
<th>Atoms</th>
<th>Eq Wt.</th>
<th>Per Cent.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morphia</td>
<td>1</td>
<td>292</td>
<td>76.24</td>
</tr>
<tr>
<td>Hydrochloric acid</td>
<td>1</td>
<td>37</td>
<td>9.66</td>
</tr>
<tr>
<td>Water</td>
<td>0</td>
<td>54</td>
<td>14.10</td>
</tr>
<tr>
<td>Crystalized Hydrochlorate of Morphia</td>
<td>1</td>
<td>383</td>
<td>100.00</td>
</tr>
</tbody>
</table>

According to the London College, crystallized hydrochlorate of
morphia should be,—

---

Soluble in water. What is precipitated [i.e. chloride of silver] from the solution by nitrate of silver, is not totally dissolved either by ammonia, unless added in excess, or by hydrochloric or nitric acid.

The Edinburgh College gives the following character of its purity:

"Snow white; entirely soluble; solution colourless; loss of weight at 212° not above 13 per cent.; one hundred measures of a solution of 10 grains in half a fluidounce of water heated to near 212°, and decomposed with agitation by a faint excess of ammonia, yield a precipitate which, in twenty-four hours, comprises 12.5 measures of the liquid.

On the above I would merely observe, that Mr. Sandall¹ found that the quantity of water which this salt loses by drying varies from 9.20 to 14.33 per cent.

The effects, uses, and doses of this, as well as the other morphia salts, have been already described (see p.1778-9).

3. MORMPHAE MURIATIS SOLUTO, E.; Solution of Muriate of Morphia.
(Muriate of Morphia, Sss.; Rectified Spirit, f3v.; Distilled Water, f3xx.; Mix the Spirit and Water, and dissolve the muriate of morphia in the mixture with the aid of a gentle heat.)—About one hundred and six minims of this solution contain one grain of muriate of morphia.—The dose is from mx. gradually increased to f3ss.

4. TROCHISCI MORPHAE, E.; Morphia Lozenges. (Muriate of Morphia, $j$; Tincture of Tolu, 3ss.; Pure Sugar, 3xxx. Dissolve muriate of morphia in a little hot water; mix it and the tincture of tolu with the sugar; and, with a sufficiency of mucilage, form a proper mass for making lozenges; each of which should weigh about fifteen grains.)—Each lozenge contains about one-fortieth of a grain of muriate of morphia. The morphia lozenges of the shops usual contain each one-twenty-fourth of a grain of muriate of morphia. This is an agreeable mode of employing morphia, especially in pectoral affections.

5. TROCHISCI MORPHAE ET IPECACUANHÆ, E.; Morphia and ipecacuanha Lozenges. (Muriate of Morphia, $j$; Ipecacuan, in powder, 3j.; Tincture of Tolu, f3ss.; Pure Sugar, 3xxx. Dissolve the Muriate in a little hot water; mix it with the tincture and ipecacuan and sugar; and, with a sufficiency of mucilage, beat the whole into a proper mass, which is to be divided into fifteen lozenges.)—Each lozenge contains about one-fortieth of a grain of muriate of morphia, and one-thirteenth of a grain of ipecacuan. Useful to allay tickling cough.

6. MORPHAE SULPHAS; Sulphate of Morphia.—This salt, though not contained in the British pharmacopoeias, is occasionally used in medicine. It is crystalline, and readily soluble in water. It consists of 1 atom sulphuric acid = 1 atom morphia = 292; and 6 atoms water = 54. One of these atoms of water

CALUMBA PLANT. 1783

Citric acid of the salt, and cannot be removed without destroying the lower 5 atoms are the water of crystallization. The dose of it is the her morphitic salts (see p. 1779).

XXXII.—MENISPERMACEÆ, De Candolle.—THE COCCULUS TRIBE.

Menispermæ, Jussieu.

Character.—Flowers (by abortion?) unisexual, usually dioecious, Floral integuments in one or several rows, each of which consists of four parts, hypogynous, deciduous. Petals sometimes absent. Sepals monadelphous, or rarely distinct; sometimes equal in number to the petals; at other times three or four times as many; anthers united outwards, or inserted on the apex of the filament. Females: stigmas numerous, each with one style cohering slightly at the base; solitary, crowned with many stigmas, internally many-celled, and, consisting of many carpels soldered together. Drupes usually seeded, oblique or lunate, compressed. Seed of the same shape as mbrye; curved or turned in the direction of the circumference; albumen small and fleshy; cotyledons flat, sometimes lying face to face, distant from each other, and lying in two cells of the seed!; radicle at sometimes appearing inferior when the apex of the fruit is, by the growth, contiguous with the base.—Sarmentaceous, flexible tough axes alternate, simple or rarely compound, mucronate. Flowers dry racemose (De Cand.).

-The roots of several species are bitter and tonic; the seeds of some are narcotic.

CULUS PALMATUS, De Candolle, L. E.—THE CALUMBA PLANT.

Menispernum palmatum, Lamarck.

Sec. Syst. Dioecia, Hexandria.

(Radix, L. D.—Root, E.)

—Franciscus Redi m, in 1675, is the first writer who mentions this plant: he praises it as an alexipharmic or antidote. Cartheuser afterwards examined it; but Dr. freival n gave the best account of it. This root has been various names, such as Calumba, Colombo, Calomina, and its native country and history were long involved in obscurity. In 1830, Dr. Hooker o published a complete description of male and female plants. The root was at first supposed to Colombo, a town of Ceylon, and from which it was said to come. But it is now known to be the produce of Mozambique. The English name Calumba is derived from the Portuguese Calombo, the 0 in which is mute p.

Gen. Char.—Flowers unisexual, (always?) dioecious. Calyx
of twelve sepals in four series, with two, three, or more, close bracteoles. *Males:* stamens six, or rarely three, opposite inner sepals, distinct; *anthers* two-celled, terminal, dehiscing; *filaments* either filiform with the anther cells horizontal, and each externally two-lobed, or thickened at the cells divaricating downwards, and separated by the style. *Females:* ovaries three, six, or numerous. *Drupes* or numerous, one-celled, one-seeded. *Peduncles* axillary lateral; males usually many-flowered; females generally few without bracts, or with very small ones if present (Lindley).

**Sp. Char.**—*Leaves* cordate at the base, five- to seven-lobed, quite entire, acuminate, somewhat hairy and *ovaries* clothed with glandular hairs (Cand.)

*Root* perennial, of several fasciculated form, fleshy tubers, with a brown warty surface; internally deep-yellow, odourless, but astringent and bitter. *Stems* annual, herbaceous, twining, set at the lower part with long glandular hairs: of the males, simple; of the females, branching. *Leaves* alternate, nearly ovate, wavy on the margin, with long hairy foramina. *Racemes* axillary, solitary; in the males compound. *Flowers* small, green. Flower buds or berries, about the size of a nut, densely clothed with long spreading hairs, tipped with a black oblong gland.

**Hab.**—Thick forests on the shores and Mozambique, as well as inland for 15 or 20 miles.

**Preparation of the Roots.**—The natives never cultivate the Calumba plant, the spontaneous produce being sufficient. The roots are cut up in March (the hot season), the offsets from the main root being sliced, strung on cords, and hung up to dry in the shade. When deemed fit for commerce, when on exposure to the sun, they become short; and of a bad quality when it is soft or black.

**Description.**—Calumba or Colombo root (radix calumbi) consists of cylindrical pieces, from one to two inches long. The surface, covering the sides of the pieces, is of a yellowish gray or greenish grey colour, smooth or irregularly rugose. The transversal surface is greenish or grayish yellow colour, depressed in the middle of the transversal surface, with a great shrinking of the medulla in the drying process, and covered with three or four concentric layers. The outer or cortical portion is thickest, but is usually about two or three lines thick, separated from the ligneous portion by a dark-coloured layer.
Calumba plant. 1785

ceeding a hair in thickness. The internal or medullary portion is light, spongy, and shrunk. The odour of calumba is faint, but somewhat aromatic; the taste aromatic, and very bitter. In the larger and thicker pieces small holes are occasionally observed, which have been made for the convenience of drying. On account of the starch which it contains, the root is readily attacked by insects.

I am indebted to Mr. N. B. Ward for a sample of calumba root cultivated at the Mauritius. It is deficient in the bright greenish yellow tint of the Mozambique calumba.

Commerce.—In the year 1838, duty (2d. per lb.) was paid on 9,805 lbs. and in 1839 only on 9,884 lbs. of calumba.

Composition.—The more recent analyses of Calumba root are those of Planche, and Buchner.

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Planche</th>
<th>Buchner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bitter matter</td>
<td>13</td>
<td>10 to 12.2</td>
</tr>
<tr>
<td>Animal matter, soluble in water and not in alcohol</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Yellow resins, extractive</td>
<td>0</td>
<td>5.0</td>
</tr>
<tr>
<td>Volatile oil</td>
<td>a trace</td>
<td>0.9</td>
</tr>
<tr>
<td>Wax</td>
<td>0</td>
<td>9.2</td>
</tr>
<tr>
<td>Gum</td>
<td>9</td>
<td>3.8 to 4.7</td>
</tr>
<tr>
<td>Starch</td>
<td>33</td>
<td>30 to 33</td>
</tr>
<tr>
<td>Vegetable medulla [pectin?]</td>
<td>0</td>
<td>17.4</td>
</tr>
<tr>
<td>Woody fibre</td>
<td>39</td>
<td>12.6</td>
</tr>
<tr>
<td>Water</td>
<td>0</td>
<td>9.8</td>
</tr>
<tr>
<td>Loss</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Odorous Principle (Volatile Oil?)—The odour of the root is supposed to depend on a volatile oil, traces of which were procured by Planche. The distilled water of the root possesses the odour of the latter.

Calumbin—(Bitter Principle).—A crystallizable, odourless, very bitter, tral substance, extracted from Calumba root by Wittstock. Its crystals are cubic prisms. It is fusible; very slightly soluble in water, alcohol, ether, and volatile oils. Boiling rectified spirit dissolves about 1/40th of its weight. It dissolves in acids and alkalis; its best solvent being acetic acid. It is unaffected by metallic solutions, and by infusion of nutgalls. Sulphuric acid dissolves it, forming a yellow, then a red colour. Its composition, according to Liebig, carbon 65.45, hydrogen 6.18, oxygen 28.37; or C112 H17 O4.

Planche describes the active principle of calumba as a yellow bitter matter soluble in water and alcohol, and yielding no precipitate either with the salts of lead or fusion of galls.

Starch.—This constitutes about one-third by weight of the root. It serves the root as an easy prey to insects. The structure of the starch particles has been described by Payen. These bodies are remarkable by their gibbosityes, by the hilum being found on the largest part of the particles.

Chemical Characteristics.—If the root be moistened with water, then touched with tincture of iodine, it becomes black. A decision of the root when cold forms with a solution of iodine a blue compound (iodide of starch). Sulphate of iron, emetic tartar, and gelat-
tine, produce no obvious change in an infusion of calumba in the absence of tannic and gallic acids. Litmus detects no Infusion of nutgalls causes in the infusion of calumba a (tannate of starch?)

Adulteration.—The root of *Frasera Walteri*, called the or *false calumba*, (see p. 1285), has been occasionally substituted for calumba root on the continent. Such a fraud would not be in England, at least to any extent, as the appearance of quite dissimilar to that of the genuine calumba. It is distinguished chemically from the latter by three characters: 1st, It unchange of colour when touched with tincture of iodine, sh it contains no starch; 2ndly, It becomes blackish green on addition of sulphate of iron; 3rdly, It yields a precipitate with gelatine. The two last characters indicate the presence of acid.

Physiological Effects.—Calumba is an excellent stimulant of the appetite, assisting the digestive process, and in the quality of the secretions from the gastro-intestinal membrane. It is not a stimulant; for Dr. T. Percival took it on an empty stomach, but did not observe that it had an effect on the regularity, fulness, or velocity of the pulse. In experiment he swallowed half a drachm: in ten minutes he was fuller, and slower by three beats, and continued so for quarters of an hour. In consequence of the quantity of gum which it contains, it is sometimes termed a mucilaginous demulcent tonic. *Cetraria islandica* and *Simaruba bark* are calumba in this circumstance. But from them, as well as Quassia, it is distinguished by its aromatic properties. In respects (i.e. in its tonic and aromatic qualities) it approaches rhubarb, but is devoid of the purgative and astringent properties, the latter. Its want of astringency distinguishes it from the tonics (as cinchona). Full doses of it, in the form of powder or when the stomach is very irritable, cause vomiting. It appear either to constipate or relax the bowels. We acquainted with the effects of excessive doses of it. Poisonous properties have been assigned to it by Buchner, who states, one of his pupils, applied a grain of the ethereal extract of calumba deprived of wax by repeated solution in water, to a wound in a rabbit, and that it proved fatal in ten hours.

Uses.—Calumba is one of our most useful stomachics and its great value consists in its not being apt, like other powerful tonics, to create nausea, sickness, febrile disorder, etc., so that it is tolerated when other remedies of this class be immediately rejected. Indeed on many occasions it has a positive power of checking vomiting. Schwilgué, in order to its anti-emetic qualities, gave it when vomiting had commenced.

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*Tuikol*. S. 229.

*Mat. Méd.* lx. 374.
he use of emetic tartar and ipecacuanha. It frequently arrested the vomiting. He also gave it in conjunction with these emetics, and observed that the vomiting occurred more slowly than usual, and was milder. Probably it owes these valuable properties to a combination of circumstances; such as its freedom from acidity and astringency, the large quantity of starch which it contains (from which it acquires demulcent properties), and the peculiar operation of its bitter principle. The following are the principal uses to which it has been applied:—

1. In a languid state of the stomach, with general debility, attended with want of appetite, indigestion, nausea, and flatulence, experience has fully established the value of calumba, and has proved the justice of the ecomiums passed on it by Dr. T. Percival. It is of all tonics the least likely to disagree with the stomach. In the stage of convalescence after an attack of fever, the infusion of calumba is an excellent preparative for the more powerful tonics (infusion of cinchona and disulphate of quina). In those forms of dyspepsia attended with great acidity of stomach, it may be given with advantage in combination with bicarbonate of potash.

2. To allay vomiting, when not dependent on inflammatory conditions of the stomach, calumba is often highly serviceable; as in bilious vomiting, in the sickness which so frequently attends pregnancy and parturition. Even vomiting arising from renal calculi or diseased cliny has been somewhat palliated by calumba. I have seen the most satisfactory results from the combined use of infusion of calumba and effervescent draughts (composed of citric acid and bicarbonate of potash) in those occasional attacks of vomiting especially observed in delicate females, and which are commonly termed bilious attacks. This treatment the violence and continuance of the vomitings have in many cases been diminished, and the continued employment of calumba has reduced the frequency, and in some cases prevented the occurrence, of future attacks.

3. In diarrhoea and dysentery, where tonics are admissible, as in later periods of these diseases, when the inflammatory symptoms have subsided, and in habitual diarrhea, calumba often proves serviceable. In Germany it is denominated Ruhrwurzel, (i.e. dysenteric plant).

Administration.—Calumba is administered in the form of powder, infusion, or tincture. The dose of the powder is from gr. x. to 5ss. The infusion is the most eligible form of exhibition.

1. Infusum Calumbæ, L. E. Infusum Colomba, D.; Infusion of Calumba. [Calumba, sliced [in coarse powder, E.], 5v. [3ss. E.; 3ij.] Boiling [distilled, L.] Water [Cold Water, E.], Oj. [Oss. wine, D.] Macerate for two hours in a lightly covered vessel, and strain, L. D.—“Triturate the Calumba with a little of the water, so as to moisten it thoroughly: put it into a percolator, and transmit cold water till 33xv. of infusion be obtained,” E.)—The facility with which this preparation undergoes decomposition is ascribed by Planche to the substance which he terms animal matter.—Dose of the infusion, 1/3.
to 5ij. It may be conjoined with alkalis or chalybes, without injury or obvious change.

2. Tinctura Calumbae, L. E. Tinctura Colombe, D. Tincture of Calumba. (Calumba, sliced [in small fragments; if by percolation in moderately fine powder, E.], 5ij. [5ij. D.]; Proof Spirit, 5ij. [wine-measure, D.] Macerate for fourteen days, and filter. "Digest seven days, pour off the clear liquor. Express the residuum strongly, and filter the liquors. This tincture is much more conveniently prepared by the process of percolation, allowing the powder to be soaked with a little of the spirit for six hours before putting it into the percolator, E.)—An excellent adjunct to bitter infusion and effervescing medicines, when given to check vomiting.—Dose, 13ij. to 5ij.


Cocculus suberosus De Candolle, D.


(Fruit, E.—Fruitus vulgaris Cocculus indicus, D.)

History.—"According to Sprengel 5, the fruit now usually called Cocculus indicus was introduced by the Arabians, and was described by Avicenna and Serapion under the name of Maherasch. 6 In my copy, however, of the Latin translation of Avicenna 7, the word Maherasch does not occur: but Mahezehergo or Mahezhergo 8 is said to intoxicate fish. Nor can I find it in Serapion. Cocculus indicus is sometimes termed the Levant nut, or baccia orientalis.


Male: stamens united into a central column dilated at the apex; anthers numerous, covering the whole globose apex of the column. Female: flowers unknown. Drupes one to three, one-seeded, carseated. Seed globose, deeply excavated at the hilum; albumen fleshy; cotyledons very thin, diverging.—Twining plants, with corky bark. Leaves more or less cordate-ovate. Flowers in lateral compound racemes (Wight and Arnott.)

Sp. Char.—The only species.

A strong climbing shrub. Bark deeply cracked, ash-colored. Leaves stalked, large (from eight to twelve inches long); petioles little shorter than the leaves.

Hab.—Malabar, and Eastern Islands, &c. of India.

Description.—As met with in commerce, Cocculus indicus (or called Cocculus levanticus seu piscatorius) has considerable resemblance to the bay berry (baccæ lauri, see p. 1163), but is smaller, a large as the latter. It consists externally of a dried, thin, blackish...
gous, acid and bitter layer, which envelops a thin, bivalved, conical shell (*endocarp*). In the middle of this shell arises a placenta, which is contracted at its base, but enlarged and into two cells superiorly. Between this placenta and the oleaginous, yellowish, very bitter nucleus (*seed*) of a semi-n. This nucleus never wholly fills the cavity of the shell,—the Coccus indicus of commerce; for by keeping, it gradually atrophies, and in old samples it is not uncommon to be almost empty. This change is observed also in other seeds. By this character alone, Coccus indicus may be distinguished from the bay berry. The *Edinburgh Col- leries that—*

**Kernels should fill at least two-thirds of the fruit.**

**Source.**—Coccus indicus is imported in bags from Bombay, and Ceylon. I am not acquainted with any official returns, but I distinctly know that about 2500 bags entered and this probably below the quantity imported. The greater part is consumed for adulterating beer and ale; but this practice is prohibited by the legislature, under a penalty of 500l. upon the brewer, and 500l. upon the seller of the drug.

**Position.**—Coccus indicus was examined in 1811, by and in 1834 by Pelletier and Couper.* The results of the last-mentioned chemists were as follows:

<table>
<thead>
<tr>
<th>Analysis of the Nucleus</th>
<th>Analysis of the Shell</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acid substance</td>
<td>1. Menispermin.</td>
</tr>
<tr>
<td>Cross matter</td>
<td>2. Paramenispermin.</td>
</tr>
<tr>
<td>Acid</td>
<td>3. Yellow alkaline matter.</td>
</tr>
<tr>
<td>Nitric substances</td>
<td>4. Hypocrotoric acid.</td>
</tr>
<tr>
<td>Nitric matter</td>
<td>5. Wax.</td>
</tr>
<tr>
<td>Inorganic substances</td>
<td>11. Inorganic substances (as those of the nucleus with the addition of copper).</td>
</tr>
</tbody>
</table>

**Picrotoxin (Picrotoxic Acid).**—At first it was supposed to be an alkaline and was termed *picrotoxix*. It is a white, crystalline, intensely acrid substance, usually crystallizing in needles, but sometimes in silky, flexible, or transparent plates, or granular crystals. It is soluble in 150 parts at 57° F., in 25 parts of boiling water, in a third of its weight of alcohol, than half its weight of ether. It is insoluble in the fixed and volatile; it is soluble in acetic acid. It does not combine with acids, but forms with alkalis. It seems, therefore, to be an acid, though a feeble one, consists of C\(^{12}\) H\(^{2}\) O\(^{3}\). The poisonous properties of the nucleus (*seed*) of Coccus indicus depend on picrotoxin.

**Menispermia (Menisperminum; Menispermine).**—This is an opaque, white, acid substance, soluble in alcohol and ether, but insoluble in water. It

\[\text{Ann. de Chim. 1xxx. 209.}\]
\[\text{Ann. Chim. et de Phys. liv. 181.}\]
fuses at 248° F., and at a higher temperature is decomposed, leaving
dant charcoal. It dissolves in, and saturates acids; and from the
alkalis precipitate it. Concentrated sulphuric acid has little action
nitric acid converts it into a yellow resinous substance, and oxalic
composed, according to Gay-Lussac, of C18 H12 N O5. It does not
have any marked action on the animal economy.
3. PARAMENISPERMA (Paramenisperma; Paramenispermine).—This
talline solid, insoluble in water, scarcely soluble in ether, but dissolves
in alcohol. It is fusible and volatile, and may be sublimed unchange
not saturate acids, and, therefore, differs in this respect from the pr
stance. Notwithstanding this, however, its composition is the same.
4. HYPOPICROTOXIC ACID.—This acid is an amorphous, brown, solid
in water (cold or boiling), insoluble in ether, soluble in alkalis, and
from its solution in them by the mineral acids. It is composed of, c
hydrogen 6-09, oxygen 29-77. This composition approximates to the
Toxin.
The yellow alkaline matter of the shell has been scarcely examined.
Boullay⁴ mentions a crystaline substance which he calls menisperm,
but its properties require further examination.⁵

CHEMICAL CHARACTERISTICS.—Iodine colours the nucleus. The cold watery infusion of the whole fruit is slightly acid, in
duces a dark precipitate with the sesquichloride of iron. It galls also occasions a precipitate.

PHYSIOLOGICAL EFFECTS. a. On Vegetables.—A solution
aqueous extract of Cocculus indicus killed a haricot plant in
four hours.⁶

b. On Animals generally.—It is poisonous to all animals; it has been found to be poisonous to dogs, goats, cows, crocodiles,
and insects. Goupil⁷ considered it to be a local irritant; the correctness of this opinion is denied by Orfila.⁸ When ingested
into the stomach its irritant effects were confined to the production
of nausea and vomiting. It acts on the cerebro-spinal system,
causing buzzing, trembling, convulsions, and insensibility. It
states, that all the fish which eat it die, —roach being killed very
barbel with more difficulty. “The barbel,” we are told, “is
fish, that whose flesh the most frequently occasions accidents to animals who eat it; probably because these fish, taking a long time to die, the poison is longer subjected to the action of the
juices, and a considerable quantity of it is consequently absorbed. Orfila says, Cocculus indicus acts like camphor on the nervous system, and principally on the brain.

γ. On Man.—Its effects on man have not been accurately
tained. Hill¹ says, three or four grains of it have brought on
dand faintings. It is frequently added to malt liquors, for the
of increasing their intoxicating powers; but, from some a
which I have received from an Excise officer, who has been
peatedly subjected to the influence of beer thus adulterated, it

⁴ Journ. de Pharm. xiv. 61.
⁶ Marcat, Ibid. xxix. 215.
⁷ Goupil, ibid.
⁸ Or ila, Toxicol. Gén.
⁹ Ibid.
¹ History of the Med. Med.
PAREIRA BRAVA.

The operation of *Picrotoxine* is analogous to, though stronger than, *Cocculus indicus*. Ten or twelve grains, given by the mouth, sufficient to kill a dog. A grain and a half, injected into the jugular vein of a dog, killed the animal in twenty minutes.

Cocculus indicus is rarely employed in medicine. It has, however, been used as an external application, in the form of powder or ointment, to destroy pediculi (hence the Germans call these fruits *louse-grains*). It has also been employed in some skin diseases, as porrigo; but its use requires caution, especially where the skin is not entire, on account of the danger of irritation. Notwithstanding the severe prohibitory statutes against employment of *Cocculus indicus* in brewing, I have reason to believe that it is extensively used; but being employed in the form of solution of the extract, the form is not easy of detection. Morin gives full directions for its employment. In the manufacture of beer, this author directs three lbs. of *Cocculus indicus* to be added to every ten quarters of malt. "It gives," says he, "an inebriating quality, which passes for strength of liquor;" and he adds, "it prevents second fermentation in bottled beer, and consequently the bursting of the bottles in warm climates."

**POTATO.**—In poisoning by *Cocculus indicus*, or *picrotoxin*, the poison from the stomach as soon as possible. No chemical antidote is known, though acetic acid has appeared to give promise. The symptoms must be combated on general principles, no rectal respiration.

**VENTUM COCCULI, E.**  
*Ointment of Cocculus Indicus.*—(Take a convenient quantity of *Cocculus indicus*, separate and preserve the kernels; beat them well in a mortar, first alone, and then with a mortar and pestle, till it amounts, altogether, to five times the weight of the kernels.)—Used to destroy pediculi.

**CISSAM'PELOS PAREIRA, LINN. E.D.—PAREIRA BRAVA OR VELVET LEAF.**

*Sex. Syst.* Dioecia, Monadelphia.

(Radix, L.—Root, E.)

**HISTORY.**—The root of this plant was first mentioned by Piso in 1791 under the name of *Cuapeba*. It was introduced into Paris in 1791 by M. Amelot, the French ambassador at Portugal. 

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1. *Treatise on Brewing.*
its margin. Seed solitary uncinate; embryo long, a fleshy albumen (Wight and Arnott).

**Sp. Char.**—Leaves peltate, subcordate, ovate-articulate beneath. Female **racemes** larger than the flowers (De Cand.)

A climbing shrub. Root woody, branching. Stems or with close-pressed down. Leaves aristate at the base, grown smooth above, underneath covered with hairs (hence called **velvet leaf**), but not truly downy. Flowers low. Berry scarlet, round or reniform, hispid.

**Hab.**—West India Islands and Spanish Main.

**DESCRIPTION.**—The root of Cissampelos Pareira (**Cissampelos pareira brava** (radix pareiræ bravae)), is sometimes called the name of **abuta** or **butua** root (radix butuæ). In Brazil, the root of that plant is called **pareiro**. Pareira brava occurs in more or less cylindrical, flattened or bluntly angular. Some of the pieces are of the size of a child's arm,—their length often a foot or more. The root is covered with a dark-brown rind or cortex, longitudinally, and wrinkled transversely. The cortex has much the appearance of large, transversely elongated scales. The surface of the transverse section of the root is gray colour, and presents a number of concentric circular layers, traversed by numerous radiating lines (between these lines are triangular bundles of woody fibres), and the latter are large, and being cut transversely, numerous holes or apertures presented by the cut surface of the layers occasionally assume a very eccentric appearance. The number of concentric circles varies with the size of the root, and may be three or more. The cortex
ntity of the extract; and the decoction prepared from it, according to the usual formula, has only a slightly bitter taste, instead of strong bitterness of the decoctions of the true root. A piece of this spurious root presents an appearance of medulla, and is powdered externally with a lichen, whence it would appear to be a species of a stem.

Composition.—Pareira brava has been analyzed by Feneuille, who found the constituents to be: a soft resin, a yellow bitter principle, a brown colouring principle, vegeto-animal matter, fucula, superoxide of lime, nitrate of potash, and some ammoniacal and mineral matters. More recently, Wiggers has announced the discovery of a vegetable alkali, which he calls cissampelin, in this root.

Feneuille considers the yellow bitter matter to be the active principle of the root. It is described as being soluble in both alcohol and water. From its property it was precipitated by tincture of nutgalls as well as by subacetate of lead. In these properties it appears to agree with cathartine (see p. 1604); but probably, a mixture of several substances.

The properties of cissampelin have not been described. Wiggers says it is a strong saline base, soluble in ether and in acetic acid. From its acetic solution it is precipitated by carbonate of soda.

Chemical Characteristics.—The presence of starch in the root is shown by iodine. An infusion of the root yields a precipitate on addition of infusion of galls, and is rendered brown by the sesquisalicylate of iron.

Physiological Effects.—I am acquainted with any experiments that determine the effects of this root in the healthy state of the body. From its taste, botanical affinities, and effects in diseases, it appears to possess a tonic power, and occasionally to act as a diuretic. Furthermore, its efficacy in certain maladies of the urinary organs induces us to ascribe an almost specific influence to this root over the mucous membrane lining the urinary passages. It certainly does appear to have the power of altering the quality of the urinary secretion. Large doses prove aperient.

Uses.—It was originally introduced into medicine as a lithontripic. Its powers in this way were at one time highly vaunted, and Petrius even went so far as to assert that calculi, the size of an orange, had disappeared under its use, and that the operation of lithotomy was no longer necessary! We now employ it almost solely in charges from the urino-genital mucous membrane.—It has been used in gonorrhoea, leucorrhoea, and chronic inflammation of the bladder. In the latter of these diseases Sir B. Brodie states, that he has seen more good done by this root than by the Uva-ursi. I am satisfied,” says this eminent surgeon, “that it has a great influence over the disease which is now under consideration, lessening materially the secretion of the sappy mucus, which is itself a very evil, and, I believe, diminishing the inflammation and irritability.

* * * * *

* Journ. de Pharm. vii. 404.
* Berl. Jahrh. xli. 223. 1838.
* Lond. Med. Gaz. i. 300.
of the bladder also." He recommends it to be taken in a concentrated decoction, to which may be added some of hyoscyamus; and in these cases, in which there is a deposit of triple phosphates, muriatic or diluted nitric acid may be added.

**Administration.**—The powder has been given in doses of a drachm to a drachm. But the infusion or decoction, to which an extract has been added, is to be preferred. A tincture or extract has been prepared by digesting one part of the root in five parts of tinctured spirit. It is reputed diuretic and anticitarrhal.

**1. Infusum Pareiræ, L. E.** Infusion of Pareira brava. Pareira, 3vi.; Boiling Water, Oj. Macerate for two hours in a covered vessel, and strain [through calico, &c.].—Dose, 6j. It will be advisable to increase the strength of this decoction, by the addition of some extract of pareira to it. Furthermore, nux vomica, opium or hysocyamus) or acids may be conjoined according to circumstances. Sir B. Brodie employs a decoction of pareira (prepared by boiling half an ounce of the root in three pints of water, and by gentle simmering, to one pint); of this eight or twelve glasses should be taken daily.

**2. Extractum Pareiræ, L. E.** Extract of Pareira brava, prepared as Extract of Gentian [as Extract of Liquorice-root]. Dose, gr. x. to 5ss. It is usually given in conjunction with infusion or decoction.

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**OTHER MEDICINAL MENISPERMACÆ.**

The student must not confound Pareira brava with the Pareira belonging to Strychnaceæ, and before noticed (see p. 922), nor with the Medica, Lindley's, a menispermacæous plant, whose root is employed in Cingalese as a stomachic.

**Order LXXXIII.**—Magnoliaceæ, De Candolle. — 1

**Magnolia Tribe.**

**Magnoliaceæ and Winteraceæ, Lindley.**

**Essential Character.**—All the parts of the flower disposed in a regular series. Sepals three to six, deciduous. Petals three to twenty-seven, usually. Stamens numerous, free, inserted on the torus of the ovaries; anthers ovoid, elongated. Ovaries numerous, inserted above the stamens, generally disposed like a spike, monostylous; stigmas simple. Carpels as many as the ovaries, one-celled; many seeded; capsular, and dehiscing by a superior chink; or capsular, bivalved, dehiscing by an inferior chink; or follicular; or somewhat indehiscent; or, lastly, sammariform, aggregate, or partially united, loose or dense strobile. Seeds attached to the internal angle of the albumen fleshy; embryo straight, small, inferior.—Elegant trees or
WINTER'S BARK TREE.

MYS WIN'TERI, De Candolle, D.—WINTER'S BARK TREE.

Wintera aromatica, Murray.

_Sex._ Syst. Polyandria, Tetragyna.
(Cortex, D.)

_Hab._—William Winter, captain of one of the ships which ac-

rds Sir Francis Drake, in the year 1578, to the Straits of 

er, returning in 1579, brought the bark of some trees, which 

it down there, to Europe. From this circumstance Clusius
Winter's bark (Winteranus cortex). It was afterwards con-

with Canella bark (see p. 1679).

_Y. Gen. Char._—Carpels congested, baccate, many-seeded. 

thickest at the apex; cells of the author separate (De

x.—Leaves oblong, obtuse, glaucous beneath. _Pedicules_

simple, approximated, or very short, divided into 

25.

A large forest tree. Branches often tuber-
culated from the scars of the old footstalks. 
_Sepals_ two to three, green. _Petals_ seven, milk-

white. _Fruit_ ovate.

_Hab._—Straits of Magellan, Chili, Peru, New 

Grenada.

_DESCRIPTION._—Winter's bark (Cortex Winteri 

seu Winteranus) occurs in quills or rolled pieces, 

commonly a foot long, one or two inches in diame-

ter, and two or three lines thick. Its colour ex-

ternally is pale-yellowish, or dull reddish-gray, 

with red elliptical spots; internally it is reddish-

Its odour is aromatic, its taste warm and pungent. The 

rs by which it is distinguished from Canella bark have been 

pointed out (see p. 1680). Its infusion is darkened by the 

ron.

_DESCRIPTION._—Winter's bark has been analyzed by M. Henry 

and its constituents to be resin, volatile oil, colouring matter, 

etate of potash, chloride of potassium, sulphate of potash, 

f of lime, and oxide of iron.

_Volatile oil_ (Oleum Corticis Winteri),—Pale-yellow, lighter than water, 

y hot and acrid taste. By standing it is separated into two parts: one

* _Exot. lib. iv. cap. 1, p. 73._
* _Journ. de Pharm._ t. v. p. 489.
Its fruit constitutes the *star-anise* (*anisum stellatum*), a variable number (usually six to twelve) of hard star-like form, each containing an oval reddish seed. "Common anise" (*Pimpinella Anisum*), but somewhat sweeter than the latter. Star-anise is aromatic and carminative, the oil is employed by liqueur-makers. As regards common anise.

**ORDER LXXXIV.—RANUNCULACEÆ**

**CROW-FOOT TRIB.**

**Essential Character.**—Sepals, three to six, hyopogynous, in one or more rows, distinct, sessile, definite or indefinite in number, hypogynous. Pod, numerous, seated on a torus, one-celled or unitunicate, pistil; ovary one or more seeded, the ovules adherent to each ovary, short, simple. Fruit either baccate with one or more seeds, or follicular with albuminous; when solitary, either erect or pendant. Flowers corneous.—Herbs, or very rarely shrubs. Leaves generally much divided, with the petiole dilated clasping the stem. Stipules occasionally present. Inflorescence variable (Lindley).

**Properties.**—Mostly poisonous. Acridity is the property in a considerable number of instances, with a narcotic. Some species are topical benumbers.

1. **RANUNCULUS A'CRIS, Linn. D.—Upright**
three deep-lobed and cut segments; those of the uppermost linear
entire. Stem erect, covered with close hairs.

Perennials. Flowers yellow. Petals with a scale at the base.

Tab. — Indigenous; very common in meadows and pastures.

Composition. — Not analysed. Its acrid principle is either very
uile, or readily undergoes decomposition, as, by drying, the plant
es its acridity.

Physiological Effects. — A powerful acrid. Inflammation of
palp of the hand has been produced by pulling it up and carry-
g it a little distance "a. Withering " says it easily blisters the skin.
X has shewn, by experiments on animals, its power of causing
flammation of the tissues to which it is applied.

Uses. — It has been applied as a rubefacient and epispastic, but is
inferior to cantharides and mustard, on account of the uncertainty
its operation.

— RANUNCULUS FLAM' MULA, LINN. D.—LESSER SPEAR-WORT,
CROWFOOT.

Sex. Syst. Polyandria, Polygynia.

(Herba recens, D.)

Botany. Gen. Char. — See RANUNCULUS ACRIS.

Sp. Char. — Leaves ovate-lanceolate, bluntish stalked. Stem reclin-
tr. Root fibrous. Seeds smooth (Smith).

Perennials. Leaves nearly entire, subseratate. Flowers bright gold
in.

Tab. — Indigenous; sides of lakes and ditches abundant.

Physiological Effects and Uses. — Similar to those of RANUNCULUS

— HELLEBORUS NIGER, LINN. E.D.—BLACK HELLEBORE, OR
CHRISTMAS ROSE.

Sex. Syst. Polyandria, Polygynia.

(Root, E. — Radix, D.)

History. — According to Sprengel " this is the plant called by the
ness Hildegarde, Christiana.

It must not be confounded with the ἡλλίσβορος μέλας (black hellesbole)
Dioscorides a, which, according to Dr. Sibthorp b, was the plant
ich he has described and figured under the name of HELLEBORUS
CINALIS. Hippocrates employed hellebore in medicine. Melampus
ployed it with great success in the treatment of madness, 1400
ars before Christ. His use of it is the earliest instance on record

a Smith, Eng. Fl.
b Curtis, Fl. Lond. vol. i.
c Arrang. of Brit. Plants, tit. 681.
d Tac. Hist.
e Hist. Rei Herb. i. 296.
fl Lib. iv. cap. 151.
fl Fl. Graec.
to 10. *Stigmas* terminal, orbicular. *Capsule* a double row, elliptical, umbilicated, (De Cand.)

**Sp. Char.**—*Leaves* radical, pedatisect, quite one- to two-flowered, bracteate (De Cand.)

*Rhizome* several inches long, tuberculous blackish brown externally, white internally, long, simple root-fibres. *Leaves* on cylinder eight inches long; lobes ovate-lanceolate, *Scape* shorter than the petiole. *Sepals* of white, slightly tinged with pink, eventually bluish green, tubular, shorter than the stamens. *Seeds* black, shining.

**Hab.**—Sub-alpine, woodland regions in the Alps and in parts of Europe.

**Commerce.**—Hellebore root is imported in small quantities from the Alps and from Turkey, and is chiefly used in Germany and in London. It is usually brought in containers from Holland.

**Description.**—The root met with in commerce is that of black hellebore root (*radix hellebori nigri*). It consists of two parts,—the rhizome or rootstock, which arise from it. The rhizome is half to one inch in diameter, several inches long, horizontal or contorted, with six to eight slightly ridges and slight longitudinal striae. The root is cylindrical, dark brown externally, internally, white, with a central paler cord. The odor is scarcely perceptible, but has been compared to the smell of burnt tobacco. Its taste is slight at first, then bitter, acrid and pungent.

**Substitution.**—It is probable that the roots of *Helleborus foetidus* and *Helleborus foetidus* are sometimes substituted for, or in part, the genuine hellebore root. This practice certainly occurs, and is often practiced with little or no knowledge of what the real article may be.
re root. Feneulle and Capron analyzed the black hellebore

**Vauquelin's Analysis.**

<table>
<thead>
<tr>
<th>Very acrid oil.</th>
<th>Volatile oil.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extractive.</td>
<td>Fatty oil.</td>
</tr>
<tr>
<td>Starch.</td>
<td>Volatile acid.</td>
</tr>
<tr>
<td>Vegeto-animal matter.</td>
<td>Resinous matter.</td>
</tr>
<tr>
<td>Sugar.</td>
<td>Wax.</td>
</tr>
</tbody>
</table>

**Feneulle and Capron's Analysis.**

<table>
<thead>
<tr>
<th>Root of Helleborus hiemalis.</th>
<th>Root of Helleborus niger.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gallic acid.</td>
<td>Gallate of potash.</td>
</tr>
<tr>
<td>Aromatic salts.</td>
<td>Ammoniacal salts.</td>
</tr>
</tbody>
</table>

Oil, Vauquelin; (Soft Resin, Gmelin; Helleborin).—This substance has an acrid taste, and is soluble in spirit. Vauquelin ascribed the acrid taste of hellebore to it. Feneulle and Capron, on the other hand, ascribe it to the presence of fatty oil and volatile acid. Probably the two latter correspond to the acrid oil of Vauquelin.

**PHYSIOLOGICAL EFFECTS. a. On Animals.**—Given by the mouth to carnivora (as dogs), it causes vomiting, frequently purging and faintness.

In excessive doses it produces gastro-enteritis. If the dose be taken, to prevent the ejection of the root from the throat, it causes staggering, weakness or paralysis of the hind limbs, insensibility, and death. Similar effects result from its application to a wound. Orfila states, when the animals survive a few hours, inflammation of the rectum is a constant occurrence; and Vicat says it causes inflammation of the arteries of all the intestines, unless the rectum is involved. The latter statement is entirely erroneous.

**On Man.**—Black hellebore is a local irritant, drastic purgative, emmenagogue. Given in small doses it increases the secretion of the intestines, and acts as a stimulant to the circulation, thereby promoting the uterine and hemorrhoidal veins, and by its influence over the portal circulation contributes to increase the hepatic secretion. Large doses act as a purgative, and frequently also occasion sickness. They have a more manifest influence over the pelvic vessels, often cause vomiting, and lower the strength of the pulse. In an excessive or toxic dose it acts as a narcotic-acid poison, and causes vomiting, burning pain in the stomach and intestines, cramps of the extremities, cold sweats, faintness, paralysis, insensibility, and death. The fresh root, applied to the skin, produces rubefaction and inflammation.

Drastic purgative it is allied to colocynth (see p. 1496), from which it differs in its narcotic operation and its greater influence over the pelvic vessels, distinguishing it.

—Black hellebore, though greatly esteemed by the ancients,
is but little employed by the moderns. It is adapted
phlegmatic individuals, especially when the pelvic cir-
languid. On the other hand, in easily-excitable persons,
any irritation of the pelvic organs (especially the uterus
exists, it proves injurious.
1. In affections of the nervous system, especially ma-
cholia, and epilepsy, it has long been celebrated, and
above-mentioned conditions, at times proves serviceable.
2. As an emmenagogue it was greatly esteemed by Dr. H.
is still much valued by some practitioners. He gave
spoonfuls of the tincture in a glass of warm water two
The remarks already made will readily suggest the class of
which it is applicable.
3. In dropsy its drastic operation renders it useful. For
when this disease depends on, or is connected with, a lack
of the portal circulation, black hellebore proves further
the stimulus which it communicates to the hepatic vessels.
4. Lastly, black hellebore has been used in chronic skin
and as an anthelmintic.

ADMINISTRATION.—The dose of powdered hellebore is fre-
to 3j. as a drastic purgative. When we require a milder
may give it in doses of grs. iij. to grs. viij. It has also been
in decoction; but the tincture is the most frequently
preparation.

TINCTURA HELLEBORI, L.; Tincture of Black Hellebore
bore, bruised, 3v.; Proof Spirit, Oij. Macerate for four
and strain).—Dose, fss. to fj. Principally employed as
nagogue.

2. DELPHIN'ium STAPHYSA'GRIA, Linn. L. E. D.—STAV

Sex. Syst. Polyandria, Trigynia.

(Semen, L. D.—Seeds, E.)

HISTORY.—Hippocrates employed stavesacre in medi-
thorp found the plant growing in Crete and Zante, and id
with the σταφύλι of Dioscorides.

BOTANY. Gen. Char. — Calyx deciduous, petaloid, irreg-
sepals elongated at the base into a spur. Petals four, the
appendiculated within the spur (De Cand.)

Sp. Char.—Spur very short. Bractlets inserted at the
pedicel. Petioles pilose. Pedicels twice as long as the
(De Cand.)

A stout herb, one or two feet high. Stem and petioles his-
soft hairs. Leaves broad, palmated, stalked, five- to nine-
cemes lax. Flowers bluish or purplish. Capsules three, lu
Hab.—South of Europe, the Levant, and the Canaries.

Description.—Stavesacre seeds (Semina staphisagriae seu staphidisi rice) are irregularly triangular (sometimes quadrangular), slightly chined, blackish-brown, and wrinkled. They contain a white and y nucleus. Their odor is slight but disagreeable; their taste bitter, very acid, hot, and nauseous. Iodine colours the seeds brown. Their watery infusion is darkened by sesquichloride of iron. Infus of nutgalls renders it turbid.

Composition.—Stavesacre seeds were analyzed in 1820 by Brandes\(^1\), and in 1821 by Lassaigne and Feneuille\(^2\).  

<table>
<thead>
<tr>
<th>Brandes's Analysis</th>
<th>Lassaigne and Feneuille's Analysis</th>
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<tbody>
<tr>
<td>Delphinia</td>
<td>Malate of delphinia.</td>
</tr>
<tr>
<td>Fatty oil</td>
<td>Volatile oil.</td>
</tr>
<tr>
<td>Waxy substance</td>
<td>Fatty oil.</td>
</tr>
<tr>
<td>Gum</td>
<td>Brown bitter matter.</td>
</tr>
<tr>
<td>Starch</td>
<td>Yellow dito.</td>
</tr>
<tr>
<td>Woody fibre</td>
<td>Uncrystallizable sugar.</td>
</tr>
<tr>
<td>Phytocel with salts</td>
<td>Gum.</td>
</tr>
<tr>
<td>Vegetable albumen</td>
<td>Woody fibre.</td>
</tr>
<tr>
<td>Sulphates and phosphates</td>
<td>Animal matter.</td>
</tr>
<tr>
<td>of lime, potash, and magnesia</td>
<td>Albumen.</td>
</tr>
<tr>
<td>Water</td>
<td>Mineral salts.</td>
</tr>
</tbody>
</table>

\(^{1}\) Delphina (Delphina; Delphine; Delphium).—As usually met with, this is white, odourless powder. Its taste is extremely acrid and very bitter. It fuses \(248^\circ\) F. It is scarcely soluble in water whether hot or cold, but dissolves in mer, and still better in alcohol. Its alcoholic solution reacts as an alkali on et paper. It is not crystallizable, though its texture is said to be crystalline, men the powder is moistened. It saturates acids, forms salts which are acrid, very bitter, and difficultly crystallizable. From its solution in acids it is precipitated by alkalis. Its composition is \(C_{26}H_{18}N\) O\(_2\). Its atomic weight, thereeree, is 211. Coutere\(^6\) says that, as usually procured, it is not absolutely pure, but contains a resinous matter, and an acrid resin which he calls staphysain.

\(^{2}\) Volatile Acid (Delphinie Acid?).—Discovered by Hofschläger\(^7\). It is white, crystalline, volatile at a low temperature, and in small doses is a powerful acid.

Physiological Effects.—The activity of stavesacre seeds depends partly on the delphinia and partly on the volatile acid. The powder of the seeds readily excites nausea, vomiting, and purging. Orfila\(^8\) shown that, on dogs, it acts first as an acrid, and afterwards as a cotonic poison. Its operation appears to be similar to cebadilla (p. 959).

Uses.—Stavesacre seeds have been used to destroy pediculi, once the Germans term them Läusesaamen, or louse-seeds. For purpose they are employed in the form of ointment or acetous ersion. They have also been administered internally (in doses from three to eight grains) against worms, and externally

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\(^1\) Gmelin, Handb. d. Chem. ii. 1240.
\(^2\) Ann. de Chim. et de Phys. xii. 358
\(^3\) Journ. de Pharm, xiii. 365.
\(^4\) Ann. Chim. et de Phys. i. ii.
\(^5\) Toxicol. Gén.
turgid cases. It has also been used in medicinal benefit. It is employed externally in the following solution. The *unguentum delphiniae* composed of 3 j. of delphinia dissolved in 13 j. of olive oil, and 1 j. of lard. Internally, delphinia is excellent embrocation. Internally, delphinia is pills. The *pili delphiniae* consist of gr. j. of extract of hyoscyamus; and the same quantity divide the mass into twelve pills, one of which three hours (Tumbull).

3. ACONI'TUM NAPE'LUS, Linn. E.—COM MONKSHOOD.

**Sex. Syst.** Polyandria, Trigynia
(Leaves, E.)

**History.**—The ancient history of Aconite obscenity. The Greeks make frequent reference to a poison which they term ἀκόρινον. Theophrastus speaks of it. As *Aconitum Napellus* is a native of Greece, where it is known at the present day, it would at first appear probable that our plant referred to by the ancient Greeks. But given by Theophrastus quite preclude this supposition; no one has been able to identify satisfactorily this ancient naturalist. Dioscorides has ἀκόρινον.

**Botany. Gen. Char.**—*Calyx* petaloid, irregular; upper sepal concave, helmet-shaped.
short, thick, inclined. Wings of the stamens cupulidate and bent. Lobes of the leaves cuneate pinnatisect. Ovaries rarely five, smooth or pilose (De Cand.)

ial herb. Root tapering. Stem simple. Flowers blue.—Species is subject to great variation in the dense or loose conff the inflorescence, in the form of the helmet, the colour and the flower, the breadth and the number of slashes of the leaves, the nature of the parts of the plant, and the condition of the stem. Cadolle admits no less than twenty-nine varieties.

—Europe. It is placed among indigenous plants, but it is a

Dublin College has adopted Aconitum panicum De Candolle, as the species, and direct the leaves (folia) to be used.

ondon College has followed the Dublin College, except that they direct (radix) as well as the leaves (folia) to be employed.

myself unacquainted with any just grounds for this preference. The A. Napellus is one of the most active species of the genus, and no good has yet been adduced to prove its inferiority to the A. panicum, var. kianum, which Stork published as A. Napellus officinalis. Moreover, the A. panicum are not found in commerce, nor is the plant grown (except in gardens) in this country; so that druggists and apothecaries cannot, as yet, obey the directions of the London and Dublin Colleges.

cription.—Aconite root (radix aconiti), when fresh, consists of a dense rootstock, placed perpendicularly, or nearly so, in the end of numerous, cylindrical, fleshy fibres arising from it. At er and thickest part, the rootstock seldom exceeds the thick- the finger; inferiorly it is attenuated and filiform. Sometimes three rootstocks are conjoined. In the latter case the root has arated appearance. Its total length is three or four or more

Its colour, as well as that of the fibres, is externally coffee; its odour is earthy. Internally it is white and fleshy. Its bitter; but after a few minutes a remarkable numbness and is perceived on the lips, tongue, and fauces. By drying, the rives, and becomes darker coloured. The root should be in the spring, just before the leaves appear. The leaves aconiti), when chewed, have the same taste, and produce the ling of numbness.

position.—No complete analysis either of the root or the Aconitum Napellus has been made. The following are the of the root of A. Lycocotonum, according to Pallas".—A l, a green fatty matter, a substance having some analogy with stable alkalies [impure aconitina?], vegetable albumen, starch, and some salts.

leaves of Aconitum medium Schraderi were analysed by e.

Brandes and Peschier announced the existence of a peculiar
Napellus, with water, to distillation, and obtained an unpleasant odour, and whose emanations after volatile principle be the product of the decomposing following circumstances favour this suggestion:—1st. little odour; 2ndly, the local effect of aconitina is on leaves; 3rdly, aconitina, when mixed with the other readily undergoes decomposition, so that considerable required in the extraction of it; and Mr. Morson failed to obtain it.

3. Aconitic Acid.—In the evaporation of the crystals of aconitite of lime are frequently deposited obtained the acid. The acid also exists in Equisetum formed by the action of heat on citric acid (see p. 57) it is scarcely crystalline, merely forming warty permanent in the air, odourless, very sour, and is very ether. When heated it fuses, but at the same time but does not yield fumaric acid. From the latter a greater fusibility and solubility; from maleic acid crystals, and not yielding fumaric acid by heat. The in aconitate of silver, consists of C4 H4 O3.

4. Fatty Oil.—This is extracted from the root coloured. All the specimens of it, which I have of numbing property (from the presence of aconitine

**Physiological Effects.**—Hitherto I have no accurate account of the effects of aconite, a property to me to have been entirely overlooked.

a. On Animals.—If a small quantity of the root of aconite be introduced into a wound (the peritoneum) in a dog, it usually causes a catarrhal character), diminishes the blood and weakens the muscular system so as sometimes stagger in walking, and destroys common sense out causing stupor. A dog under the influence

b. On Man.—On the skin of a man, aconite

ight, and rather to be termed spasmodic movements. I have repeatedly demonstrated these effects to the pupils attending my lectures. The following is a notice of one experiment:

March 31, 1837, London Hospital. Present Mr. Adams, and several medical members. A small portion of alcoholic extract of aconite was introduced into the tracheal sac of a strong dog, who had been kept fasting for some hours. In a few minutes he was evidently affected. He was less capable of supporting himself, and leaned against a wall. In ten minutes was insensible to the pain caused by the introduction of pins into his legs, paws, body, tail, nose, &c. His sight, however, was unaffected; at least he winked as usual when attempts to take him were feigned. Was not paralytic, for he walked, though not firmly. He recognised several individuals, and wagged his tail when spoken to. He made violent attempts to vomit. He then laid down, became apparently weaker, and died without a single convulsion. At one period the action of the heart was slower than usual, and the first and second sounds of the heart were unusually far and distinct. Subsequently the circulation was quickened. Respiration was not disordered; nor were the bowels affected.

I have subsequently found that if a large quantity of alcoholic extract be used, the loss of feeling is not so well marked; for death succeeds in so short a period of time that the loss of feeling, as distinguished by the insensibility immediately preceding death, is not well sustained. For the same reason, rabbits do not answer well for demonstrating these effects; and the weakness (paralysis?) of the hind extremities, and spasmodic movements, are much more marked in rabbits than in dogs. I can distinguish no difference between the effects of Aconitum Napellus on rabbits, and those of Aconitum ferox on the same animals. On opening the bodies of dogs killed by it, immediately after death, no pulsations of the heart are visible.

Want of space compels me to abstain from entering into any details respecting the experiments made on animals with aconite by several persons, Sprengel, Viborg, Brodie, and Orfila.

On Man.—The topical effects are peculiar and most remarkable. A leaf or a small portion of the root be chewed, or a few drops of alcoholic tincture of the root be applied to the lips, there are produced in a few minutes numbness and a remarkable tingling sensation. These effects endure for many hours. If the quantity taken be somewhat larger, the palate and throat are affected. The sensation appears as if the velum and soft palate were irritated, and rested on the dorsum of the tongue. To relieve this, violent attempts are made to swallow.

When small and repeated doses of the alcoholic tincture of the root are taken internally, they cause a sensation of heat and tingling in extremities, and occasionally a slight diuresis.
The extract of aconite of the shops is but little to be relied on. Many samples produce neither numbness nor tingling when rubbed on the lips and gums. Stöckl states that it acts as a diaphoretic and diuretic. These symptoms, however, are by no means constantly produced, and, when they occur, are not always clearly referable to the aconite used.

In poisonous doses the effects of aconite are most remarkable. The following details of the effects produced on a family of three persons were furnished me, a few days after the accident, by one of the sufferers (Mrs. Prescott), and her account was confirmed by a very intelligent neighbour who witnessed the progress of the symptoms.

In December, 1836, Mr. Prescott, aged 57, residing in the City Road, planted in his garden a few pieces of horse-radish. On February 5th, 1837, he observed some green shoots, which he supposed to be those of horse-radish. He dug up three of them. The roots (samples of which were given, and have yielded on thriving plants of Aconitum Napellus) were tap-shaped and small. Perhaps a very small walnut would exceed in bulk that of the whole root. These roots were washed, scraped, placed on a plate with some vinegar, and eaten at dinner (at 2 o’clock) with roast-beef, by Prescott, his wife (aged 57), and a child (aged 5). It was remarked at dinner that the root was very mild, and had not the pungency of horse-radish. After the family had dined, about one root was left, so that two had been eaten at dinner, the greater part (perhaps one or one and a half roots) by the husband. About three-quarters of an hour after dinner, Mr. Prescott complained of burning and numbness of the lips, mouth, and throat, and which soon extended to the stomach, and was accompanied with vomiting. The matters ejected were first his dinner, and afterwards a frothy mucus; but no time was any blood brought up. The vomiting was very violent and continued for an hour, and continued more or less until half an hour of his death. An emetic was swallowed at a quarter past four o’clock; and therefore the consequent vomiting may be ascribed, in part at least, to this. His extremities were cold, but his chest was warm: the head was bathed in a cold sweat. He used to express the expression of his neighbour, were “glaring.” He complained of violent pain in the head, and trembled excessively. The last symptom might perhaps be in part owing to his terror of the mistake he had committed. They were blue. His mental faculties were not disordered; on this point I made particular inquiry, and I was assured that he was neither delirious nor sleepy, but was quite conscious until within two minutes of his death. He had no spasm, or convulsion: the only approach to it was trembling. He frequently put his hand to his throat. Though exceedingly weak he did not lose his power over the voluntary muscles; for within a few minutes of his death he was able with the assistance of his neighbour, to walk to the water-closet. His bowels were acted on once only after dinner, and that on the occasion just mentioned which was about an hour after he had taken the emetic and some castor oil. His breathing was apparently unaffected. On his return from the water-closet he was put to bed, and within a few minutes expired, apparently in a fainting state. Death occurred about four hours after dinner.

Mrs. Prescott was affected in a similar way. She had the same burning of numbness of the lips, mouth, throat, and stomach, and violent vomiting. She experienced a curious sensation of numbness in the hands, arms, and legs; she lost the power of articulating, so that she was unable to tell the address of her son. Her attempts to speak were attended with unintelligible sounds and grunts. She experienced great muscular debility, and was unable to stand. In the spect her condition differed from that of her husband, who could both stand and walk. She felt stiffness of, and difficulty in moving, her limbs. She had 1

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1 Essay on the Internal Use of the Thora-Apple, Henbane, and Monkshood, Lond. 159.
The only approach thereto was the stiffness of their muscles, and the perturbation of the brain, which they were disposed to as in her attempts to open, her sight was very dim, and the hearing was unaffected. The face was ashen white; her face and throat were almost ashen white; but was neither delirious nor sleepy. She at times scarcely knew what she was doing. Her extremities were cold. She was frequently cold. She knew not why. Five or six hours after dinner, her natural warmth returned. The remedies employed were pediluvia, rum and water, and some "warm" "warm" nourishing practitioner.

She was more slightly affected, except that she evinced a slight swelling of the others she was constantly putting her hands

As published a most interesting case of a female alcoholic tincture of the root. About five minutes after it, she was seized with a pricking and tingling of the tongue and mouth. Then the tongue and mouth next felt the same, then the legs and hands, and less than ten minutes her face seemed to her feelings to her legs, and the throat growing tight. She felt sick, made many attempts to vomit. Her legs failed, she was almost blind, but was of her plight. When seen by Mr. Sherwen her eyes were protruded, with contracted pupils; countenance livid; jaws rigid; arms and hands quite cold and pulseless; the legs much in the same state; breathing short, imperfect, irregular; while the heart fluttered feebly. She was sufficiently to tell how the accident occurred. In an attempt to avoid emetic convulsion occurred. Copious vomiting took place. Five hours after she had taken the poison, she was becoming full, only 58 per minute, and intermitting, with less oppression at the precordia, and the pupils were.

The cases now recorded agree with the one detailed in the "British Transactions." Pallas (quoted by Christison) and Delaroche published cases in which violent vomiting, purging, and abdominal tenderness, are said to have been produced by

Comparing the operation of aconite with that of other cerebrotenous, we observe that its most characteristic topical effect is and tingling. Applied to the eye it causes contraction of.

When the root or its tincture is swallowed, the most symptoms are numbness and tingling of the parts about the head, throat, and of the extremities, vomiting, contracted pupil, and of the circulation. The heart appears to be weakened or

1 Lancet, March 25, 1837, p. 13.
2 Vol. xxxviii. p. 287.
3 Journ. de Chin. Méd. ii. 344.
As a topical remedy, aconite is most valuable for neuralgic and rheumatic pains. In neuralgia, no remedy has been found equal to it. One application of the tincture of aconite to the affected part, usually brings relief; and, after a few more applications, it frequently causes the patient to be cured. In some cases, the benefit seems to be permanent; but in others, the remedy entirely fails to produce any effect. Though the pathology of this disease be not yet well understood, it is generally agreed that the causes of it, and the condition of the nerves when the disease occurs, are by no means uniform. We are, therefore, not justified in believing that while in some cases aconite may be of great benefit, it may be useless in others. I do not think that aconite is injurious. The causes of neuralgia, are, however, in most cases, not able to determine the probability or the reverse of the beneficial agency of aconite. Its employment must be, for the most part, determined by the nature of the case, and the condition of the patient. When the disease depends on inflammation of the nerves, and the patient has either a local swelling or redness, aconite is frequently found to be of great benefit. When the disease is rheumatic in its nature, and occurs in rheumatic individuals, I have found aconite to be of great value. In one case of sciatica, I gave partial and complete relief to the patient by the application of aconite. In acute rheumatism, aconite has been found to be of great benefit. Dr. Turnbull states that a lady was entirely cured of the disease by the aconite ointment. In acute rheumatism it has proved successful in my hands; but I have been less successful in cases in which it has been of great benefit.
ACONITE.

In the large majority of these maladies scarcely any practitioner believes in its efficacy. Fouquier gave it very extensive trials about obtaining much relief from it, except as a diuretic in passive diseases. In rheumatism it has frequently proved serviceable when united with a sudorific regimen. I have seen it give great relief to rheumatic pains. In hypertrophy of the heart it has been recommended by Dr. Lombard, on account of its decidedly sedative effects on the heart.

Administration.—The only preparations of aconite, whose activity may be relied on, are the tincture (made with rectified spirit), alcoholic extract, and Morson’s aconitina. The powder is given in doses of one or two grains, gradually increased, until some effects are produced. But no reliance can be placed on it. When of good quality, it causes numbness and tingling of the lips and tongue a few minutes after its application to these parts.

Antidotes.—See the treatment for poisoning by tobacco, p. 1254. Mr. Sherwen’s case great benefit was obtained by the abstraction of ounces of blood from the jugular vein.

TINCTURA ACONITI, Tincture of Monkshood. (Root of aconite, partly dried and coarsely powdered, lb. j.; Rectified Spirit, Oiss. erate for fourteen days and strain.) This formula is very nearly given by Dr. Turnbull. Its dose is five drops three times a day. It should be employed with great caution. As an embrocation in neuralgia and rheumatism it is invaluable. It is applied by means of a sponge tooth-brush, or a small piece of sponge attached to the end of a stick. Mr. Curtis, of Camden Town, has suggested to the use of an aconite plaster, prepared by spreading the alcoholic extract (obtained by evaporating the tincture) on adhesive plaster, in neuralgia.

EXTRACTUM ALCOHOLICUM ACONITI, Alcoholic Extract of Monkshood. (Prepared by distilling the spirit from the tincture, until the instance of an extract has been obtained.)—It has been employed orally in doses of one-sixth of a grain every three hours. It could be given in the form of pills (pilulae aconiti) made of liquorice and syrup. It may be also employed externally in the form of an ointment (unguentum aconiti), composed of one part of the extract, two parts of lard (Turnbull), or spread on adhesive plaster.

EXTRACTUM ACONITI, L. E. Succus Spissatus Aconiti, D. Infused Juice or Extract of Monkshood. (Fresh Aconite Leaves, Having moistened the leaves with water, bruise them in a

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* Treat. on Pain, and Nerv. Dis. p. 91, 1837.
* Lancet, March 25, 1837.
stone mortar; then press out the juice; and evaporate it, unstrained, to a proper consistence, L. D.—" Take of the leaves of monkshood, fresh, any convenient quantity; beat them into a pulp; express the juice; subject the residuum to percolation with rectified spirit, as long as the spirit passes materially coloured; unite the expressed juice and the spirituous infusion; filter; distil off the spirit, and evaporate the residuum in the vapour bath, taking care to remove the vessel from the heat so soon as the due degree of consistence shall be attained," E.)—An uncertain preparation. When of good quality it causes numbness and tingling, within a few minutes after its application, in the mouth and lips. The tincture or alcoholic extract are in my opinion, greatly to be preferred to this variable preparation.—Dose, one or two grains at the commencement, and to be gradually increased until some obvious effect is produced.

4. ACONITINA, L. Aconitine. The following directions for making this alkaloid are given in the London Pharmacopoeia:—

"Root of Aconite, dried and bruised, lb. ij.; Rectified Spirit, Ung. 8.; Diluted Sulphuric Acid; Solution of Ammonia; Purified Animal Charcoal, each as much as may be sufficient. Boil the Aconite with a gallon of the Spirit for an hour, in a retort with a receiver adapted to it. Pour off the liquor, and again boil the residue with another gallon of the Spirit and the Spirit now distilled, and pour off the liquor also. Let the same be done a third time. Then press the Aconite, and all the liquors being mixed and strained, let the liquor distil. Evaporate what remains to the proper consistence of the extract. Dissolve this in water, and strain. Evaporate the liquor with a gentle heat, that it may thicken like a syrup. To this add a dilute Sulphuric Acid, mixed with distilled water, as much as may be sufficient to dissolve the Aconitine. Then drop a solution of Ammonia, and dissolve the Aconitine precipitated, in dilute Sulphuric Acid and water, mixed as before. Afterwards mix in the Animal Charcoal, frequently shaking them during a quarter of an hour. Lastly, strain a solution of Ammonia being again dropped in that the Aconitina may be precipitated, wash and dry it.

Aconitina exists in the plant in combination with a vegetable acid (aconitic acid?). Alcohol extracts this salt with some other matter. The alcoholic extract yields this salt to the water, and on the addition of sulphuric acid a sulphate of aconitina is formed, which is decomposed by ammonia, and the aconitina precipitated. It is then again dissolved by sulphuric acid, the solution decolorized by charcoal, and the aconitina again precipitated by ammonia.

As prepared by Mr. Morison, this substance presents the following properties:—It is a white, odourless solid, either dull and amorphous or somewhat sparkling, and apparently crystalline. As it is usually described as being uncrystallizable, I have carefully examined a supposed crystalline mass with the microscope, but I could not discover any distinct crystals. The fragments appeared like thin plates of chlorite of potash, and, though they varied greatly in shape, the triangular form seemed predominant. Heated in a tube, aconitina readily decomposes. It forms a pale amber-coloured liquid; and at a higher temperature decomposes. It is not volatile. Heated on platinum foil over
AONITE.

It is speedily and entirely dissipated. It is soluble in
ol, ether, and the acids. From its acid solution it is precipitated
anomia. A minute portion of it mixed with lard, and applied to
the eye, causes contraction of the pupil, as I have repeatedly seen.
and Hesse state that the aconitina which they obtained pro-
dilatation of the pupil. Mr. Morson’s aconitina is so powerful
one-fiftieth of a grain has endangered the life of an individual.
The most virulent poison known, not excepting hydrocyanic acid.
The following are the notes appended to it in the London Phar-
macia:

alkali prepared from the leaves and root of aconite. It is very soluble in
the ether, less in alcohol, and very slightly in water. It is totally con-
fined, and no salt of lime remaining. This substance possessing strong
is not to be rashly employed."

puristic aconitina is found in the shops. It is imported from
France, and bears the stamp and label of a celebrated French chemical
Its colour is greyish-yellow. It is inert or nearly so; at least
the taken one grain of it without perceiving the least effect of it on
the tongue or otherwise. It is not completely soluble in either ether
or alcohol. When burnt on platinum foil it leaves a calcareous
The only genuine aconitina which I have met with is that
acquired by Mr. Morson, of Southampton-row; and Dr. Turn-
forms me that he has found none other to possess any medicinal

Mr. Skey also found this to be the case."

effects of this alkaloid are similar to those of aconite root, but,
se much more powerful. If the ointment or alcoholic solution
be rubbed on the skin, it causes intense heat, ting-
and numbness, which continue for more than twelve or eighteen

A minute portion of an ointment, composed of a grain of the
id to two drachms of lard, applied to the eye, causes almost in-
tearable heat and tingling, and contraction of the pupil. This
fect was shewn me by Dr. Turnbull, in some amaurotic cases
real years’ standing, and whose pupils underwent no change
the eye was exposed to strong day-light. In very minute doses
caused heat and tingling upon the surface of the body, and
omes diuresis; but it cannot be administered internally with

In one case (an elderly lady), one-fiftieth of a grain had nearly
fatal. Satisfied that great insecurity attends its internal use,
tell me he has long since ceased to employ it in this
as the slightest inattention on the part of the dispenser may be
ed with fatal results.

enormous cost (3s. 6d. per grain!) of Morson’s aconitina limits
I believe that the alcoholic tincture is a perfect substitute
and the experience of others confirms my own observation.

Of the great efficacy of aconitina in neuralgic and rheumatic complaints, no one can entertain any doubt who has submitted it to trial. The following are Dr. Turnbull's formulas for using aconitina externally:

1. **Unguentum Aconitina. Aconitine Ointment.** (Aconitine, gr. x; Oil, g. xvi.; Lard, sj.; Mix.)—It is employed by friction, with the face several minutes.

2. **Soluto Aconitina. Aconitine Emulsion.** (Aconitine, gr. viij.; Spirit, sj.; Dissolve.)—Used by friction-sponge (as a sponge tooth-brush) must be taken not to employ it where the skin is abraded.

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**OTHER MEDICINAL OR POISONOUS RAMUNCULACEAE**

1. The leaves of *Helleborus foetidus* are emetic and purgative and have been employed as a vermifuge against the large round worm (*hymenolepis*).

2. *Helleborus viridis* possesses similar properties.

3. *Aconitum ferox* is, perhaps, the most violent of the rhamunculaceous. It is a Nepal plant, and constitutes the *Bishead* or *Bishā* poison of that country. Several years since I undertook, at the request of Dr. Wallich, to test the effects of this plant on animals. My experiments were made with plants which had been ten years in Dr. Wallich's possession, and which, therefore, had lost part of their activity; yet their effects were most energetic; but of nature as those of Aconitum Napellus.

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II. The Animal Sub-Kingdom.

Division I. Invertebrata.—Invertebral Animals.

Essential Characters.—Animals destitute of a vertebral column and an internal skeleton. Skin sometimes ossified, and thereby forming an external skeleton. Nervous system not always evident.

Subdivision I.—ACRITA, Macleay.

Nervous system indistinct, diffused, or molecular (Owen) *. 

Class I.—PORIPHERA, Grant.—PORIPHEROUS ANIMALS.

Essential Characters.—Simple, soft, aquatic animals, with a fibrous axis, without perceptible nerves or muscular filaments, or organs of sense, or any circulating or glandular organs. Their body is composed of a soft gelatinous flesh, traversed internally with numerous, ramose, anastomosing canals, which commence from superficial minute pores, and terminate in larger, open vents  5.

Spongia officinalis, Linn. E.D.—THE OFFICINAL SPONGE.

(Sponge, E.)

History.—Aristotle  7 was acquainted with the sponges, and noted the popular but erroneous opinion of their shrinking when tempted to be plucked.

Zoology. Gen. Char.—Body soft, very elastic, multiformal, more or less irregular, very porous, traversed by numerous tortuous canals which open externally by very distinct vents (oscula), and composed of a kind of subcartilaginous skeleton, anastomosed in every direction, and entirely without spicules (De Blainville)  9.

My friend, Mr. J. S. Bowerbank  5, has recently shown that spicula do exist in keratose or horny sponges of commerce. They are imbedded, to a greater or lesser extent, in the substance of the fibre, and are mostly to be observed in the larger flattened portions of the fibre, and not in the finer anastomosing threads. Mr. Bowerbank has also shown that the fibre of the true sponges is solid, and tubular, as commonly supposed  6.

Sp. Char.—Masses very large, flattened and slightly convex above, it, tenacious, coarsely porous, cracked and lacunose, especially beneath. Vents round, and for the most part large (Lamouroux)  6.

These characters are insufficient to distinguish the officinal sponge from numerous other allied species; and it is tolerably clear, from Mr. Bowerbank's

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* Cyclopa. of Anat. arts. Acritia.
* Grant, Brit. Annual, for 1838, p. 267.
5 The only tubular sponges known to Mr. Bowerbank is Spongia fistulatia. This, however, he proves to separate from the genus Spongia, and to give it the generic name of Fistulatia.
Sponge adheres to rocks by a very broad base; out of the sea it has a strong fishy odour. Its colour is pale to deep brownish yellow. It often contains concretions (lapis spongiarum), which Bley performed principally of the carbonates of lime and magnesia, and found in sponges. Various marine animals plug the irregular holes.

Hab. — In the Red and Mediterranean Seas, and about the islands of the Grecian Archipelago.

Collection. — The inhabitants of the Greek islands dive for it. In their submarine operations they use a knife. Practice enables them to remain a considerable time in the water. As soon as the sponge is brought on board, it is dried in the sun and washed to get rid of the gelatinous matter, and then it swells up.

Description. — Commercial sponge (spongia) is the animal, from which the gelatinous flesh just mentioned. When deprived of stony concretions, from the interior of the mass, it is soft, light, flexible. When burnt it evolves an animal odour. If wet, it thereby swells up. Nitric acid colours it yellow; it dissolves it; the solution forms a precipitate of calcareous acid. The finer sponges, which have the greater facility of being dried, were formerly called male sponge; while those which were denominaded female sponge.

In 1841 duty (6d. per lb. with an additional
1. Turkey Sponge.—This is imported from Smyrna, and consis-
et the best sponge of the shops. It occurs in cup-shaped masses
of various sizes. Its texture is much finer than that of the West Indian
d. Mr. Bowerbank, by the aid of the microscope, has discovered
that it consists of two species of Spongia, not distinguishable from
the other by the naked eye. One of these is characterized by the
presence of a beautiful, branched, vascular tissue, which surrounds
the abundance, nearly every fibre of its structure, and is in-
folded in an external membrane or sheath. In the other, and most
common, kind of Turkey sponge, no vascular tissue has yet been
discovered.

2. West Indian Sponge.—The principal source of this is the
Bahama Islands; whence it is commonly known as Bahama Sponge.
Forms are more or less convex, with projecting lobes. Its fibre is
faser. Its tissue has but little cohesion, and hence this kind of
sponge is commonly regarded as rotten. Mr. Bowerbank states that it
consists of one species only of Spongia.

Composition.—Well-washed sponge, freed as much as possible
from earths and salts by dilute acids, was analysed, in 1828, by
Memran, who found it to consist of a substance similar to osma-
ne, animal mucus, fat oil, a substance soluble in water, a substance
soluble in potash, and traces of chloride of sodium, iodine, sul-
phate of lime (?), silica, alumina, and magnesia. Mr.
Schettig found sponge to consist of gelatine (which it gradually
becomes soluble in water), and a thin, brittle, membraneous substance, which
possessed the properties of coagulated albumen.

Uses.—The extensive economical uses of sponge are familiar to
everyone. To the surgeon it is of great value on account of its
porest, porosity, elasticity, and the facility with which it imbibes
water. Its use at surgical operations and for checking hemorrhage
is well known. It has also been applied to wounds and ulcers for
holding acrid discharges. The sponge-tent is usually made of
pressed sponge impregnated with wax (spongia cerata), and
is called prepared sponge (spongia preparata). It is prepared
by dipping sponge into melted wax, and compressing it between two
plates till the wax hardens. It was formerly much used for dilat-
sations and small openings, but it is seldom resorted to now.

Spongia Usta. Pulvis spongicæ usteæ, D. Calcined or burnt sponge.

1. Cut sponge into pieces, heat it to free it from little stones;
2. it in a closed iron vessel until it becomes black and friable, and
3. re it to powder, D.)—Preuss calcined 1000 parts of sponge:
ese, 343·848 parts were destroyed by heat. The residue con-
of carbon and siliceous insoluble matters, 327·0; chloride of
sodium, 112.08; sulphate of lime, 16,430; iodide of sodium bromide of magnesium, 7,570; carbonate of lime, 10,82; 473; protoxide of iron, 28,720; and phosphate of lime. 

Burnt sponge, if good, should evolve violet fumes or vapour when heated with sulphuric acid in a flask. It has been as a resolvent in bronchocele, scrofulous enlargement of the glands, &c. Its efficacy is referrible to iodine and bromine, and is now almost invariably substituted for it. — Dose, 5 j. to 3 gr., given in the form of electuary or lozenges (burnt sponge trochisci spongic ustae).

**CLASS 2. — POLYPHEMERA, Grant. — POLYPHEMUS ANIMALS.**

The polypipherous animals have received their name from the circumstance of their being called polypes. They consist of two parts, a fleshy portion and a fleshy portion. The skeleton is softer and more flexible, and less in their position relative parts. They are soft and flexible, or bony and solid. The fleshy portion may be, with the skeleton, either external or internal in origin to the fleshy tubes (polypes), each of an external orifice, is surrounded by tentacles.

The calcareous internal skeleton of *Corallium rubrum*, Lamarck (*Corallium rubrum*, Pallas; *Corallium tenebrosum*, Ellis), is the Red Coral of the shop. It consists of carbonate of lime principally as oxide of iron. Prepared Red Coral (Coral preparatum) was formerly used in medicine.

It presents no advantage over chalk. Its powder, obtained by leaching, is of no advantage over chalk. Its powder, obtained by leaching, is of no advantage over chalk. Its powder, obtained by leaching, is of no advantage over chalk. Its powder, obtained by leaching, is of no advantage over chalk. Its powder, obtained by leaching, is of no advantage over chalk. Its powder, obtained by leaching, is of no advantage over chalk. Its powder, obtained by leaching, is of no advantage over chalk.

**SUBDIVISION II. — RADIATA, Lamarck. — RADIATE ANIMALS.**

**Essential Characters.** — Nervous system distinct, composed of rudimentary ganglia; the filaments arranged circularly around the body (Cyclo-neura).

No officinal substance is obtained from the Radiata.

**SUBDIVISION III. — MOLLUSCA, Latreille. — MOLLUSCS OR SOFT ANIMALS.**

**MALACOZOA, Blainville. — CYCLO-GANGLIA, Grant.**

**Essential Characters.** — Inarticulated animals with a soft skin. Cerebral ganglia arranged circularly around the oesophagus.

**CLASS III. — CONCHIFERA, Lamarck. — CONCHIFERAN MOLLUSKS.**

**Essential Characteristics.** — A cephalous, aquatic mollusks, with a bivalve shell. Organs of respiration four pectinated laminae, the impregnation effected without the assistance of a second individual.
COMMON EDIBLE OYSTER.

OSTREA ED'ULIS Linn. L.—COMMON EDIBLE OYSTER.

(Teat, L.)

History.—Oysters were greatly admired by the Romans as a most cious article of food. Those of Britain were much esteemed; they were said to be inferior to those of Cyzicena (Pliny). 

Oology. Gen. Char.—Body compressed, more or less orbicular. es of the mantle thick, non-adherent or retractile, and provided a double row of short and tentacular filaments. The two pair ofital appendices triangular and elongated. A subcentral, bipar-muscle. Shell irregular, inequivalved, inequilateral, coarsely articulated. Left or inferior valve andent, largest, and deepest; its rim prolonged, by age, into a kind of keel. Right or upper valve less, more or less opiculiform. Hinge oral, toothless. Ligament what internal, short, inserted in a cardinal pit, growing with the 
it. The muscular impression unique and subcentral (Blain-

Char.—Values ovate-roundish or obovate; the upper one flat. felle of both valves, imbricated and undulated (Brandt). 

Brandt 4 has given an elaborate account of the anatomy of the t, to which I must refer the student interested in these details.

Fisheries. European and Indian seas. Our own coasts furnish some finest kinds. Those found at Purfleet are said to be the best.

Oyster Fisheries.—Oysters are caught by dredging. In order to prove their flavour and size they are laid on beds in creeks or shore, where they rapidly improve. Colchester and other ports of Essex are the nurseries or feeding grounds for the metro-

Description. — The official parts of oysters are the shells (testae). The hollow valves are preferred, as they contain more carbo of lime. When calcined, oyster shell yields a quicklime erily much esteemed as a lithontriptic.

Composition. — Oyster shells have been analysed by Buchholz and others, and by Rogers.—The flesh of the oyster has been ana by Pasquier.

Buchholz and Brandes's Analysis. | Pasquier's Analysis.
---|---
Oxalate of lime | Osazonium.
Sulphate of lime | Gelatine.
Camina | Mucus.
Euminous matter | Albumen.
Oyster Shells | Fibrine.
| Water.

100:5 | 100:9

---

The dietetical properties of oysters have been before not p. 69.

Testa Preparata, L.; Testa Ostreae Preparata; Oyster Shells. (Wash the Shells, first freed from impurities, with ing water; then prepare in the same manner as directed for chalk. — The mode of preparing chalk by elutriation has been described (see p. 596). After oyster shells have been washed, but crushed, they are dried and ground to an impalpable powervious to elutriation. In the shops the substance sold as oyster shells is in small conical masses. The principal use of prepared oyster shells is carbonate of lime, and they possess the same medicinal properties as chalk, already described (p. 597), and which is usually substituted for them.

Class IV.—Cephalopoda, Cuvier.—Cephalopod.

Essential Characters.—Body enclosed in a bag (mantine). Head protruded from the bag, crowned with articulated arms, furnished with cups or tentacles surrounding the mouth. Eyes two, sessile. Mouth with two mandibles. Hearts three. Senses separate.

Sepia officinalis, Linn.—Common Cuttle Fish.

The substance called *os sepia* or cuttle-fish bone is an oval or oblong bone (sometimes termed a shell) deposited in the mantle of the animal. The common species of *sepia* is *S. officinalis*, Linn.; but *S. elegans*, Blainville yields part of the cuttle-fish bone of the shops.

*Os sepia* has a cellular texture, and is so light as to float on water. It was collected in considerable quantities on the shore, and is collected for commercial use. It was analysed by John, who found the constituents to be as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbonate (with a trace of phosphate) of lime</td>
<td>80</td>
</tr>
<tr>
<td>Non-gelatinous animal matter, soluble in water with some common salt</td>
<td>7</td>
</tr>
<tr>
<td>Gelatinous membrane, not soluble in water</td>
<td>9</td>
</tr>
<tr>
<td>Water, with a trace of magnesia</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

Reduced to powder it is used as a dentifrice. It is employed for various purposes in the arts, as for polishing, for forming moulds for small silver articles, and as a pounce.

Subdivision IV.—Articulata, Cuvier.—Articulated Animals.

Essential Characters.—Skin annulated. Muscles attached to the surface of the skin. Nervous system of two cords extended along the surface of the body, with ganglionic enlargements at intervals (except the anterior ganglion (brain) placed over the oesophagus.

*Brandt and Ratschow, Med. Zoolog. ii. 399.*
THE BLOOD-SUCKING LEECHES.

CLASS V.—ANNULOSA, Macleay.—ANNULOSE ANIMALS.

Annelides seu Annelida.

ENTIAL CHARACTERS.—Body more or less elongated. Skin soft, segmented and annulated. Articulated members and wings absent. Blood red.

SANGUISUGA, Savigny.—THE BLOOD-SUCKING LEECHES.

Iatrobdella, Blainville.

HISTORY.—We have no accurate knowledge of the exact period in which leeches either became known to, or were employed by, man; this deficiency of information is not necessarily referrible to their discovery preceding the date of our historical documents. It is true, in the common version of our most ancient record, the Bible, a passage occurs, “The horse-leech hath two daughters, crying, e, give;” but critics are not agreed as to the correctness of this statement. The word “Olukheh,” or “Aluka,” here interpreted “horse-leech,” means, according to Bochart, destiny or fate, either of which was the subject, according to this writer, be substituted for that of horse-leech; the daughters alluded to being Eden and Hell. But Vulgate, Greek, and Lutheran translations, are all against his notion. Brandt has entered into a very elaborate discussion of the subject, from which it appears that, in Arabic, the term Aluka indicates a leech, while Aluk signifies fate; the latter being derived from Alaka, to attach or hang to, because every man’s fate is supposed to be appended to him, just as a leech affixes itself to the body; that from this it appears probable the word “Olukheh” of the Old Testament really refers to the leeches. Nay, I think there is some reason for suspecting that the Sanguisuga aegyptiaca is the species referred to. The leeches referred to by Herodotus are Bdella nilo-(Savigny).

But admitting that these animals were known at this early period, does not appear that they were employed in medicine: for Hippocrates makes no mention of them, though he notices other modes of using blood. Aristotle also is silent with regard to them. In the facts which Cælius Aurelianus has made from the writings of Herophilus, Herophilus, Heraclides, Asclepiades, and other ancient physicians, who lived between the time of Hippocrates and Aristotle, no mention is made of the employment of leeches; a salutary fact in favour of the opinion that they were not at this age in use. In fact, the founder of the Methodic sect, Themison, the first person in whose works we find mention of leeches being employed therapeutically. However, it does not follow that he was first who prescribed them, though our documentary evidence fails to trace back their use beyond his time.

* Prov. xxx. 15.
9 Med. Zoal. ii. 231.
5 Euterpe, Irv.
In the Latin and Greek languages, the animal has name from its sucking or drawing qualities. Thus the Greek \( \beta\delta\alpha\lambda\alpha \), from \( \beta\dot{\epsilon}\dot{\epsilon}λ\lambda\alpha \), to suck; the Romans \( \text{h\textipa{}}\text{i\textipa{}}\text{r\textipa{}}\text{u\textipa{}}\text{o\textipa{}} \), pr \( \text{hau\textipa{}}\text{r\textipa{}}\text{i\textipa{}}\text{r\textipa{}} \), to draw out; or \( \text{sang\textipa{}}\text{i\textipa{}}\text{s\textipa{}}\text{u\textipa{}}\text{g\textipa{}}\text{u\textipa{}} \), literally signify a sucker, from \( \text{sang\textipa{}}\text{u\textipa{}}\text{i\textipa{}}\text{s\textipa{}} \) and \( \text{sug\textipa{}}o \). It would appear, however, that one of these two Latin terms is the more modern; so speaking of elephants, says, “Cruciatum in potu maxime hausta hicride, quam sanguisugam vulgo cepisse a verto.”

ZOOLOGY. Gen. Char.—Jaws with two rows of pointed teeth, which are mutually inclined at an acute angle (Bran Body elongated. Back convex. Belly flat. Extrem what narrowed, furnished with disks or suckers; the extremity somewhat narrower than the posterior one. A ninety to a hundred. Eyes represented by ten black Mouth tri-radiate. Jaws cartilaginous, armed with numerous teeth. Anus small, placed on the dorsum of the last ring.

Cuvier included all leeches in the genus \( \text{Hirudo} \); but later naturalists found it necessary to arrange them in several genera. The leeches in medicine have been formed into a distinct genus, called by Blainville \( \text{bdella} \) (from \( \text{lurps} \) and \( \beta\dot{\epsilon}\dot{\epsilon}λ\lambda\alpha \), a leech), by Savigny, \( \text{Sanguisuga} \), classical term, so expressive of the blood-sucking properties of the have adopted. All leeches, it appears, are not provided with an organ perforating the skin of vertebrate animals. In consequence of the complaints addressed to the Préfet de Police, in 1822, that of the leech Paris some would not bite, while others caused painful and obstinate he consulted the Council de Salubrité, who deputed MM. Pelletier & fils, to inquire into the accuracy of the statements. One of the most investigation was, that the animal called in France \( \text{horse-leech} \), and been particularly charged with causing painful wounds, could not penetrate human skin, the teeth of the animal being quite blunt. The horse ferred to, the reporters declared to be \( \text{Hemopis sanguisurba} \), Savigny; ville says it was \( \text{Hemopis nigra} \).


Moquin-Tandon admits three varieties:—

a. Dorsal bands interrupted at intervals.

b. Dorsal bands reduced to blackish spots.

c. Dorsal bands united by transverse ones.

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+ Dict. des Scien. Nat. t. 47, art. Sanguisuga.
+ Journ. de Pharm. t. xi.
+ Monogr. de la Jeune. (Les Hirudo. p. 112.)
THE BLOOD-SUCKING LEECHES.

1. Sanguisuga medicinalis, Savigny. *Hirudo medicinalis*, Linn. 9. True English or Speckled Leech.—Back greenish or olive-green, with six rusty red longitudinal stripes, which are mostly little with black. Belly greenish yellow, spotted with black (Brandt). Spots very variable in size and number; in some cases they are but small; in others are so numerous as to form the almost prevailing tint of the belly, the intervening spaces appearing like greenish yellow. —Europe, especially the northern parts. A native of England, rare. Imported from Hamburg.

Several varieties of this leech have been described and figured. One of the most remarkable of these is the flesh-coloured medicinal leech (*Sanguisuga medica- lies carnea*) described by Guillem of Paris. The anterior half of its body is flesh-coloured; while the posterior half is of the usual colour. The spotted or ind leech is flesh-coloured with olive-green spots.

These are the only species employed in medicine in this country. Others have been described and figured by Brandt. The following short sketch of the anatomy of the medicinal leech is:

**The Cutaneous System** of the animal consists of a transparent epidermis which is thrown off from the body every four or five days) and the corium. The corium consists of condensed cellular tissue, composed, according to Brandt, of a series of globules impregnated with a pigment, varying in colour in different individuals, and which is the source of the colours presented by the surface of the animal.

It is asserted that the predominant or base colour is, in part at least, owing to the substance of the soil in which the animals are found. Dr. J. R. Johnson says, "A Baker, a man of some intelligence, residing in Glastonbury, and who for last twenty years has been in the habit of collecting large quantities of them for sale, informs me that at the Black River, near Glastonbury, they are found in the peat bog of that colour; at Cook's Corner, they are of a reddish brown; while at Auler Moor, where, from a deficiency of peat, penetrate the clay, they are yellow."

**The Muscular System** has been elaborately described by Brandt, but can only be comprehended without the aid of drawings. The muscles of the leech are arranged circularly, longitudinally, and obliquely; of these, the circular ones are the most external, and the longitudinal ones the most internal.

**The Digestive System** consists of a mouth, alimentary tube, anus, salivary glands, and liver. The mouth is placed in the middle of the oval or buccal plate; its shape is triradiate; —that is, of three equidistant lines or rays, a centre. Within it are three white sublenticular jaws (dentiferous alae or piercing), which in appearance are cartilaginous; but Brandt says consistency of a strong firm skin, including a muscular mass. On the free end, a sharp margin of each jaw are about sixty small, finely-pointed teeth. Esophagus is a muscular tube, and dilates as it approaches the stomach; at its termination it contracts into a small circular aperture, which opens into a sac of the last cell being the largest, and extending by the side of the intestine as far as the commencement of the rectum. Stomach consists of three coats,—a cellular, a muscular, and a mucous one.

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1 See Brandt and Ritzhaupt, *Med. Zool.*
3 *Treat. on the Med. Leech*, p. 42. 1816.
Its eleventh cell terminates by a funnel-shaped projection in the intestine, is about an inch in length; the orifice is a valve, and at its lower end: on either side of it, for the greater length, is one of the sacs for the last coils of the stomach; on its inner surface folds. It is divided into small and for the lower part of the latter being called The anus is not, as we might anticipate posterior disk, but on the dorsal surface, last ring. Salivary organs have been they consist of whitish granular mass around the esophagus, into which the common salivary duct opens. De Blainvil and Brandt, speak of a liver. It is a mass placed on the alimentary canal, opening into the stomach and intestine; the best mode of displaying the cells of this is to immerse a leech, fully gorged with a week in a saturated solution of sublimate.

The Vascular System consists of the pulsating vessels, giving off numerous ramifications; but without any heart, as so called. Two of these are placed in a third in the median line of the dorsal, and a fourth on the abdominal surface these vessels pulsate (Johnson). We know little about the manner in which they circulate. Brandt thinks that the lateral vessels must be arteries, on account of their very transverse and longitudinal fibres; the dorsal venous vessels he terms veins. Does the dorsal vessel correspond to the vena cavea, the abdominal vessel to the vena porta of animals? Grant, however, terms the vessel of the annelids an artery.

The Respiratory System consists of apertures (called stigmata or spiracles) in two rows on the abdominal surface, occurring at every fifth ring. They are little cavities lined by mucus membrane which have been called air sacs, pulmonary mucoys bags, cryptes, or lateral vesicles, containing usually a whitish fluid. They are placed on each side of the alimentary canal, in the spaces between the cecal sacs of the stomach, and are usually small organs of respiration. Brandt, however, asserts that the respiratory action is effected solely by the skin, and that these vesicles are, in fact, receptacles for mucus secreted by a neighbouring glandular apparatus, which has no appearance, and in form represents a folded intestine. This notion, he says, is not new, but was held by De Blainville and Johnson.

The Nervous System consists of two parts: one (which we may call the cerebro-spinal axis of the vertebrata) consists of a chain of ganglia (about twenty-three in number) occupying the mesial line of the abdomen, connected by a double nervous cord; the first ganglion (brain) is to the esophagus, and supplies the eyes and neighbouring muscles. It

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2. Outl. of Comp. Anat. 440.  
THE BLOOD-SUCKING LEECHES.

The nervous system is that lately discovered by Brandt, and may be regarded as a kind of sympathetic system. It consists of three ganglia (connected to the brain by filaments, and supplying the jaws), and a single nerve connected to them, and running along the abdominal surface of the stomach in the mesial line.

Of the External Senses three only have been recognized: feeling, which resides in the external surface of the body; taste, apparently indicated by the fondness of leeches for certain fluids (as blood, milk, &c.); and vision, effected by ten eyes (in the form of black spots) arranged in a crescent form at the anterior or cephalic extremity of the animal.

The Sexual System is double,—that is, each animal is androgynous, or possesses both male and female organs. There is, however, no power of self-impregnation (the contact of two individuals being requisite, each acting to the other in a double capacity of male and female). The Male Organs consist of several pairs of testicles, two vasa deferentia, two vesicula seminalis, two ejaculatory ducts, and a penis surrounded at its base by what some have termed a prostate gland. The penis projects from the abdominal surface at about one-third distant from the anterior extremity. The Female Organs consist of two ovaries, two oviducts (which subsequently unite into one) a hollow organ (uterus) which opens by a contracted aperture (vagina) externally, at about the twenty-ninth ring, or five rings below the penis.

That leeches are essentially oviparous admits of no doubt; and we have now an admirable account of their development by, Professor Weber*. It appears that soon after copulation an unusual activity pervades the ovaries, in consequence of which some ova (termed by Weber germs, by Carus yelke) are separated, and pass along the oviduct to the uterus, where they order to obtain the matter necessary for their development, and their coats. They here become invested with a serous-like membrane, on the le of which is produced (either by secretion from the uterine cavity or membrane itself) an albuminous whitish mucus, serving in part for theoment of the ova, and which is regarded as a kind of liquor amnii. Subly a glutinous fluid is deposited on the outside of the serous coat. When are expelled from the uterus, part of this fluid gives a coating to them, art is expelled before and after them. But this coat seems now distended vesicles, and has the frothy appearance of well-beaten white of egg, by the violent contraction of the uterus.

Animals usually deposit their ova (in their own native waters) in moist places on the shore, from May to the end of September. When expelled, they are somewhat cylindrical in form, and have a brownish ace. The frothy layer adheres very slightly; but after lying in the quarter of an hour, the outer surface becomes somewhat hardened, a kind of pellicle or fine skin. After some days a portion of this frothy is converted into a spongy tissue (spongy coat of the cocoon), covering

* Meckel's Archiv for 1828, p. 366.
the capsule of the ova (cocoon) wholly or partially. In this state the ovum has a brownish, fibrous appearance, a fine sponge, and varies somewhat in size and weight; its longest diameter being six to twelve lines, its shortest eight, and its weight from twenty to twenty-eight grains.

The ova or eggs, which have a spongy form, evince vital movements; and we perceive on each a funnel-like extension or web which appears to absorb the albumen of the cocoon. The ova or eggs, when not in the jelly, becomes somewhat elongated, and shortly it begins to develop on the exterior part of the aperture of the funnel being long where the mouth of the young leech is observed. The abdominal surface first, the dorsal last, to be developed. When the young leeches have attained a considerable size they pierce their

Diagram illustrative of the internal anatomy of the leech.

a, Brain.
b, Last ganglion.
c, Lateral or branchial vessels.
d, Folded mucous glands; each is connected by a duct to the air vessel.
e, Penis, the rounded enlarged base of which is supposed to contain the prostate gland.
f, Vesicle seminæ.
g, Vasa deferentia. 
h, Testicles.
i, Urethra.
j, Ovaries.

Diseases of Leeches.—Therapeutists find the duration of the life of leeches is easily determined; but judging from the slowness of their growth and the length of time full-grown leeches have been preserved, we may infer that they are long-lived animals. Dr. Johnson thinks that in their natural condition, the leeches, if they can always meet with an abundant supply of food, may live at least twenty years and are subject to several diseases, some of which are epidemic and very destructive kind. Although the study of the pathology of this animal is of considerable interest in a commercial and even scientific point of view, yet no practical or useful leech have hitherto been arrived at, regard to the prevention and treatment of the diseases of leeches. Dr. Johnson mentions three diseases common to this animal:—

1stly. An ulcer, seated in various parts of the body, but more generally on the side. It destroys life in a few days. 2dly. A rigidity and lassitude of one part, whilst another portion is studded with ulcers, and the putrid coagulated blood. 3dly. A flaccid appearance of the body, except the lips, which are hard, swollen, purple, and free
bloody. These diseases are particularly prevalent during the summer months. Brostat describes three epidemic disorders.

Collection and Commerce of Leeches.—Leeches may be caught with the hand, or by a kind of net (described by Derheims), or by the gatherers going into the ponds with naked feet, to which the leeches adhere; or by baits, especially the liver of animals. The two latter methods are objectionable,—one because it is not free from danger to the gatherers, and the other because it is apt to injure the health of the animal. An interesting and graphic account of the leech fishery at La Brenne, and of the miserable appearance of the fisherman who collects the leeches, by allowing them to attach themselves to his legs and feet, has been published in the Gazette des Hôpitaux. A translation of this paper is given in McCulloch’s Dictionary of Commerce.

All our leeches are imported from Hamburgh. The Hamburgh dealers draw their supplies from the Ukraine. “Having exhausted all the lakes of Siberia, Bohemia, and other more frequented parts of Europe, the buyers are now rolling gradually and implacably eastward, carrying death and desolation among the leeches in their course—swiping all before them, till now they have got as far as Pultava, the pools and swamps about which are yielding them great captures.”

Leeches are sometimes imported in bags, but more usually in small barrels, each holding about 2000, the head being made of stout canvas to admit the air. The best vessels for preserving these animals are unglazed brown pans or wooden tubs. The dealers have a notion (and possibly a correct one) that the leaden glazing is injurious. These pans should be very little more than half filled with soft water (pond, river, or rain water). This does not require changing so often as is commonly supposed. In very hot weather, or when the water has become bloody, or otherwise much discoloured, it should be changed every day or so; otherwise, in summer every four or five days or a week; in winter, once a month is believed, by large dealers, to be sufficient.

The consumption of leeches must be enormous. Some years ago it was stated that four principal dealers in London imported, on the average, 600,000 monthly, or 7,200,000 annually. Feé says, “it is estimated that 3,000,000 are annually consumed in Paris; and as the population of Paris is to that of the whole of France as one is to thirty-three, it follows that, independently of exportation, 100,000,000 are consumed annually, which is equivalent to three leeches annually for each person. Now, if we estimate the average price at fifty francs per thousand, we shall have the enormous sum of five millions of francs paid for this one article of our materia medica.”

Mode of Biting.—Having fixed on a suitable spot, the animal applies his oval disk, and firmly fixes it (at first, perhaps, by atmos-

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p Brodsky’s Archiv, Bd. v.
* Price, Treat. on Sanguinol.. p. 129. 1822.
Cours d’Hist. Nat. t. i. p. 21.
pheric pressure; then by intimate contact), so that the anterior forms an angle with the other portions of the body. The three tilaginous jaws bearing the sharp teeth are now stiffened and trudged through the tri-radiate mouth against the skin, which perforate, not at once, but gradually, by a saw-like motion. Johnson* says, “The jaws are carried from side to side in an oblique direction;” and adds, “their action may be seen by presenting to the leech a coagulum of blood, and when the leech is in the act of suction, cautiously removing it. For a few seconds it appears conscious of its removal, which presents a fair opportunity of observing the oscillatory movement of each piercer.” The wound is not produced instantaneously, for the gnawing pain continues for two or three minutes after the animal has commenced operations. Then, it appears that the leech saws the skin; hence the irritation and inflammation frequently produced around the orifices. The flow of blood is promoted by the suction of the animal, who swallows the fluid as fast as it is evolved. During the whole of the operation the jaws remain lodged in the skin. In proportion as the anterior cells of the stomach become filled, the blood passes into the posterior ones; and when the whole of this viscus is distended, the animal falls off. On examination it will be found that not a particle of blood has passed into the intestine.

Physiological Effects.—There are two classes of phenomena observed in all modes of drawing blood; one of which has been termed local, the other general. In phlebotomy and arteriotomy, the first is trifling, and of no therapeutic value; and we resort to these operations only as means of affecting the general system. On the other hand, we obtain topical effects, both powerful and useful, from cupping and leeching; hence these are termed local, while the former are denominated general blood-lettings. It must, however, be remembered, that constitutional or general effects are also frequently obtained from both cupping and leeching.

1. Constitutional or general effects of leeching are the same in kind as those caused by the loss of blood from other means. A moderate quantity of blood may be abstracted without any obvious effects on any of the functions; but, if the amount taken be increased, syncope results. The quantity necessary to produce this varies, however, considerably, and will depend on the mode of drawing it (whether rapidly, or otherwise); the position, constitution, and age of the patient; the nature of the disease; and many other circumstances not necessary to enumerate. It is well known that a small quantity will, if taken rapidly, and the patient be in the erect posture, cause this effect; whereas a considerably larger amount may be abstracted, if taken gradually, and the patient in the recumbent position, without giving rise to it. The usual explanation of this is, that when blood is drawn faster than the vessels can contract, the circulation is inter

*Treat, p. 112.
THE BLOOD-SUCKING LEECHES.

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rarily stopped, and fainting ensues. Several reasons, however, lead to doubt the sufficiency of this explanation. Leeching, then, as a slower mode of abstracting blood, is less likely to cause syncope than venesection, or even cupping. As the patient recovers from the fainting state, hysterical symptoms sometimes manifest themselves. Throbbing headache, and sleeplessness, are by no means uncommon consequences of loss of blood. In some cases I have seen febrile excitement, of several hours' duration, brought on by blood-letting.

Dr. Marshall Hall has directed attention to the disorder of the cerebral functions (marked by convulsions, delirium, or coma) caused by blood-letting. I may observe, that convulsive movements are by no means uncommon in syncope from general blood-letting, and I think are not always to be considered as denoting that the remedy has been used beyond the safe degree. I have on several occasions seen told by patients about to lose blood, that they are apt to faint and struggle when bled; and I have, in consequence, been requested to prevent them from injuring themselves. Delirium and coma are as frequently met with. Great depression of the vascular system, Howed by sudden dissolution, is another occasional effect of loss of blood.

As might be expected, an operation so powerfully affecting the vital functions cannot be passive in its influence over morbid action; the phenomena vary so much in different diseases, and even in the same disease under different circumstances, that it becomes extremely difficult to offer any general results. That loss of blood is sometimes beneficial, at other times hurtful, is well known. Its immediate beneficial effects are best seen in pneumonia and ophthalmia. First of these diseases the respiration sometimes becomes easier, the pain removed, while the blood is flowing; and from this time improvement progresses. In ophthalmia, the redness of the conjunctiva disappears during the syncope from blood-letting, and somehow returns with equal intensity. A tendency to hemorrhage has been thought by some experienced practitioners to be engendered by the application of leeches. Thus the return of the hemorrhages, the aggravation of menorrhagia, hemoptysis, and apoplexy, has been found to follow, and apparently to result from, the employment of leeches.

The effects of blood-letting are considerably influenced by disease. Every practitioner is acquainted with the fact, that in certain morbid conditions patients bear the loss of larger quantities of blood than in others. I need only mention apoplexy, inflammation of the serous membranes, peripneumony, and phrenitis, as examples of increased tolerance; while chlorosis and cholera may be cited as instances of

* For further details respecting the effects of loss of blood, see Dr. Clutterbuck On the proper Administ. of Blood-letting, 1840.
* On the Morb. and Curative Effects of Loss of Blood, 1830.
* See an illustrative case in the Lancet, vol. xi. p. 94.
* See the observations of Laennec and Sir James Clark, in Forbes's translation of Laennec's treat. on Dis. of the Chest, p. 195, 1827.
were satisfied that inflammation be present; for to occasion syncope, although the quantity of blood to endanger the safety of the patient. The trophop is much to be preferred in this respect; for, although both recommend bleeding to retention, the former places his patient in the recumbent posture. And here I cannot help the practice of ordering patients to be bled to syncope posture appears to me a highly dangerous one. Sometimes occur in the erect position, before a syncope has been drawn, we all know; and, to prevent it is frequently proper to bleed in the recumbent posture. I protest against bleeding patients to syncope in this way.

I have yet to notice another class of the general changes of blood, which may be denominated secondary and are of no way useful in the treatment of disease. Passive re-action occurs, attended with throbbing head, pain and disorder of the cerebral functions. They are seen in women who have suffered severely from hemorrhage. Exhaustion, with insufficient re-action, effect of loss of blood. In two cases of infants, I have noticed increasing after a leech. Other secondary or remote effects of blood-letting they consist principally in disorder of the sensorium by delirium, coma, or even amaurosis.

Having hitherto described the consequences of leeching, I must now refer more particularly to leeching, or general effects caused by the application of leeches. They are caused in children and delicate females, more or
powerful influence which a small quantity of blood produces in infants; and secondly, because one leech will cause the loss of more blood in them than in adults, owing to the greater vascularity of the anæmic system. It is apparent, therefore, that in the diseases of infants, leeching may, in most cases, be substituted for venesection. In disorders which are rapidly fatal, as croup, opening the jugular vein is undoubtedly to be preferred, since it is necessary to produce an immediate and powerful effect. As children advance in years they become capable of bearing larger evacuations of blood; and, therefore, leeching excites a less influential effect. It is quite impossible to say at what age venesection ought to be substituted, or, in infancy, what number of leeches should be applied; since they take away such unequal quantities of blood. These are points which must be decided by the practitioner in each case. Here is a tabular statement of the amount of blood which Dr. James Blundell has taken from children at different ages:—

<table>
<thead>
<tr>
<th>Ages</th>
<th>Quantities</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 months</td>
<td>1 oz. to 1½ oz.</td>
</tr>
<tr>
<td>4 months</td>
<td>1½ oz. to 2 oz.</td>
</tr>
<tr>
<td>8 months</td>
<td>2 oz. to 3 oz.</td>
</tr>
<tr>
<td>12 months</td>
<td>3 oz. to 4 oz.</td>
</tr>
<tr>
<td>18 months</td>
<td>4 oz. to 5 oz.</td>
</tr>
<tr>
<td>3 years</td>
<td>8 oz. to 10 oz.</td>
</tr>
<tr>
<td>6 years</td>
<td>10 oz. to 12 oz.</td>
</tr>
</tbody>
</table>

But the quantities are exceedingly large, and in most instances greater than it will be found prudent to abstract. Guersent says, that infants up to two years of age, we ought never to draw more than one or four ounces of blood in twenty-four hours.

The local effects of leeching must now be noticed. The jaws of a leech may be compared to three saws, each armed with sixty teeth. It is, therefore, not surprising that pain and aspersion of blood to the wounded part should be occasioned by the laceration of the skin by a single leech. I have sometimes seen one of these animals produce intense redness to the extent of an inch around the bite. This is observed when the skin is delicate, as that covering the ear of the female. Now when a number of these animals are used, their united local effects must have some influence over a morbid disease. There are also certain topical effects which consequently, such as ecchymosis; the irritation and inflammation of the mouth of the punctures; the diffused redness and the presence in the parts intervening between the bites, which cannot be but influence over morbid action. They act on the principle of counter-irritation. In taking into consideration the beneficial influence of leeches, we must, therefore, not forget these, nor the fomentes and poultices subsequently employed.

When leeches are applied to the temples, especially if they fix to the external canthus, a diffused swelling frequently arises.

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1 Lancet, Sep. 20, 1828, p. 773.
2 On the sensible effects of leeches on man, see Vitet, Traité de la Sange Méd. 1809.
similar to that caused by erysipelas. This is not manife
noxious qualities of the animal, for it happens when the least
most healthy are employed; nor to the teeth of the animal left
left within the wound, since I have often seen it when the tooth
fallen off spontaneously.

In concluding these remarks on the local effects of leeches, it
only to add, that independently of the local irritation caused
puncture, I believe the evacuation of blood from an
may be more beneficial than the same quantity taken by a
operation of venesection. In other words, I am disposed to
what were formerly termed the derivative effects of local leeches.
The amount of benefit obtained by the application of leeches to
parts that have been injured by falls, &c. as in fractures and
fractures, has frequently appeared to me much greater than could
be referred to the combined influence of the quantity of blood lost
the local irritation of the punctures; so, also, with respect to
the good effects of leeching hemorrhoidal tumors. Mr. Wardrop
more benefit is in some cases obtained by the application of leeches
at a distance from the affected organ, constituting what has
been termed a revulsive operation.

I trust the remarks now offered will be sufficient to prove,
estimating the therapeutic influence of leeches, the quantity of
blood drawn is not the only element in the calculation; and I think
practice, constant proof will be found that leeching is more benefi-
than can be accounted for by the mere quantity of blood drawn.

Uses.—The following are some of the uses of leeches:—

1. In children and delicate adults (as females and aged),
leeches often form an excellent substitute for general blood
where the object is not to occasion any immediate or sudden
on the disease. In children it is necessary to avoid applying
the neck, or other parts where compression cannot be con-
made.

2. In local determinations of blood, unattended with febrile
symptoms, local blood-letting, when it can be resorted to, is gen-
though not invariably, preferred to phlebotomy. The advantage
leeching over cupping are, the less pain, and the ease with
blood may be procured; for it is evident that in swelled tense
inflammation attending fractured limbs, and in acute inflamma-
the inflammatory gland, patients could not, in most cases, bear the
ary pressure of the cupping-glass; and in some parts of the
as the abdomen, blood can only be procured from cupping by
dexterous manipulation.

3. In internal and other inflammatory affections, acces-
with constitutional disorder, the rule is to employ gen-
ference to local blood-letting. But circumstances occa-
der the reverse practice justifiable and proper, as where the dis-
not active, and the patient delicate and weak. In many in-
it will be found most advantageous to combine both modes of
blood: for example, in abdominal inflammations, the applica-
tleeches, preceded by venesection, will sometimes do more go
quantity taken by the lancet alone. During the progress of
the determination of blood to the brain, the application of
the temples, after the use of blood-letting, is often attended
best effects.

are some diseases in which no substitute of equal efficacy
and for leeches. Such, I conceive, are hemorroidal tumors,
epulis of the rectum. In these cases general is not equal to
blood-letting, and cupping is out of the question.

Various organic diseases leeches will often be found an ex-
tremely useful palliative means. I would particularly mention as
affections of the heart and lungs.

Crampton recommends the application of leeches to the
surfaces; as to the conjunctiva in ophthalmia, to the tonsils
ache tonsillaris, and to the internal surface of the nostrils in
cin. The mode of applying a leech to the tonsils is as follows:
single thread of silk through the body of the leech, and make
ligature to the finger of the operator; then apply the leech to
it.

are few diseases in which loss of blood is required, where-
ing is positively objectionable; indeed, erysipelas is the only one
be named. Here it has been supposed that the local irrita-
ted by leeches would add to the severity of the malady; but
ve that even in this case the objections are more imaginary
al. There are, however, numerous instances in which leeche-
tively objectionable: in some the quantity of blood drawn by
imals is insufficient to make much impression on the disease,
cer of inflammation of robust persons; in others, where the
is very rapid and fatal, the effects of leeches are too slow, as
p. Venesection is the remedy in all these instances 4.

II. OF APPLYING LEECHES.—Let the part be well cleansed
imes it may be necessary to shave it): then dry the leeches, by
them in a clean linen cloth: place them in the lid of a pill-
and apply to the affected part. This is a preferable method to
ng them by the fingers, or in a wine-glass. A narrow tube
Leech-Glass) will be found useful when we wish to affix one
animals to the inside of the mouth, or any particular spot.
ral circumstances influence the fixing of leeches; as the con-
of the animal, whether healthy or otherwise; the nature and
ion of the part to which it is applied: thus, leeches will not
attach themselves to the soles of the feet, or the palms of the
or to the hairy parts—the presence of grease, vinegar, salt,
other substances, will prevent them from biting; whereas
angered water, and blood, are said to have the contrary effect.
ing the part has been advised to promote their attachment.
condition of the patient also affects the fixing of the animal.

In Hospital Reports, vol. iii. 1822.
more extended account of the uses of leeching, see Dr. R. Price, Treat. on the Utility of
Hem. 1822.
Derheims* says that leeches will not bite those under the influence of sulphur, on account of the evolution of sulphuretted hydrogen by the skin. The effluvia, or vapours of the room, as the fumes of tobacco, sulphur, vinegar, &c., will prevent them biting, or even cause them suddenly to fall off.

The quantity of blood a leech is capable of drawing varies considerably. I believe four drachms to be the maximum. On an average I do not think we ought to estimate it at more than one drachm and a half. Of course this has no reference to that lost after the animal has fallen off, and which varies according to the vascularity of the part; in children being oftentimes very considerable. When the leech has had sufficient it drops off; but it is said that if the tail be snipped, the animal will continue to bite, the blood passing out posteriorly as fast as it is taken in by the mouth. I have tried several, but they usually let go their hold the instant the tail is cut.

H. Cloquet† has made the same remark.

In order to disgorge the leech of the blood, the usual practice is to apply salt to its body; but it is objectionable (if you wish to preserve the animal), since the surface is frequently thereby blistered, and several days elapse ere the creature regains its former activity. Some advise squeezing the blood out by the mouth; others the application of diluted vinegar to the head. If no kind of emetic be employed, the blood remains for a considerable time in the stomach of the leech undigested, but without putrefying.

After-treatment.—When leeches have fallen off it is generally desirable to promote the sanguineous discharge. This is best done by the use of warm fomentations or cataplasms; or even, in some cases, by cupping-glasses. Great caution is necessary in the case of children. Some years since, the application of a leech was ordered to the chest of a child labouring under pneumonia; it was at the same time mentioned that the bleeding should be encouraged. The directions were literally fulfilled—the discharge of blood was assiduously promoted—until so large a quantity had been lost, that death was the result. No attempt was made to stop it, nor notice sent to the Dispensary, in the practice of which the case occurred. The child being illegitimate, and the mother evidently careless of its recovery, led some to suspect that this did not take place through ignorance. In another instance, two leeches were ordered for a child of about eighteen months, suffering with pneumonic inflammation, a consequence of measles. The following day the poor little creature was found in a fainting, or rather dying, state, with face and lips completely blanched. On inquiry it appeared the leech-bites were still bleeding, and no attempt had been made to stop the discharge. The mother thinking it would be beneficial, more especially as the pneumonic symptoms had considerably abated. As predicted, the sufferer died within twenty-four hours.

In some persons there appears to be an hereditary predisposition to hemorrhage, so that very slight wounds are attended with

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† Diet. de Médec., art. Sanguine, p. 93.
ven fatal effects. Mr. Wilson, quoted by Mr. Wardrop, has
the case of a child where one leech had nearly caused death,
serious hemorrhage. When about three or four years old,
bleen bit its tongue, and notwithstanding that every attempt was
to stop the discharge, death took place from the loss of blood.
been called to many cases of hemorrhage after leech-bites,
ever failed in stopping it by compression. Sometimes mere ex-
the air will be sufficient; or, if this fail, we may apply a
of lint and a bandage. In other instances this will not succeed.
apply compression, thus: roll a piece of lint into a fine
and introduce it into the bites by means of a needle or probe;
lay a compress and bandage. Sponge may be substituted
lint. Various other modes have been proposed; some, I
exceedingly cruel, since I do not believe them ever necessary.
e, now, to the application of a red-hot needle; and to passing
le through the orifice, and wrapping thread round, just as a
stops the discharge of blood from the vein of a horse. Some
absorbing powders, as gum arabic; or styptic washes, as a
ed solution of alum. One very effectual means is to apply a
lunar caustic scraped to a point, or powdered nitrate of silver.
les Bell, in one case, stitched up the wound.
scidents from Leeches in the Mucous Cavitities.—The
ists were very apprehensive of the ill consequences likely to
swallowing leeches. That their fears were not groundless
ed from the following circumstances, related by the celebrated
Larrey. When the French army entered upon the deserts
separate Egypt from Syria, the soldiers, pressed by thirst,
themselves on their faces, and drank greedily of the muddy
and which, unknown to them, contained leeches (Sanguisuga
cea), having the form of a horse-hair, and the length of a few
ely. Many of them felt immediately stings, or prickling pains,
posterior fauces, followed by frequent coughs, glairy spots,
tinged with blood, and a disposition to vomit, with a difficulty
allowing, laborious respiration, and sharp pains in the chest,
appetite and rest, attended with great uneasiness and agitation.
pressing down the tongue of the individual first attacked, a leech
scovered, which was with difficulty removed by the forceps,
or no hemorrhage followed, and the patient recovered. Those
ad attached themselves to the posterior fauces were removed
use of gargles composed of vinegar and salt water. The
of Brigade, Latour-Mauberg, commander of the 22d regi-
of chasseurs, swallowed two in the deserts of St. Makaire, a
journey from the Pyramids, which so much weakened him, that
valescence was long and difficult.
heims relates a case where a young man, who had leeches
his anus, was so unfortunate as to have one enter his
noticed. The animal made several punctures; and was

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not expelled until some hours after, when salt water injections were used. The wounds caused by the bites, however, did not heal for several months, during which time the patient suffered considerably, and constantly passed blood with the feces.

Whenever practicable, salt-water injections should be resorted to. In the following cases related by Derheim's, this practice could not be adopted. Two small leeches were applied to the gums of an infant during the period of dentition, and by the inattention of the nurse they fixed themselves at the back part of the mouth, and, becoming gorged with blood, caused great difficulty of respiration. The infant, by strongly closing the jaws, prevented the removal of the animals, who only ceased their hold when they were filled with blood. The hemorrhage continued for two hours.

Ill effects have resulted from swallowing leeches. A lady accidentally swallowed a leech she was applying to her gums. Acute cardialgia soon came on with a feeling of erosion, and creeping in the interior of the stomach; sometimes convulsive movements in the limbs and muscles of the face; frequency and irregularity of the pulse; universal agitation and paleness of the countenance. The physician who was called in, recollecting the fact ascertained by Bibiéna, that leeches could not live in wine, administered half a glass every quarter of an hour. The symptoms were soon alleviated; and the fourth dose caused vomiting, by which the dead leech was evacuated, with much glairy matter, mixed with clots of black blood. By a proper subsequent treatment the patient recovered in eight days.

**Class VI. INSECTA, Goldfuss.—INSECTS.**

**Essential Characters.** Articulated animals with six feet (hexapoda), one pair of antennae, a dorsal vessel for circulation, respiring by tracheae, and undergoing metamorphosis (being successively ovum, larva, pupa, and imago). Head distinct from the thorax.

**Order I. COLEOPTERA, Linnaeus.—BEETLES.**

**Essential Characters.** Four wings, of which the two upper or anterior (alata or wing cases) are horny or leathery, united down the back by a suture; lower or posterior wings folded longitudinally. Mandibles and jaws for mastication.

**Cantharidis vesicatòria, Latreille, L. E. D.—THE BLISTER BEETLE OR SPANISH FLY.**

Lytta vesicatoria, Fabricius.—Meloë vesicatorius, Linnaeus.

(The whole fly, E.)

**History.**—Hippocrates employed in medicine an insect which he calls (καβαθικός), whose effects were similar to those of our Cantharides vesicatoria. Hence it has been erroneously inferred by some that our blistering beetle is identical with that employed.
That this inference is incorrect is proved by the facts. In the first place, many beetles agree in their effects with those of Cantharis vesicatoria; secondly, the word merely signifies a small beetle or scarabaeus parvus; thirdly, Corizides and Pliny refer to several kinds of cantharides, that the most powerful are those with transverse yellow wings, and that those which are homogeneous in colour and inert. It is tolerably clear, therefore, that neither of the writers were acquainted with Cantharis vesicatoria.

Characters assigned to the ancient blistering insect agree with those of two species of Mylabris. Burmeister sug-

Mylabris Fusselini, a native of the south of Europe, was used by the ancients. Mylabris Cichorii is employed as a beetle at the present day in China and some parts of India, and may, perhaps, have been used by the Greeks and Romans.

Gen. Char.—Antennae elongate, simple, filiform. Maxillae with terminal joint somewhat ovate. Head large, heart-shaped. Thorax small, rather quadrate, narrower than the elytra, as long as the abdomen, soft, linear, the apex slightly gapped two, ample (J. F. Stephens).

—Bright glossy brass-green or bluish, glabrous; beneath, with a few hairs. Breast densely pubescent, finely granulated. Head and thorax with a longitudinal channel. Elytra slightly raised lines. Tarsi violaceous. Antennae black, basal joint brassy (J. F. Stephens).

Elongated, almost cylindrical. Length six to eleven lines, one to two lines. Colour brass or copper green. Odour agreeable. Body covered with whitish grey hairs, which are numerous on the thorax. Head large, subcordate, with a prominent furrow along its top. Eyes lateral, dark brown. Thorax not larger than the head, narrowed at the base. Elytra from four to six lines long, and from 3-4ths to 1½ lines broad; costa slightly margined. Wings ample, thin, membranous, veined, transparent, pale brown; tips folded. Legs stout, from four to six lines long, the hinder pair longer:

in the female all terminated by two small moveable claw-like pincers; in the male the two hinder pairs of extremities alone have this

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1 Lib. ii. cap. 65.
arrangement, the anterior ones having but one spur; last tarsi with a pair of bifid claws. Abdomen soft, broad; female. In the female, near the anus, are two articular appendages.

The internal organization has been elaborately studied and by Brandt. The Nervous System consists of a cerebro-spinal axis, a double and single sympathetic system. The cerebro-spinal axis consists of a nervous cord, and nine cephalic, one of which is thoracic, and four abdominal ganglia. The single sympathetic system consists of the brain by two branches at the ganglia frontale, single nerve proceeds along the nervous cord, two forming at its division, and gus to the stomach, where two, forming at its division, two, forming at its division, single nerve proceeds along the nervous cord, just described, two, forming at its division, and gus to the stomach, where two, forming at its division, single nerve proceeds along the nervous cord, just described, and is divided into two, forming at its division, single nerve proceeds along the nervous cord, just described, and is divided into two, forming at its division, and is divided into two, forming at its division.

The double sympathetic system consists of four ganglia placed on the side of the nervous cord, just described, and is divided into two, forming at its division.

The digestive system consists of a simple, sal vessel, which extends from the extremity of the abdominal system, to the heart, which opens into the trunk. The digestive system consists of a simple, sal vessel, which extends from the extremity of the abdominal system, to the heart, which opens into the trunk. The digestive system consists of a simple, sal vessel, which extends from the extremity of the abdominal system, to the heart, which opens into the trunk.

The biliary vessels consist of six filiform, convoluted tubes, which terminate in the duodenum. pylorus, and posteriorly at the intestine near the cecum. The testis of the male consists of a pair of spherical testicles, having externally a testicle shape; two vasa deferentia, which have a ringed appearance; a pair of tubes (seminal vesicles or epididymoid vessels), the functions of which are imperfectly known; a common spermatic duct, and a penis which has hooks or hooks at its extremity, and is enveloped by a sheath. The female consist of two large, hollow, egg-shaped ovaries, the cavities of which contain the calyces. On their external surface is an immense number of pyriform

Digestive Organs of the Cantharis vesicatoria.

a. The head, which supports the antennae, the eyes, a transverse clypeus, to which is united anteriorly the labium; on the sides of the latter are the mandibles and maxillary palpi.

b. The oesophagus.
c. The stomach.
d. The biliary vessels.
e. The small intestine.
f. The cecum.
g. The rectum.

The latter is transversely by bands formed by the circular coat. Between the small intestine is a valve (pylorus) of four small, floating, kidney-shaped muscles.

The small intestine forms two convolutions and then proceeds directly to terminate in the swollen extremity of the duodenum in the very short manner. The biliary vessels consist of six convoluted tubes, which terminate in the duodenum.

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Med. Zoöl.*
from each ovary or calyx arise an oviduct, and the two oviducts by their junction form the common oviduct, the lower portion of which is called the vagina. Into the common oviduct passes a tube from a vesicular bag, called spermatheca (vesicula copulatrix, Audouin), and also of other appendages (sebaceous glands, Audouin).

**Male Genital Organs of Cantharis vesicatoria.**

- Testicle.
- Vasa deferentia.
- a, c, e. The four pair of vesicular seminales, or epididymoid vessels.
- g. Portion of the intestinal tube inverted.
- h. Last abdominal ring.

must refer to Audouin’s paper for an amusing account of the amours of these males.

ab.—Europe. Originally, perhaps, a native of the southern, especially Italy and Spain. Now found in France, Germany, Hungary, Russia, Siberia, and England. With us they are rare. In summer of 1837 they were abundant in Essex and Suffolk.

They are found on species of Oleaceae (as the ash, privet, and lilac,) of Caprifoliaceae (as the elder and Lonicera).

**MODE OF CATCHING CANTHARIDAE.**—In the south of France these animals are caught during the month of May, either in the morning or evening, when they are less active, by spreading large cloths under trees, which are then strongly shaken, or beaten with long poles. The catchers usually cover their faces, and guard their hands by gloves. Various methods have been recommended for killing the insects; such as exposing them to the vapour of vinegar (the practice...
vation. Besides mites, they are subject to (Tinea flavifrontella) and two coleopterous insects (Corum and Hoplia furinosa.)

COMMERCE.—Cantharides are imported from St. Petersburg and other Russian ports in cases, each containing 160 or 170 lbs.; and in barrels or cases, holding each about 100 lbs., brought over towards the end of the year.

In 1889, duty (1s. per lb.) was paid on 16,379 lbs. from Russia, and 2.5 tons of cantharides from St. Petersburg.

The cantharides from St. Petersburgh are somewhat more copper-coloured and more esteemed. They are somewhat more copper-coloured than the best Russian or English varieties, which have a rather a brownish tinge.

Sir James Wylie states that they are very abundant in the northern provinces of Russia.

CHARACTERISTICS FOR MEDICO-LEGAL PURPOSES. Chemical tests for cantharides to be relied on. The effects of various reagents on tincture of cantharides are unimportant. Cantharides are rarely met with in a perfect form to enable us to recognise them by their physical characters. Their physical characters are much more important; and they may be distinguished from other powdered substances by immersing them in boiling water: the fatty acid rises to the surface, while the cantharides powder falls to the bottom. We recognise these particles in a body nine months old; and that they do not readily decompose, even when agitated among animal matters. Some other insects, however, have a bright green colour, but are without vesicating properties. There are many insects which vesiculate, but which have a yellowish green colour. The physical characters of the cantharides, together form tolerably certain...
The properties of the residuum may be determined by applying
the inside of the lip or to the arm. If the suspected matter con-
solid particles, these are to be digested in ether, and the con-
tined tincture applied to the inner surface of the lip.

Dr. Wrig has published an interesting fatal case of inflammation of
intestine canal and urinary organs. The symptoms simulated
caused by excessive doses of cantharides; but the moral and
evidence seemed to negative the suspicion that these insects had
taken.

ULTERATION AND GOODNESS.—The goodness or quality of can-
tles may be recognized by their odour, and freedom from other
its, especially mites. Sometimes the powder, but more com-
the plaster, is adulterated with powdered euphorbium. I have
informed, by persons well acquainted with the fact, that it is a
ion practice, amongst certain druggists, to mix one pound of
orium with fourteen pounds of powdered Spanish flies.

Composition.—Cantharides were analysed in 1803 by Thou-
"", in 1804 by Beauvill ; and in 1810 by Robiquet .

<table>
<thead>
<tr>
<th>Thouvenel's Analysis</th>
<th>Robiquet's Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extract</td>
<td>37-50</td>
</tr>
<tr>
<td>Alcoholic extract</td>
<td>19-42</td>
</tr>
<tr>
<td>Etherial extract</td>
<td>2-08</td>
</tr>
<tr>
<td>Residue</td>
<td>59-00</td>
</tr>
<tr>
<td>Total</td>
<td>100.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Beauvill's Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Matter insoluble in alcohol, but soluble in water</td>
</tr>
<tr>
<td>Matter soluble in water, alcohol, and ether</td>
</tr>
<tr>
<td>Oil soluble in alcohol and ether</td>
</tr>
<tr>
<td>Salicylic acid</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

CANTHARIDIN (Vesicatoria; Cantharides-Camphor).—Has been found in
larides vesicatoria, Lyttia vittata, Mylabris Cichorii, and other vesicat-
ing insects. Probably exists in all the blistering beetles. To procure it, con-
centrate the alcoholic tincture (prepared by percolation) and set aside: the cantha-
larides crystallizes. It is purified by washing with cold alcohol, and boiling
alcohol and animal charcoal. Its properties are as follows:—It crystallizes
from water. It is fusible, forming a yellow oil, which
stronger heat is vaporizable, forming white vapours: these subsequently
rise into acicular crystals of cantharadin. Dana regards it as an organic
substance, but without any just grounds; for it will not restore the blue colour of
paper reddened by an acid. Gmelin's opinion, that it is a solid volatile
substance, seems to be correct. When isolated, it is not soluble in water, but becomes
insoluble in the other constituents of cantharides; the yellow matter
being the principal agent in rendering it so. This, then, is the reason
why aqueous infusion of the insects contains cantharadin in solution. Cold
spirit, digested on cantharides, extracts cantharidin; which it can only do by action of some of the other principles of the flies. It is easily soluble in ether, oils (volatile and fixed), and hot spirit of wine; and from the latter it separates as the liquid cools. Concentrated boiling sulphuric acid dissolves cantharidin in a short time; when diluted with water it deposits small needle-like crystals of cantharidin. Boiling nitric and muriatic acids dissolve it without changing colour; the solutions, by cooling, deposit it. Cantharidin is dissolved by potash and soda; but when concentrated acetic acid is added to the solution, the cantharidin is precipitated. Ammonia is without action on it. According to Regnault, it consists of carbon, 61.68; hydrogen, 6.64; and oxygen, 32.28.

Robiquet thus describes the effects of cantharidin:—The 1/100th part of a grain, placed on a slip of paper and applied to the edge of the lower lip, caused in about a quarter of an hour, small blisters. A little crepe being applied served only to extend the action over a larger surface, and both lips were in consequence covered with blisters. Some atoms of cantharidin, dissolved in two or three drops of almond oil, were rubbed over a small piece of paper, and applied to the arm; in six hours a blister was formed, the size of the paper. The opening of cantharidin at a comparatively low temperature, and the action of its vapour on the conjunctival membrane, are shown by the accident which happened to one of Robiquet's pupils, who was watching its crystallization, and felt acute pain in the conjunctiva, which was followed by inflammation, accompanied with small phlyctene and loss of sight for several days. Robiquet, who was not near the liquid, suffered but slightly. I have suffered once in preparing this substance. I applied one drop of an etherial solution of impure cantharidin to the inside of the lower lip; but immediately afterwards, resuming of my temerity, I wiped it carefully off. In about an hour a blister had formed on the inside of the lip, and it was five or six days before the part had completely healed. Bretonneau, in his experiments on animals, has not found an marked aphrodisiac effect produced by cantharidin. He found that it renders the circulation slower, and caused fatal lethargy.

2. VOLATILE ODOROUS OIL.—Orfila asserts, that volatile odorous oil is one of the constituents of the insects. The distilled water of cantharides is strongly odorous and milky; and its vapour affects the eyes and kidneys like cantharides.

The active and odorous principles of cantharides reside principally in the sexual organs of the animals. Both Farines and Zier tell us, that the soft portions contain more active matter than the hard parts. It appears, also, that the posterior is much more acrid than the anterior portion of the body; and Zier says the insects are particularly rich in this active matter. If so, it is evident that we ought to prefer large female to male insects. It is a well-known fact, that the odor of these animals becomes much more powerful at the season of copulation than at other periods; and that persons sitting under the trees in which these insects are, at this season more particularly, are very apt to be attacked with opthalmia and ardor urinae.

Physiological Effects. a. On Animals.—The principal experiments on cantharides on animals (dogs) are those of Orfila" and Schubarth "a. It results from their investigations, that these insects cause violent inflammation in the parts to which they are applied, and an affection of the nervous system (spinal cord principally). Injected into the jugular vein, the oleaginous infusion caused nausea; introduced into the stomach, the oesophagus being tied, the tincture produced insensibility (Orfila). Inflammation of the inner coat of the bladder was observed when the poison had remained in the stomach for a few hours before death.

β. On Man.—The topical effects of cantharides are those of a most powerful astringent. When these insects are applied to the skin, the first effects noticed are, a sensation of heat accompanied by pain, redness, and slight swelling. These phenomena are soon followed by a serous effusion between the corium and epidermis, by which the latter is raised, forming what is commonly termed a blister, or, in the more precise language of the cutaneous pathologist, an ampulla or bulla. The effused liquid has a pale yellow colour, with a very feeble taste and smell. Two analyses of it have been made:

<table>
<thead>
<tr>
<th>Analysis by Dr. Bostock.</th>
<th>Analysis by Brandes and Reimann.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albumen</td>
<td>Albumen</td>
</tr>
<tr>
<td>Urea</td>
<td>Urea</td>
</tr>
<tr>
<td>Animal matter, with urate of ammonia, potash salts, carbonate, lactate,</td>
<td>0.26</td>
</tr>
<tr>
<td>Muriate and sulphate of soda</td>
<td>0.08</td>
</tr>
<tr>
<td>Water</td>
<td>Water</td>
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<tr>
<td>100.00</td>
<td>100.00</td>
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</tbody>
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If the cuticle be removed, the subjacent corium is seen intensely reddened, and, by exposure to the air, oftentimes becomes exceedingly painful. If irritants be applied, a secretion of pus takes place, and sometimes a whitish-looking false membrane is formed. Long-continued irritation occasionally causes tubercular granulations. Not unfrequently I have noticed eczematous pustules around the blistered surface; and in one remarkable case, which fell under my notice, the whole body, but more especially the pectoral region (to which the blister had been applied), was covered with them. Sometimes the vesicles of eczema occur. Ulceration and gangrene are not uncommon: the latter effect is occasionally observed after exanthematos diseases, especially measles. I have seen death result therefrom in two instances. The constitutional symptoms frequently produced are excitement of the vascular system (as denoted by the increased frequency of pulse, heat of skin, and furred tongue), and dilatation of the urinary and genital organs (marked by heat and pain passing the urine, which is usually high coloured, or there may be complete suppression). It not unfrequently happens, that the part to which a blister has been applied remains considerably darker coloured the surrounding skin. Rayer states, that the disappearance of discolorations is hastened by the use of sulphurous baths.

When swallowed, cantharides act topically on the gastro-intestinal tract; in poisonous quantities they excite inflammation of the mucous lining of the alimentary canal, with constriction and ulcer of swallowing, which is sometimes so great, that not a single fluid can be got into the stomach without the most pressible anguish; violent burning pain, nausea, vomiting, frequently bloody matters, sometimes with flakes like the inner lining the alimentary tube, and great tenderness to touch. These phenomena sufficiently indicate the gastric inflammation. Ptyalism is not uncommon occurrence. The enteritis symptoms are, abundant frequent evacuations, sometimes of blood, with horrible griping and burning pain, and exquisite sensibility of the abdomen.
The volatile odorous matter evolved by these insects is a local irritant; for it causes itching and even inflammation of the eyelids and conjunctiva, irritation of the air-passages, marked by epistaxis, convulsive sneezing, &c. If it be inhaled, as is done when persons under trees on which the animals are found, or by breathing the vapour of the decoction of cantharides, an affection of the urinary organs may be brought on. The same remote effects may also be excited by blisters, by handling the insects, by applying them to wounds, by swallowing them, or by injecting solutions of their active principle into the veins. We may classify the remote effects of cantharides into those observed in the urino-genital, the nervous, and the vascular systems.

aa. Action on the urino-genital system.—The pain in the loins, and the alteration in the quantity and quality of the urine, are the symptoms indicative of the inflamed condition of the kidneys. The burning pain and tenderness in the hypogastric region, and the constant desire to pass the urine, with the inability of doing so except drop by drop, are evidences of the vesical inflammation. The action on the genital organs in the male is proved by priapism, which is sometimes accompanied by satyriasis, sometimes not; and by the occasional inflammation and mortification of the external organs. In the female, the action on the sexual system is shown by the local heat and irritation, and by the occasional occurrence of abortion.

ββ. Action on the nervous system.—The affection of this system is proved by the pain in the head, disordered intellect, manifested in the form of furious or phrenitic delirium, convulsions of the tetanic kind, and subsequently coma. It is deserving of especial notice, that sometimes several days elapse before the nervous symptoms show themselves: thus, in a case related by Giulio, they appeared on the third day; in another instance, mentioned by Graaf, on the eighth; and in a case noticed by Dr. Ives, they were not observed until the fourteenth day.

γγ. Action on the vascular system.—The pulse becomes hard and frequent, the skin hot, and the respiration quickened; diaphoresis is occasionally observed.

The susceptibility to the influence of cantharides is by no means uniform. Werlhoff mentions the case of a lad who used to be attacked with priapism and involuntary emission by merely smelling the powder. Amoreux says, in one case a pinch of the powder caused death; while in another a spoonful occasioned only slight heat in the throat and ardor urinæ. Dr. Hosack has mentioned an instance in which a man took nearly six ounces of the tincture with the view of self-destruction, yet no dangerous symptoms followed. In contrast with this, I may instance a case that came within my own knowledge, where one ounce of the tincture produced serious symptoms. Orilha has seen twenty-four grains of the powder prove fatal.

1. Action in small or medicinal doses.—In very small quantities
are no obvious effects. If we increase the dose, a sensation of
sweat is felt in the throat, stomach, and respiratory passages, with
reased secretion from the alimentary tube. By continued use, a
ring or burning sensation is experienced in the urethra, with fre-
cent desire to pass the urine, which may or may not be altered in
ity and quantity. In some cases diuresis is observed, in others
in the latter the urine is generally higher coloured than usual.
asionally the sexual feelings are excited.
Action in larger doses: Subacute poisoning.—The symptoms are,
in the throat, stomach, intestines, and respiratory passages;
in the loins, burning sensation in the bladder, with frequent de-
to evacuate the urine, which is sometimes bloody, and passed with
ncy. Painful priapism, with or without satyriasis. Pulse more
ent, skin hot, and the respiration quickened: the nervous system
quently excited.
Action in still larger doses: Acute poisoning.—The symptoms ob-
ed are, in part, common to other irritable poisons; in part peculiar the vesicating insects. Violent burning pain in the stomach, with
isite sensibility and constant vomiting; extreme thirst, dryness,
etid odour of the mouth, and not unfrequently ptysialism. Burning
and spasmodic contraction of the bladder, giving rise to the
tracting agony. Notwithstanding the incessant desire to
urine, nothing but drops of blood are passed, and with great
The constriction of the throat and difficulty of deglutition are
distressing and alarming: the unfortunate sufferer is constantly
ented with violent gripings, purging, generally of blood, ex-
ted tenderness of the whole abdominal surface, faintings, giddiness,
tions, and an almost hydrophobic aversion to liquids, with
rnum terminating in coma.
The mode, and the immediate cause of death, are various: some-
s the nervous symptoms kill before gangrene makes its appear-
but more usually the patient dies from inflammation and sub-
ent mortification of the alimentary tube or of the genital organs.
Post-mortem appearances.—On opening the bodies of persons
ioned by cantharides, inflammation and its consequences have
observed in the alimentary tube, and the urinary and genital
ns. The cerebral vessels have been found in a congested state.
worth of notice that inflammation of the urino-genital organs
re likely to be met with in patients dying within a few days
poisoning.
uses.—Hippocrates used vesicating insects (under the name of
arides) internally; but the practice was subsequently regarded
angerous; and, so lately as the year 1698, the President of the
ge of Physicians committed Dr. Groenvelt to Newgate for
ng to employ them.
Local Uses.—Cantharides are frequently used as topical agents;
etimes as stimulants, sometimes as rubefacients, at other times as
ants.

Groenvelt, De tuto Cantharidum in Medicina Utr interno, 12mo. Lond. 1698; Greenfield,
see on Cantharides, transl. by Martin, 1700.
a. To stimulate topically.—Tincture of cantharides with water (in the proportion of three or four drachms of the tincture to a pint of water) has been employed to stimulate ulcers; more especially sinuses and fistulous sores. It is said, on the same principle that stimulant and irritant applications are made to the eye in ophthalmia; that is, to excite a new action, which shall supersede the old one. Mathew's once celebrated injection for fistula in ano is a wash of this kind. In alopecia or baldness, when this is not the result of old age, unguents of cantharides have been employed to promote the growth of hair. Powdered cantharides have been advised as an application to the parts bitten by rabid animals.

b. To produce rubefaction.—For this purpose the tincture may be mixed with soap or camphor liniment; or, when it is desirable to limit the effect to a particular spot, and especially if friction be objectionable, the common blistering plaster may be applied, allowing it to remain in contact with the part for an hour or two only. Rubefacient liniments are employed to excite the sensibility of the skin in numbness and paralysis; as also to promote local irritation in neuralgic and rheumatic pains. In the inflammatory affections of children it will be occasionally found useful to employ the plaster as a rubefacient merely.

g. To excite vesication.—A considerable number of substances (mineral, vegetable, and animal) cause vesication when applied to the skin. Horse-radish, mezerion, liquor ammonia, and acetic acid may be mentioned as examples. To these may be added heat, applied in the form of hot water or a hot metallic plate. For facility of application, certainty of effect, and slightness of pain, no agents are equal to cantharides, and these are now almost solely used.

It was formerly supposed that the efficacy of blisters was in proportion to the quantity of fluid discharged. But the truth is, that the therapeutic influence is in proportion to the local irritation, and has no more relation to the quantity of fluid discharged, than that the latter is frequently (not invariably) in the ratio of the former. Smith's axiom is, therefore, correct:—"Non suppuratio sed stimulus predict." As to the precise manner in which blisters, or, indeed, any remedy influence diseases, we are quite in the dark. We are accustomed to refer their operation to the principles of counter-irritation (see p. 146) I must refer those who feel interested in the question whether blisters ought to be applied in the neighbourhood of, or at a distance from, the affected part, to a paper by Barthez, in the Recueil de la Société Médicale de Paris. In this country we generally apply them next to the morbid part; to which practice Barthez assents, with some exceptions.

We employ blisters in inflammatory diseases, both acute and chronic; in the former, however, preceding their use by blood-letting. In chronic inflammatory disease we often employ what is termed perpetual blister—that is, the cuticle is removed, and the blister
with savine or cantharides ointment. This practice chronic diseases of the chest, of the joints, of the eyes, are sometimes useful in erysipelas; thus to localize the disposed to spread, and as a revulsive, applied to the las of the head. A blister to the perineum has found beneficial in gleet.

d safe to apply blisters to children immediately after diseases, sloughing being not an unfrequent result. d to produce in them counter-irritation, the best plan common blistering plaster, by mixing it with three st of soap cerate. I have seen this compound freed, but never observed any unpleasant results from it. sometimes adopted, is to apply a common blister, for only, so that it shall merely produce rubefaction.

es.—These will require examination under distincti to the particular object we have in view in employ-

specifically on the urinary organs.—In dropsy they have cite diuresis, though they frequently fail in producing diabetes, cantharides have been employed, but without . In paralysis of the bladder they are frequently useful, to marks of local irritation. Two opposite conditions ult of paralysis of this organ; namely, retention or urine. The latter condition is not unfrequently met , and is very likely to be relieved by cantharides. It that they are particularly serviceable in that species of ich occurs during sleep only; but I have seen them cure ng day, and fail in giving relief at night. The case hat of a boy, 14 years old, who had been subject to urine since his infancy. He was a robust lad, and o most perfect health. I put him under the influence reased doses of tincture of cantharides, and within as enabled to retain his urine by day, but it still passed night; and, though he continued the remedy for a e, no further benefit was obtained. In incontinence of urs after lingering labours, from the long-continued child's head, cantharides are sometimes serviceable. ust not be commenced until all the symptoms of local ibsided.

the organs of generation.—In consequence of the spec mmunicated by cantharides to the bladder, it has been e same influence might be extended to the uterus; isects have been employed as stimulating emmena cases with apparent benefit, but frequently without t. Abortion has occasionally happened from their have myself witnessed in one case.

are also employed as an aphrodisiac, both in man and horses, heifers, and asses). In man, if given in suf- affect the sexual feelings, it endangers the patient's the cases in which we are requested to administer
aphrodisiacs, will be found, on examination, to require more than pharmacological treatment. In discharges from the gans, beneficial effects are frequently obtained by the internal cantharides. In gleet it has been often found serviceable. Robertson explains their efficacy by saying, that they excite an inflammatory action on the urethra (shown by the discharge being thick, opaque, and puriform), which supersedes the previous one. I have frequently found equal parts of tincture of iron and tincture of cantharides a successful combination in standing gonorrheas. The dose is twenty drops at the commencement.

γ. In chronic skin diseases.—Pliny states that cantharides (bris) were employed in a disease which he terms lichen. At the present time, tincture of cantharides is not unfrequently employed in psoriasis, and eczema. Having found other remedies very successful in lepra and psoriasis, I have rarely had occasion to try cantharides, but Rayer says, "Of all the energetic and dangerous remedies which have been used in lepra, the tincture of cantharides is, perhaps, that has the most remarkable influence over the disease. The objection to its employment is its liability to excite inflammation of the digestive organs and urinary passages, especially among children, which necessitates the immediate suspension, and occasionally a total abandonment, of the medicine." Biett has found it successful in chronic eczema, as well as in the scaly diseases.

δ. In diseases of the nervous system, cantharides were at one time in great repute. The cases in which they were employed were phobia, epilepsy, chorea, tetanus, and mania. Experience has shown that they deserve little attention in any of these complaints.

ε. In obstinate sores, Mr. Robertson recommends cantharides under the same principle that he uses them in gleet.

Administration.—Powdered cantharides are not frequently employed internally. The dose is one or two grains in the dose. The tincture is the safest preparation, and should, therefore, be preferred.

Antidote.—In poisoning by cantharides, remove the chief symptoms speedily as possible from the stomach. In sickness however, the emetic, by the stomach-pump, emetic, or the astringent on the throat (see treatment of poisoning by Opium), the vomiting by mucilaginous and albuminous substances, liquids, as linseed-tea, milk, white of egg, with water, of the chemical antidote is known. Oil was at one time thought an excellent remedy; but since the discovery of its being a solvent for cantharidin, suspicion has been entertained that it is capable of increasing, rather than decreasing, the patient's danger. This theory was finally broached, I believe, by Paley, and not supported by experience. Orfila found that cantharides

* Pract. Treat. on the Powers of Cantharides, 1806.
† Diseases of the Skin, translated by Dr. R. Willis.
and afterwards given to dogs, killed them in a few minutes; as Dr. Prieston says, "The case mentioned in the Genoa Memoirs was exasperated by the use of oil." I confess, however, that the experience required to determine the hurtful consequences of employing oil; for, as the editors of the "Dictionnaire de Réflexes" very properly observe, on the same principles that the Cantharides, blood-letting, both local, opium, and the warm-bath, must be prepared by active means and cutaneous ones, and at one time highly esteemed for counteracting the effects of (see p. 1157). Oleaginous and mucilaginous injections in J. Cantharidis. (Epispasticum), L. Acetum Cantharidis, E. Episprasticum of Cantharides. (Cantharides, rubbed to powder, Acid, Oj. Macerate the Cantharides with the acid for occasionally shaking. Lastly, express and strain, L. esses, in powder, 5iij.; Acetic Acid, 5v.; Pyroligneous Acid, torbium, in coarse powder, 5ss. Mix the acids, add the macerate for seven days, strain and express strongly, and obtain a solution, E.) Not fitted for internal employment. Applied as a convenient and prompt vesicant. In the formula of College, eight times as much cantharides are employed as in the urine.

Dra Cantharidis, L. E. D.—Tinctura Lytica. Tincture of Lythrum. (Cantharides, in powder, 5iv. [5iij. D.]; Proof Spirit. 2. Oiss. wine measure, D.) Macerate for fourteen [seven, 4, strain and express strongly the residuum, E.] and filter. Acetum may be obtained much more conveniently and expeditiously, provided the cantharides be reduced to coarse powder left with a little of the spirit in the state of pulp for twelve hours the process of percolation is commenced, E.) It is to be noted that the strength of this preparation is not uniform in the older Pharmacopoeias.—Dose nix., gradually increased to 5ij. or 5vj. with care must be taken that the bladder must be carefully watched. It should be used as a demulcent liquid, as barley-water or linseed tea. It is employed externally as a rubefacient.

Im Cantharidis, L. Unguentum Cantharidis, E. Cera des. (Cantharides, in very fine powder, 5j.; Spermaceti, Ointment, E.) 5vj. [5vj. E.] Add the cantharides to, softened by heat, and mix.)—This preparation is not indicated with the next one, than which it is more irritant. The two are the same. From the greater activity of the cerate or the absorption of the active principle of the cantharides apprehended. When this occurs the bladder becomes inflamed, in severe cases, inflammation of the absorbents, and fever, d.

85
4. UNGUENTUM INFUSII CANTHARIDIS, E. Unguentum Cantharidis.

D. Ointment of Cantharides.—(Cantharides, in very fine powder, 3
Distilled Water, 4; Resinous Cerate, 4. Boil the water with the
Cantharides down to one half, and strain. Mix the cerate with the
strained liquor, then evaporate the mixture to a proper consistence.
L. D.—"Cantharides, in moderately fine powder, Resin, and Bee
Wax, of each, 3; Venice Turpentine and Azoinge, of each, 3;
Boiling Water, 4. Infuse the Cantharides in the water for one
hour, squeeze strongly, and filter the expressed liquid. Add the wax
and boil till the water is dispersed. Then add the wax and rem-
der, when these have become liquid, remove the vessel from the fire
and add the turpentine, and mix the whole thoroughly." E.)—A milder
than the preceding. Used to excite a perceptible discharge from
blistered surfaces, and to stimulate issues and indolent ulcers.

5. EMPLASTRUM CANTHARIDIS, L. E. D.; Emplastraum Lydt.

Plaster of Cantharides; Blistering Plaster. (Cantharides, in very
fine powder, lb. 3.; Plaster of Wax, lb. 4.; Lard, lb. 8. L—Can-
tharides, in very fine powder; Resin; Bees’ Wax, and Suet, of each
3 lb. E.—Cantharides, in very fine powder; Yellow Wax, of each
lb. 3.; Yellow Resin, giv.; Mutton Suet; Hog’s Lard, of each lb. 8.
L—Liquefy the fats, remove from the heat, sprinkle in the cantharides
in very fine powder, and stir briskly, as the mixture concretes on cook-
ing;" E.)—Dishonest druggists sometimes omit a portion of the can-
tharides here ordered, and substitute powdered euphorbium. In mak-
ing blistering plasters, care must be taken not to add the cantharides
while the melted lard is quite hot, as the heat greatly injures the ves-
iculating power of the insect. For a similar reason the plaster should
be spread by the thumb, a heated spatula being objectionable. To
prevent the blister moving after its application to the skin, its mar-
gin should be covered with adhesive plaster. In order to guard
against any affection of the urinary organs, place a piece of thin
book-muslin or silver (tissue) paper between the plaster and the skin.
The efficacy of the blister depends on the fatty matter dissolving the
cantharidin and transuding through the muslin or paper. Some re-
commend the paper to be soaked in oil, which is supposed to dissolve
the cantharidin. Now oil, not being miscible with the blood, is not
readily absorbed; and hence, it is supposed, arises its protective influ-
ence. The usual time requisite for a blistering plaster to remain in
contact with the skin is twelve hours; the vesicle is then to be
left at its most depending part, and dressed with spermaceti oint-
ment. When the irritation caused by these plasters is excessive, it is some-
times necessary to substitute a poultice for the ointment.

When we wish to make a perpetual blister, the cerate of cantharides is employed
as a dressing; or if we wish to excite less irritation, and prevent the possibility of the urinary organs being affected, the cerate of

The danger of applying blisters to children after exanthemata
diseases, especially measles, has been already noticed (see p. 385
and 1845).
3. Emplastrum Cantharidis Compositum, E.; Compound Plaster Cantharides. (Venice Turpentine, $\frac{3}{4}$voss.; Burgundy Pitch, and Cantharides, of each $\frac{3}{16}$; Bees' Wax, $\frac{3}{7}$; Verdigris, $\frac{3}{8}$voss.; White Mustard Seed and Black Pepper, of each $\frac{3}{16}$. Liquefy the wax and Burgundy pitch, add the turpentine, and, while the mixture is hot,inkle into it the remaining articles previously in fine powder, and mix together. Stir the whole briskly, as it concretes in cooling, $E$.)

"This is supposed to be a most infallible blistering plaster. It tainly contains a sufficient variety of stimulating ingredients."

4. Emplastrum Calefaciens, D.; Warming Plaster. (Plaster of Cantharides, one part; Burgundy Pitch, seven parts. Melt them with medium heat; mix well and make a plaster.)—Stimulant, rubefacient, and, in some cases, vesicant. Used in catarrh, local pains, &c.

5. Pannus Vesicatorius; Blistering Cloth; Taffetas Vesicant. Mix the most powder of cantharides in sulphuric ether. Let the ethereal extract be submitted to distillation, and the residue evaporated, by means of a salt water bath, until ebullition ceases. The oily mass remains is to be melted with twice its weight of wax, and spread cloth prepared with waxed plaster, Henry and Guibourt.)—Emended as a substitute for the ordinary blistering plaster, than which a more convenient and elegant preparation is Tela Vesicatoria or Blistering Tissue, and Charta Vesicatoria, or Blistering paper, are analogous preparations.

Papier épipastique or Epispastic Paper of Henry and Guibourt prepared as follows:—Take of white wax 8 parts, spermaceti 3, olive oil 4 parts, turpentine 1 part, powder of cantharides 1 part, later 10 parts. Boil slowly for two hours, constantly stirring it, the fatty mixture through a woollen cloth, without expression, spread on paper.

**OTHER COLEOPTEROUS VESICANTS.**

Europe, the ordinary vesicating insect is the Cantharis vesicatoria; but in other parts of the world other blistering insects are employed. Thus, Cantharidae, or the Potatoe-fly, C. atrata, marginata, and cinerea, are used in North America. In the Brazilia, C. atomaria has been employed. C. ruficeps, a native of Yucatán and Java, is said to possess extraordinary blistering properties. C. Lytta carolina, (Pfaff), is a native of Guinea and the East Indies. C. violacea (Haller, Buchner), a native of the East Indies. In Arabia, C. syriaca (Sennett), is said by Förskal to be employed. Mylabris Cicchii is used in and some parts of the East Indies. Meloe proscarabaeus is an indigenous insect which has in two instances caused death. M. majalis or true possesses similar properties.
Order II.—HEMIPTERA, Linnaeus.

Essential Characters.—Two wings covered by elytra. Mouth formation; the rostrum composed of a tubular articulated sheath, with scaly setae in place of mandibles and jaws. Elytra in some cases the posterior extremity membranous; in others almost similar, more extended, thicker, and coloured (Stark). 1

COC'CUS CACTI, Linn. L. E. D.—COCHINEAL INSECTS

(Cocci, L.—The entire insects, E.)

History.—The Spaniards, on their first arrival in Mexico, in the year 1518, saw the cochineal employed (as it appears to have been done long before) by the native inhabitants of that country in colouring some parts of their habitations, ornaments, &c. 2

Zoology. Gen. Char.—Tarsi with one joint, and terminal single hook. Male destitute of a rostrum, with two wings extending horizontally; abdomen terminated by two setae. Female apterous, furnished with a rostrum. Antennae of eleven joints and setaceous.

Sp. Char.—Male very small, antennae shorter than the body, elongated, of a deep red, terminate; wings white, crossed above the abdomen. Female nearly twice as large as the male, bluish red, covered with a white bloom. Antennae short; body flattened, convex; feet short.

Wings of the male beautifully variegated with violet, scarlet, and white. The females fix the eggs firmly on the plant, which serves as a habitation, and never anaede; here they couple, and the males are considerably in size. Each female produces several thousand eggs, which are placed at the extremity of the stem and pass under the belly to be hatched. Death then ensues; the body of the mother dries up; its exuviae become flat, and form a shell or cocoon, in which the insect is inclosed, and from whence it emerges. The female only is of commercial value.

Fig. 333.

Cochineal Insects (male and female).

a. Male, with the wings expanded.
b. Adult female (natural size).
c. Adult female (magnified).
d. Impregnated female (natural size).

cocinelds soon proceed.

Hab.—Mexico.

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2 Bancroft, Explores. Researches, vol. i. p. 413; and Beckmann, Hist. of Insects vol.
The cochineal insects feed on the Nopal (Opuntia cochinillifera). Mr. Ward says, the plantations are confined to the district of La Mistaeca, in the state of Oaxaca, in Mexico. The animals are domesticated and reared with the greatest care. Plantations of these are cultivated for the nourishment of the insects. Here the impregnated females are this operation being denominated sowing. Young ones are sowed; and some months afterwards, when the females are fecundated and enlarged, the harvest commences. They are brushed off with a squirrel’s tail, and killed by immersion in hot water, and afterwards drying them in the sun, or in a stove.

Harvests are made annually; the first being the best, since impregnated females alone are taken; in the second the young are collected; and in the third both old and young skins, are collected indiscriminately. Before the rainy season commences, branches of the nopal plant, loaded with infants, are cut off and preserved in the houses of the Mexicans, to make the animals being destroyed by the weather.

In 1839, the quantity of cochineal on which duty (18 per cent.) was paid, was 489,997 lbs. In 1838, it was only 84,490 lbs. It is said that, on the average, one pound of cochineal contains from 400 to 500 dried insects.

Cochineal (coecus; coccinella) consists of the dried insects, which are about one or two lines long, wrinkled, of an orange, convex on one side and flat or somewhat hollow on the other. They are inodorous, have a bitterish warm taste, tinge violet red, and yield a dark red powder. In burning, they have an animal odour, and leave a greyish white ash. By infusion they swell up, show their ringed character, and even their red colour. Both the Hondurans and Verrazanos are distinguished into the silver and black varieties. Spanish cochineal (cochinilla jaspeada of the Spaniards) has a purplish red; but in all the furrows and depressions we observe a white powder, which, examined by the aid of a lens, appears like Black cochineal (cochinilla renigrida or grana nigra of the Spaniards) is reddish or purplish black, and devoid or nearly so of the white.
the silvery character. *Granilla* (*cochinilla syloestré or grana*) consists of very small cochineal insects, and smaller, wrinkled or ovate masses, (cocones and new-born insects?) some fragments of the cochineal insect. An extensive system of adulterating cochineal by a house in London was discovered a few years ago. The article was moistened with gum-water, and then agitated in leathern-bag, first with powdered sulphate of baryta, then or ivory-black, to give it the appearance of black cochineal. means the specific gravity of the cochineal was increased to 1.85, and 12 per cent. of worthless heavy spar sold at the cochineal. Powdered talc and carbonate of lead have been give the silvery appearance. But a lens will readily detect these powders from the real wool which gives the true character.

**Composition.**—Two analyses of cochineal have been made by John *, the other by Pelletier and Caventou ?. The chemists found the constituents to be *carmine, peculiar animal fatty matter, (composed of stearine, olein, and an odorous acid), salts, (viz. phosphate and carbonate of lime, chloride of potassium phosphate of potash, and a salt of potash, containing an ox acid).*

**Cochenillin (Carmine).**—Obtained by digesting cochineal in ether, to extract the fatty matter, and then in alcohol, which dissolves the carmine. This seeping matter is a brilliant purplish red substance, with a granular or crystal appearance; unalterable in the air, easily soluble in water and alcohol, but insoluble in ether. It fuses at 112°, F. Chlorine renders it yellow. Acids change its colour. The concentrated mineral acids decompose it. Alkalis render the water solution of carmine violet. Lime-water forms a violet precipitate with it. The affinity of hydrate of alumina for it is most remarkable: the compound formed by their union is called a *lake*.

The pigment sold in the shops as carmine, and which is one of the most valuable colours employed by the painter in water-colours, is a compound which cochenillin is one of the constituents. Pelletier and Caventou regard it as consisting of cochenillin, animal matter, and an acid. Some mystery is attached to the manufacture of it. A fine clear day seems essential to the formation of a pigment of the most esteemed quality.

**Physiological Effects and Uses.**—Diuretic, diaphoretic, spasmodyic, and anodyne qualities, have been assigned to cochineal, but without the least evidence of their existence. A mixture of carbonate of potash and cochineal is a popular remedy for hooping-cough. The only real value of cochineal is as a colouring matter, and as such is used both in powder and solution. In the arts it is extensively employed in dyeing scarlet and crimson, and in the manufacture of *dye* and *lake*.

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* See *Granilla, in Bancroft's Exp. Research*, vol. i. p. 433.
* Urs, *Dict. of Arts and Manufactures*, p. 294-4.
THE HONEY BEE.

ORDER III.—HYMENOPTERA, LINNAEUS.

1. Characters.—Four naked veined wings of unequal size. Mouth of jaws, mandibles, and two lips. Lip tubular at its base, terminated in either doubled or folded in, and forming a kind of succer. Females pound ovipositor or sting at the anus (Stark).

LLIFICA, LINN. L. E. D.—THE HIVE BEE OR HONEY BEE.

&c floribus decorticus et ab Ape preparatus, L.—Saccharine secretion, E.—Mel. D. secretum ab ape paratum; Cera alba; Idem dealbatum, L.—Cera alba; Waxy secretion; Cera alba; Bleached Bees’ Wax, E.—Cera alba; Cera flavo, D.)

L. Gen. Char.—Labium filiform, composing with the jaws proboscis, geniculate and bent downwards. First joint of tarsi large, compressed. No spines at the extremity of two legs. Upper wings with one radial and three cubital (Stark).

—Blackish. Abdomen of the same colour, with a transverse band, formed by the down at the base of the third and segment (Stark).

The honey bee lives in societies, called swarms, consisting of from thirty thousand individuals. Each swarm is composed of ses of individuals—viz. a female, males, and neuters. The called the queen bee, is narrower and longer than the others, termed drones, are smaller than the females, and are de- wings. In each hive there are from 800 to 1000 drones. autumn, when they can be of no further use, they are de- the neuters. The neuters are termed working bees, and for the most numerous, since in each hive there are from thirty thousand. They are in reality females, whose ovaries developed, in consequence, as some have supposed, of the aliment with which they are supplied while in the larva.

Estive system of the animal consists of highly developed salivary mucificating with the proboscis, of an esophagus (which enlarges at one the crop, sucking stomach or honey bag), a proper stomach, small and es, and biliary vessels. The latter open into the alimentary canal behind the stomach. This sexual system, in the male, consists of testicles, each having a vas deferens, which terminates in a vesicula seminalis the conjoined extremities of the vesicula proceed a common duct in a penis. The female genital organs consist of two ovaries made up each containing about twelve ova; the two oviducts from these ovaries in vagina, into which also opens a duct from a roundish vesicle. The paratus is found in the females and neuters only. It consists of two setal secreting organs, opening into a pyriform receptacle, from which it passes to the sting, which consists of two portions placed side by side, the extremity and contained in a sheath. The poison is said to be hot to the taste. The consequences produced by the sting of a bee are
a. HONE Y PRODUCTION.—Honey (mei) is secreted by the nectariferous glands of flowers, and is collected by the bees, who take it up by suction or lapping, and portion of the oesophagus denominated crop, sucking bag; beyond which, we presume, the honey does never been found in the true stomach. When the hive, the honey is disgorged by a kind of motion, and is probably somewhat altered in its secretions of the crop. It is used by the animal.

PHYSICAL PROPERTIES.—Honey varies in its properties according to the age of the bees and the flowers fed. A hive which has never swarmed is considered the best, which is, therefore, called virgin honey. In other instances, the honey is said to be good for the labiate flowers on which the animals feed; to imitate rosemary is sometimes added to the honey obtained from these places.

PURITY.—Flour, it is said, is now and then mixed with other substances to resemble in its insolubility in water. The London College directs that honey,—

Is not to be employed without being despumated. Dissolve potassium and acid being added, it does not become of a bl

CHEMICAL PROPERTIES.—The constituents of honey include sugar, according to the food of the bees, the season, and the age of the animals, the mode of extracting it from the comb, and other conditions. However, it is always regarded at all times as a concentrate mixed with odorous, colouring, gummy, and waxy substances.
PHYSIOLOGICAL EFFECTS.—Honey is emollient, demulcent, nutritive, and laxative. When fresh it is apt to occasion indigestion and ic. Collected from poisonous plants it has been found to possess eterious qualities. The honey of Trebizond has long been noted for its deleterious qualities. Mr. Abbott says it causes intense headache, vomiting, and a condition like that of a tipsy man. Larger dose produces deprivation of all sense and power for some hours afterwards. These effects agree with those assigned to this honey by Xenophon in his account of the ‘Retreat of the Ten Thou-
d.’ Pliny also speaks of this poisonous honey. Tournefort describes its venomous properties to the bees feeding on the Azalea tica. Many other instances of poisonous honey are on record.

Uses.—Mixed with flour, and spread on linen or leather, it is a useful application to promote the maturation of small abscesses and ulcers. It sometimes forms a constituent of gargles, partly on account of its taste, partly for its emollient properties. It is also used as a vehicle for the application of other powerful agents to the mouth and throat, especially in children. It is occasionally employed as an emollient and demulcent in inflammatory affections. In scabrous coughs, barley-water, mixed with honey, and sharpened in slices of lemon, and taken warm, forms a very agreeable and full demulcent to allay troublesome coughs.

1. MEL DESPUMATUM, D.; Clarified Honey. (Melt the honey in a pan, bath, and remove the scum.)—The object of this process is to remove honey of certain impurities which render it apt to ferment; the flavour and odour of the honey is somewhat injured by the operation.

2. OXYMEL. See p. 404.

3. WAX. SECRETION OF BEES’ WAX.—Bees’ Wax (cera) was at one time supposed to be merely the pollen of plants elaborated by the bees. Bonnet, however, so early as 1768, asserted it to be a secretion on the ventral scales. Hunter and Huber have subsequently proved the correctness of this assertion. The latter writer, indeed, asserted that the pollen is not at all essential to the production of wax, the bees feeding on honey and water equally secreted it, and formed the wax. With this wax they construct the comb (fava), cells (alveoli) of which are hexagonal with angular bottoms. A substance called Propolis is collected by the bees from the buds of trees. It is of a resinous nature, and is used for lining the cells of a new comb, stopping crevices, &c.
Other animals secrete wax. Thus the larva of the Cicada limbata or white wax insect of China is covered with a waxy powder, which is communicated to the trees upon which these insects are found, and is collected by the natives, who esteem it highly as a medicinal substance.

Wax is also a product of vegetables; but edible wax is not employed in this country. Acacia wax is obtained from the berries of the Myrica cerifera, a native of the United States of America. These are boiled in water and pressed. The wax exudes, floats on the water, is skimmed off, and is remelted. This kind of wax has a green-yellow colour. By saponification it yields stearic, margaric, and oleic acids, along with glycerin, so that it is rather fat than wax.

Preparation.—Wax is extracted from the comb, partly by allowing the latter to drip, partly by subjecting it to pressure. The comb is then melted in water, by which the impurities subside, and the wax is allowed to cool in moulds.

Properties of Yellow Bees' Wax.—Yellow wax (cera flava) has a remarkable and peculiar odour; its colour is more or less yellow, but varying in degree; its specific gravity varies from 0.960 to 0.965. It is said to be sometimes adulterated with suet, which gives it a fatty feel and disagreeable taste. Resin may be recognised by its solubility in cold alcohol; bean or pea meal, by its insolubility in oil of turpentine.

Wax Bleaching.—This is effected by melting yellow wax (either in a copper vessel, or in a large vat or tub, by means of steam); running it off, while in the melted state, into a trough, called a creek, perforated at the bottom with holes, and placed over a large water tank, at one end of which is a revolving cylinder, almost wholly immersed in water. By this means the wax is solidified, converted into a kind of ribbon, and conveyed on the surface of the water to the other end of the tank. These ribbons of wax are here lifted out, and conveyed in baskets to the bleaching grounds, where they are exposed to the air for one or two weeks (according to the state of the weather), being turned every day, and watered from time to time. The wax is then re-melted, re-ribbed, and re-bleached; it is subsequently refined by melting in water acidulated with sulphuric acid.

Properties of White Wax.—White Wax (cera alba; cera dealbata) is yellowish-white; I have never met with pure wax perfectly white. The circular cakes of commerce, as well as wax candles, always contain spermaceti, which the dealers add to improve the colour. Pure wax is solid, brittle, inodorous, or nearly so, insipid, fusible, and at a much higher temperature decomposable. Its specific gravity varies from 0.8203 to 0.965.

Composition.—According to John, wax is a compound of
ther substances;—the one called cerine, the other myricine. These
were examined by Boudet and Boissenot.

1. Cerine.—This constitutes at least 70 per cent. of wax. It fuses at 143½ F.
dissolves in 18 parts of boiling alcohol. By saponification with potash it
its margaric acid, a minute portion of oleic acid, and a considerable quantity
a non-saponifiable fat called cerine.

1. Myricine.—It fuses at 149° F. It dissolves in 200 parts of boiling alcohol
sp. gr. 0.833. It is not saponifiable by potash.

2. More recently Hess* asserts that pure wax is homogeneous, and possesses the
properties of myricine; its composition being C20 H40 O. The difference between
the one and myricine he ascribes to the presence of cerio acid formed by the oxida-
tion of myricin.

Physiological Effects and Uses.—Wax is an emollient and
mucilaginous. It has been administered internally, in the form of
ulsions (prepared with melted wax: and soap, yolk of eggs, or
scirrhage), in diarrhoea and dysentery, especially when ulceration of
the alimentary canal is suspected. In these cases it has been used
by Hufeland and Wedekind. It has sometimes been employed as
nastatory, but its action is mechanical only. Its principal use,
ever, is externally, sometimes as a mild soothing or protecting
application, sometimes as a basis for the application of other agents.

1. Emplastrum Ceræ, L. Emplastrum simplex, E. Emplastrum
fræns. Wax Plaster.—(Wax; Suet, of each, lb. iiij.; Resin, lb. j.
—Bees' wax, iiiij. Suet, and Resin, of each, iiiij. E.—“Melt them
together with a moderate heat, and stir the mixture briskly till it con-
teles on cooling,” E.)—Employed in the preparation of Emplas-
trum Cantharidis. Sometimes used to promote discharge from a
sterilized surface.

2. Emplastrum Aromaticum, D. Aromatic Plaster.—(Frankincense
(Thuya), iiiij.; Yellow Wax, iiiij.; Cinnamon Bark, powdered
; Essential Oil of Allspice; Essential Oil of Lemons, of each,
Melt the Frankincense and Wax together, and strain; when
are beginning to thicken by cooling, mix in the powder of cin-
mon rubbed up with the oils, and make a plaster.”—By keeping
all as by the application of heat in spreading, the volatile oils
preparation are dissipated. “It is used as a stimulant, ap-
over the region of the stomach, in dyspepsia and increased
bility of that organ, to allay pain and nausea and expel flatus.”

Ceratæ, L. Unguentum Simplex, E. Unguentum Cera alba,
Simple Cerate. Simple Dressing. (Olive oil, fœ. iv. [fœvss. E.]

* Journ. de Pharm. xiii. 38.
* Thomson, Org. Chem.
* Pharm. Central-Blatt für 1838, p. 332.
* Montgomery, Obs. on the Dublin Pharm.

4. Unguentum Cere Flave, D. Ointment of Yellow Wax. (At the preceding, except that Yellow Wax is substituted for White Wax).—Effects and uses as the last.

5. Linimentum Simplex, E. Simple Liniment. (Olive Oil, for parts; White Wax, one part). Dissolve the wax in the oil with gentle heat; and agitate well as the fused mass cools and concretes. —Differs from the Unguentum simplex in its greater liquidity. Use to soften the skin, and to promote the healing of chaps, &c.

Other Hymenopterous Insects.

The tribe of hymenopterous insects, called Gallicola or Diploleperis, contain the insects which produce those excrescences on plants commonly denominate galls (see Nutgall, p. 1079, and Bedeguar, p. 1556). Latreille 4 comprehends all the insects of this tribe in one genus,—viz. Gymips.

Class VII.—Crustacea, Cuvier.—Crustaceans.

The dietetical properties of the Crustaceans (Lobsters, Crabs, Craw-fish, Prawns, and Shrimps), have been already noticed (see p. 62).

1. Astacus fluviatilis.—In the stomach of the Crawfish are found, at the time the animal is about to change its shell, two calcareous concretions, commonly called Crab's Eyes, Crab's Stones (Lapilli Cancerorum), which were formerly ground and employed in medicine, as also bents and antacids, under the name of Prepared Crab's Stones (Lapilli Cancerorum preparari; Lapida Cancerorum; Oculi Cancerorum preparari). They consist of carbonate of lime and animal matter principally, with a little phosphate of lime. Their use is now obsolete. In the shops, imitations of them (prepared with chalk and mucilage, or size) are still sold with.

2. Cancer Pagurus.—The Black-clawed or Leg Edible Crab was at one time an official animal in Claus (Chele Cancerorum) when prepared by grinding constitute the Prepared Crab's Claws (Cheles Cancerorum preparati) of the shops. Their composition and use are similar to those of prepared Crab's stones. For an account of the effects and uses of carbonate of lime, see p. 597.

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Division II. Vertebrata.—Vertebral Animals.

Essential Characters.—Animals furnished with a skull and vertebral column for the protection of the brain and spinal marrow.

Class VIII. Pisces.—Fishes.

Essential Characters.—Vertebrated animals with cold red blood, respiring by gills or branchiae, and moving in the water by the aid of fins.

No article of the Materia Medica, contained in the British pharmacopoeias, is derived from this class of animals: but the importance of isinglass, and the extraordinary efficacy, in various diseases, ascribed by some writers to Cod’s Liver Oil, render it necessary to notice both of these productions.

1. ICHTHYOCOLL’IA.—ISINGLASS.

History.—Ichthyocolla (ἰχθυόκόλλα, from ἰχθῦς, a fish, and κόλλα, glue) is mentioned by both Dioscorides and Pliny. The latter of these writers ascribes its invention to Daedalus.

Zoology.—Isinglass is obtained from various fishes, some only of which have hitherto been ascertained. The finest kinds are procured from different species of Acipenser. Several other genera,—Silurus, Morrha, Gadus, Otolithus, Lota, and Polynemus, also yield it.

The organ from which isinglass is usually procured, is the air-bag, swimming bladder, sometimes termed the sound. It is a membranous sac filled with air (containing from 69 to 87 per cent. of oxygen), and placed under the spine, in the middle of the back, and above the centre of gravity. In most fish it communicates with the oesophagus, or stomach, by the ductus pneumaticus. In others it is an imperforate sac. Occasionally there are two sacs, which communicate with each other. In the Acipenser stellatus, according to Brandt, the bag is composed of three membranes: an external, silvery one, derived from the peritoneum; a middle, membranous (hautigen) one; and the most internal, very vascular, and, as it were, pulpy membrane. The latter, he states, yields the fish gelatine. But unless the sound of this fish differs considerably from that of other fishes, there must be an error in this statement. I have examined all theurse and pipe isinglasses of commerce, and find the internal to be an insoluble membrane. In the cod the innermost membrane is very thin, and is perhaps analogous to the epithelium. External to this is a highly vascular thin coat, and still more external is the gelatinous coat, which appears devoid, or nearly so, of vessels.

Preparation.—The mode of preparing the swimming bladder for

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* Lib. iii. cap. 102.
† Hist. Nat. lib. vii. cap. 57; and lib. xxxii. cap. 24, ed. Valp.
‡ Brandt and Ratzeburg’s Medicinische Zoologie, p. 27. Berlin, 1833.
sale as isinglass, varies in different countries. Sometimes the bag is
dried unopened, as in the case of the purse, pipe, and lump isinglass
of the shops. At other times it is laid open, and submitted to some
preparation; being either dried unfolded, as in the leaf and honey-
comb isinglass; or folded, as in the staple and book isinglass; or
rolled out, as in the ribbon isinglass. When it arrives in this coun-
try it is picked or cut. Formerly it was picked into shreds by women
and children, but it is now usually cut by machines worked by steam.

Description.—Many varieties of isinglass are imported: the
Russian kinds are the most esteemed; but the Brazilian, on account
of its cheapness, is the most extensively-used kind.

1. Russian and Siberian Isinglass.—The isinglass produced in the
Russian empire is principally obtained from the Sturgeons. These
cartilaginous fishes constitute the genus Acipeus.

The following are the generic characters of Acipeus:—Body elongated and
angular, defended by indurated plates and spines, arranged in longitudinal
rows; snout pointed, conical; mouth placed on the under surface of the head;
tubular, and without teeth (Yarrell*). The species are badly determined.
Brandt† has described and figured eight. Acipeus Sturio, or the Caspian
Sturgeon, is occasionally caught in the river Thames. The species
from which isinglass is procured is the follow-
ing:—

1. A. Huso, Linn. The
Beluga or Beluga.—In-
habits the Caspian Sea
and its tributary streams.

2. A. Güldenstädt, Brandt and Ratzeburg. The Ossetr or Osseter.—In-
habits the Caspian and Black Seas and their tributary rivers. Caviar is pre-
pared from its roe (ovary.) From its swimming bladder are obtained both staple
and leaf isinglass. The varieties of the staple are, the Patriarch Astrakhan
and Astrakhan firsts, seconds, and thirds. The leaf varieties are firsts, seconds,
and thirds.

3. A. Ruthenus, Linn. The Sterlet.—Inhabits the Black and Caspian Seas
and their tributary rivers; and the Arctic Ocean. Its roe yields caviar. Leaf
and book (first and second) isinglass are obtained from the swimming bladder.

4. A. Stellatus, Pallas. The Severuga.—Inhabits the Caspian and Black
Seas and their tributary rivers. Yields caviar and leaf isinglass.

But in Russia the acipecus is not the only genus from which
isinglass is obtained, for it is also procured from Silurus Glanis,
which Dr. Royle says may be the source of the Samovye* is-
ninglass of commerce.

* History of British Fishes, ii. 360.
§ Pallas, Reise durch verschiedene Provinzen des russischen Reiches. Thal. i. 5.13

* On the production of Isinglass along the coast of India, with a notice of its Fishes.

† This word is sometimes written Samoviy or Samoye. I have been unable to trace its
name. Dr. Royle’s suggestion appears to me probable, since the Russian name for the Siberia
Smol, while Albertus Magnus calls it Salmo. The Pole terms it Szaas. (Brandt and Hallen.
op. supræ cit. vol. ii. p. 51.) Moreover Martius says that staple, leaf, and book isinglass
procu from this fish. Now these are the three forms of the Samovye isinglass.
Brandt thus describes the preparation of Russian isinglass. The swimming bladder is cut open, washed, and then exposed to the air with the inner silvery membrane turned upwards. The latter is then stript off and placed in damp cloths, or left in the outer covering, and after prepared or kneaded. It is then taken out of the cloths, and either merely dried (leaf isinglass) or twisted in a serpentine manner, between three pegs into the shape of a horse-shoe, heart, or lyre (long and short staple), or folded in the manner bookbinders fold printed sheets of paper (book isinglass). Jackson has given figures to illustrate the manner in which the staple and book isinglass are made to retain their shapes by skewers.

Several kinds of leaf isinglass are imported from Russia. The finest kind is that from Astrakhan, of which one kind is said to be obtained from the Beluga (Acipenser Huso). These are imported from Petersburg. The Samoyed leaf is an inferior kind brought from Taganrod. Siuane leaf is the produce of a small fish; each leaf measuring only about 2\(\frac{1}{4}\) inches each way, and weighing about a gram: it looks like pieces of dried bladder, marked by two fibrous muscular bands. Kroski isinglass I have not seen; but I am told it is in small circular membraneous disks.

Long staple isinglass is of fine quality. It is the produce of the Oural. Of short staple three kinds are known: the finest is from the Oural, and is distinguished by the name of Patriarch, but it is very scarce. The Astrakhan short staple is one of the best kinds. The Samoyed short staple is of inferior quality.

Two kinds of book isinglass are met with. That from the Oural is of excellent quality. Samoyed book is an inferior kind.

Siberian purse isinglass is of moderately good quality, and is in general demand.

2. Brazilian isinglass.—This is imported from Para and Maranham; but it has not hitherto been ascertained from what fishes it is procured: though it is obvious, from a superficial examination of the commercial specimens, that they must have been obtained from at least several species or genera. Mr. Yarrell suggests the genera Pimephales and Silurus as the source of it. It comes over in the form of Pipe, Lump, and Honeycomb.

Pipe Brazilian isinglass must have been procured from a large fish. It is prepared by drying the swimming bladder unopened. In some cases this bladder is imported distended with air. The dried bladders, or pipes, as they are called, are from 10 to 12 inches in length, and about 2\(\frac{1}{4}\) inches broad. Their weight is about 5 ounces. Their shape is somewhat conical, tapering at one extremity, and broader at the other, where, on either side, is a conical cæcal prolongation.

\[1\] Though the account above given by Brandt agrees with the statements of Pallas, Gmelin, Georgi, and Cooke, there must be some inaccuracy in it. I have before stated (p. 159), that the innermost membrane of the swimming bladder is insoluble. But according to Brandt’s statement, the innermost gelatinous membrane. The account which T. W. C. Martius (Lehrbuch d. Pharmaceut. Jie, p. 71, Stuttgart, 1838,) gives of the preparation of isinglass in Russia, confirms my views. The swimming bladders, he observes, are first placed in hot water, carefully deprived of adhering blood, then longitudinally, and exposed to the air, with the inner, delicate, silvery membrane upwards, dried, this fine membrane is removed by beating and rubbing, and the swimming bladder is made into different forms.

Royce, op. supra cit. p. 21.

\[2\] Phil. Trans vol. xxxi. 1783.
It is devoid of smell. *Lump Brazilian isinglass* consists swimming bladders placed side by side, considerate at one end, and communicating at the other extrem other. When perfect, each lump somewhat resembles a torpedo. Its size varies. A perfect, though not very large now before me, is 8 inches long, and, at the broadest in breadth. Its weight is 6½ ounces. It consists of separated by constrictions. The largest portion is 5 and 3½ long; flattened in front, rounded posteriorly. two sacs, placed one on either side. The middle part 3 inches long, and 2 broad; it consists of two sacs, with those of the preceding portion. The third port 1½ inches long, and ¾ of an inch wide. It consists of the labor into which both the sacs of the middle portion open. *Brazilian Isinglass* appears to be the largest portion of the split open.

The lump variety is sometimes softened, and rolled out into ribbons, in this country. On account of its deeper colour and solubility, Brazilian isinglass is not in demand for domestic uses, though, as it is sold in the cut state, it is probably in use with the finer kinds of Russian isinglass, such. As it is moderately cheap and soluble, while it has no fishy smell, it is in extensive use for fining by brewers, who are the principal consumers of isinglass.

3. New York Isinglass.—Occasionally ribbon isinglass is imported from New York. It is thin ribbons of several feet long, and from an inch and a half to two inches in width. It is but little used in this country. It is less soluble than the Russian, and affords a dull-coloured solution.

Dr. J. V. C. Smith, a 7 author of a work on the fishes of Massachusetts, states, that it is obtained from the air-bladder of the common Hake (*Gadus merluccius*), which is thrown into water to macerate for a little while, and is then taken out and pressed between two iron rollers, by which it is elongated to the extent of half a yard and more. It is then carefully dried, packed, and sent to market. The common cod (*Morrhua vulgaris*) yields a poorer kind of isinglass; but the hake only is known to the extensive manufacturers as fit for their purposes.

4. Hudson's Bay Isinglass.—I have been unable to ascertain from what fish this isinglass is procured. It comes over in the *gurka* box. A specimen now before me measures 12 inches in length, and 3½ inches in diameter; its weight is 1½ ounces. It is light yellow, transparent, and free from taste and smell. The inner lining of the sac, which may be readily stripped off, is insoluble in water: the remaining membrane dissolves in boiling water.

5. East India Isinglass.—It appears that, for a long period, this has been exported from Calcutta to China, but it has only recently entered the attention of Europeans. It is probably the produc
Isinglass.

Polynemus. But the fishes called, by Dr. Buchanan, several species of Silurus, especially Silurus vaita, also yield isinglass (Royle). Most of the specimens of isinglass which I have examined, have an unpleasant fishy stench, which renders them totally unfit for domestic use, and greatly reduces their commercial value. A specimen of East India purse isinglass, now before me, consists of an unopened swimming-bladder, and dried. Its shape is oval-oblong; its length, 9 inches; breadth, 3½ inches; its weight, 7½ oz. It has a strong fishy smell, and dark colour.

The kind (East Indian leaf isinglass) is merely the sac laid bare, and dried. It is 8 or 9 inches long, 6 or 7 inches broad, and about an inch thick. A third kind, (East Indian rolled leaf) which I have received from Dr. Royle, appears to have been formed by rolling out the preceding kind into thin plates. A specimen is about 18 inches long, 3½ inches wide, and ¼ of an inch thick. Some of the sheets are covered with a thin film of chalk.

East India isinglass, kindly furnished me by Dr. Royle, is sold in little shreds, two or three inches long, and tapering at the extremity. It is hand-picked in India by the natives. The composition of this isinglass has been ascertained by Mr. and will hereafter be stated.

SOUNDS.—Cod sounds, in the dried state, are brought from the East, and used as a substitute for foreign isinglass. They are usually preserved soft by salting, and dressed for the table.

CUT.—When isinglass is reduced to small shreds (picked or cut) it is scarcely possible to distinguish, by the eye, some of the finest kinds. The best criteria are its whiteness, freedom from unpleasant odour, and its complete solubility in water.

Reptation.—Hartshorn shavings and sole skins (when clean, and well prepared) are sometimes substituted for isinglass in these cases.

GELATINE.—Gelatine may be extracted from bones, by boiling them in water, or, more readily, by employing bones, which have been digested in hydrochloric acid to extract the phosphate of lime. In this retort so-called gelatine is prepared in Paris for the hospitals, and other paupers disposed of them. Gelatine has even been extracted from fossil bones. A soup was made from one of the bones of the great Mastodon, by the Prefect of one of the departements of France.

Patent Gelatine is obtained from glue-pieces, freed from hair, wool, flesh, and bone. It is probable that inferior kinds of isinglass are also employed. Two of the best patent gelatine are made up:—the best (called gelatine of the first quality, by Dr. Royle's work, On the Production of Isinglass, with a Notice of its Fisheries. Lond. 1842.

Gelatine, Recherches sur les Substances Nutritives qui renferment les Os, Paris, 1830; also, Recherches Statist. sur l'Emploi de la Gelatine, Paris, 1835; and Quarterly Journal of the Asiatic Society of Bengal, vol. viii., p. 293.) states, that Indian isinglass is of very inferior quality, and that the best is obtained by Polynemus Setæ of Buchanan. But, inasmuch as he obtained only 60 grains of gelatine from one of these fishes, while some of the specimens of commerce weigh from half to three pounds, it seems tolerably clear that the Indian isinglass of English commerce cannot be of P. Setæ, but must be procured from some larger fish. It may be the produce of Silurus vaita, Buchanan, or the new species of Polynemus, referred to by Dr. Cantor (Journ. of the Asiatic Society, vol. v. p. 166.) as the Salliah or Saccidich. For domestic uses, patent gelatine is frequently used as a substitute for isinglass.

Cited:—Gelatine may be extracted from bones, by boiling them in water, or, more readily, by employing bones, which have been digested in hydrochloric acid to extract the phosphate of lime. In this retort so-called gelatine is prepared in Paris for the hospitals, and other paupers disposed of them. Gelatine has even been extracted from fossil bones. A soup was made from one of the bones of the great Mastodon, by the Prefect of one of the departements of France.

Patent Gelatine is obtained from glue-pieces, freed from hair, wool, flesh, and bone. It is probable that inferior kinds of isinglass are also employed. Two of the best patent gelatine are made up:—the best (called gelatine of the first
qualit) is opaque; it is, by preference, made from the cuttings of beasts, or from the skins of calves: the inferior kind (called 'gelatine') is transparent; it is made from non-transparent glue-pieces. They are sold, cut somewhat in imitation of picked isinglass.

French gelatine is sold in cakes, marked like those of common glazes on which they have been dried. They are either uncoloured, or red, green, or blue.

For the following table of the different kinds of isinglass and the present time known in the London market I am principally indebted to Mr. James Metcalfe, wholesale dealer in isinglass, of Artillery Place, Finsbury Square.

<table>
<thead>
<tr>
<th>Country</th>
<th>Place of Produce</th>
<th>Place of Export</th>
<th>Name and Character</th>
<th>Prices Per lb. English</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Long Staple Ural 1st &amp; 2nd</td>
<td>12 6 12 6</td>
</tr>
<tr>
<td>The Oral (Ural)</td>
<td>St. Petersburg</td>
<td></td>
<td>Short ditto Patriarch</td>
<td>12 6 12 6</td>
</tr>
<tr>
<td>The Irtysh and Obi</td>
<td></td>
<td></td>
<td>Ditto ditto 1st &amp; 2nd Book</td>
<td>12 6 12 6</td>
</tr>
<tr>
<td>Oural and tributaries</td>
<td></td>
<td></td>
<td>Thin Leaf 1st &amp; 2nd</td>
<td>12 6 12 6</td>
</tr>
<tr>
<td>Astrakhan</td>
<td></td>
<td></td>
<td>Beluga 1st &amp; 2nd</td>
<td>12 6 12 6</td>
</tr>
<tr>
<td>The Volga and tributaries</td>
<td></td>
<td></td>
<td>Cut by machine or hand</td>
<td>12 6 12 6</td>
</tr>
<tr>
<td>Russia</td>
<td></td>
<td></td>
<td>Picking (the brown ends)</td>
<td>12 6 12 6</td>
</tr>
</tbody>
</table>

| Russian Tributaries of Black Sea | Odessa | Siberian Purse | 8 6 7 6  |
| Tcherkasoy | Taganrog | Kings Purse | 8 6 7 6  |
| The Ob and tributaries | | | 8 6 7 6  |
| Ditto | | | 8 6 7 6  |
| Siberia | The Irtysh and Obi | St. Petersburg | Siberian Purse | 8 6 7 6  |

| Hudson's Bay and rivers | Hudson's Bay | Purse | 8 6 8 9  |
| United States | New York | Ribbon | No price |
| South America | The Brazil | Maranhem and Para | Cut Brazil | 7 6 6 6 6 0  |
| East Indies | Bay of Bengal | Calcutta | Purse | 7 2 0 2 0  |
| | | | Leaf | 3 0 3 0  |
| | | | Picked | 3 0 3 0  |
| Scotland | Coasts of Scotland | Calcutta | Cods Sounds | 1 9 1 9 2  |
| England | England | Sole Skins | 6 10 if clean, even |

Composition.—Iisinglass of fine quality was analyzed by a well-known chemist, who found the constituents to be, gelatine 70%, osmanthus bran insoluble in boiling water, 2-5%, free acid (lactic acid) of potash and soda, and some phosphate of lime, 4-0%, and other matters. These results, however, can scarcely be accurate; for C. Berzelius observes, does not contain more than 8 per cent. of a substance; and if isinglass contained 16 per cent. it could not dry when exposed to the air.

* Guerin, Histoire de la Chimie. II. 1469.
* Trusté de Chem. VII. 523.
Mr. E. Solly, jun., examined three specimens of Bengal isinglass, and found the constituents to be gelatine, albumen, a small portion of gelatine and earthy substances, osmazone, and a minute trace of odorous oil. The quantities of gelatine in three specimens were respectively 86.5, 90.9, and 92.8 per cent.; while those of albumen were 13.5, 9.1, and 7.2 per cent.

Effects and Uses.—The dietetical properties of gelatine have been before noticed (see p. 54). Considered medicinally it is an emollient and demulcent. It is employed, dissolved in water or milk, and rendered palatable by acid and sugar, as a nutritious substance for invalids and convalescents.

A solution of isinglass, with some tincture of benzoin, is brushed over black sarcenet to form Court or Black Sticking Plaster. Liston's isinglass plaster consists of oiled silk coated with isinglass. The preparation of Gelatine Capsules has been already described (see p. 16 19). It is also employed as a clarifying or fining agent (for coffee, ines, beer, &c.) Some of the constituents of these liquors unite with the gelatine, and form insoluble compounds, which precipitate in the act of precipitation the gelatine incloses within its meshes the matters which rendered the liquid turbid. The great consumers of glass are the brewers, who employ principally the Brazilian variety.

2. Oleum Jecoris Aselli.—Cod Liver Oil.

(Oleum Morrhuæ.)

History.—The oil obtained from the livers of the Common Cod, various other allied species of fish, appears to have been for a long time a popular remedy, in various countries of Europe, for rheumatic and other diseases, though its use by medical practitioners comparatively recent. In 1782 it was strongly recommended in a case of rheumatism by Dr. T. Percival, and in 1807 by Dr. Bard, who states that it was in high repute in Lancashire.

Zoology.—This oil is principally procured from the common cod (Gadus morrhæus vulgaris; Gadus morehæus) formerly called Asellus major; from allied species, as the Dorse (Gadus callarias), the Coal-fish (Lampus carbonarius), the Burbot (Lota vulgaris), the Ling (Lota lingua), and the Torsk (Bromius vulgaris).

Preparation.—In different countries the mode of preparing the varies somewhat. The cod oil met with in the London market is the produce of Newfoundland, where, according to Pennant, it is thus procured:—"They take a half tub, and, boring a hole through the bottom, press hard down into a layer of spruce boughs; upon which they place the livers, and expose the whole apparatus to the sun until as possible. As the livers corrupt the oil runs from them, and, straining itself through the spruce boughs, is caught in a vessel set under the

\[1\]

On the Production of Isinglass, p. 40. Lond. 1842.


[3] Particularly respecting the mode of fining beer are given by Jackson in his \textit{Essay on British Beer}, Lond. 1765.


hole in the tub's bottom." "At Newhaven, near Edinburgh, fishermen simply boil the livers in an iron pot, and then filter it through a towel containing a little sand." (J. H. Bennett)

DESCRIPTION.—Among London dealers I have met with but one kind of Cod-liver oil. Its colour is chestnut brown, and its odour like that of boiled cod's liver. It is the Cod Oil of commerce, oleum fuscum of continental pharmacologists, and extensively used by curriers in dressing leather.

Three other varieties are met with in Germany. They are distinguished as the White (oleum album), the Yellow (oleum flavum) and the Red (oleum rubrum), Cod Liver Oils. These differences of colour depend probably in part on the species of fish from which each variety is procured, and in part also on the mode of preparation. Thus the Dorse (Gadus callarias) yields a white oil. In Genoa the deep golden yellow coloured oil is, for the most part, used medicinally.

COMPOSITION.—Cod oil has been analysed by several chemists. The most recent analysis is that of Marder*. In 200 grm. of oil he found the following substances:

<table>
<thead>
<tr>
<th>In the Clear Oil</th>
<th>In the Brown Oil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green soft resin</td>
<td>0.104 (brown resin)</td>
</tr>
<tr>
<td>Brown hard resin</td>
<td>0.055 (black resin)</td>
</tr>
<tr>
<td>Gelatin</td>
<td>0.812</td>
</tr>
<tr>
<td>Oleic acid</td>
<td>111.862</td>
</tr>
<tr>
<td>Margeric acid</td>
<td>39.628</td>
</tr>
<tr>
<td>Glycerine</td>
<td>10.298</td>
</tr>
<tr>
<td>Colouring matter</td>
<td>11.560</td>
</tr>
<tr>
<td>Chloride of sodium</td>
<td>0.1045</td>
</tr>
<tr>
<td>Chloride of potassium</td>
<td>0.1170</td>
</tr>
<tr>
<td>Sulphate of potash</td>
<td>0.0351</td>
</tr>
</tbody>
</table>

Since the above analyses were made iodine and bromine have been detected in this oil. Herberger examined several oils, and obtained the following results:

<table>
<thead>
<tr>
<th>1000 parts of Cod Liver Oil</th>
<th>Iodide of Copper</th>
<th>Bromide of Potassium</th>
<th>Iodine</th>
<th>Bromine</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. White Oil</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>From Bremen</td>
<td>1.355</td>
<td>0.255</td>
<td>0.93</td>
<td>0.789</td>
</tr>
<tr>
<td>Mainz</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mannheim</td>
<td>0.439</td>
<td></td>
<td>0.283</td>
<td></td>
</tr>
<tr>
<td>Frankfort</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>From Stuttgart</td>
<td>0.563</td>
<td></td>
<td>0.375</td>
<td></td>
</tr>
<tr>
<td>Mannheim</td>
<td>2.337</td>
<td>0.435</td>
<td>1.964</td>
<td>0.22</td>
</tr>
<tr>
<td>Hamburg</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bremen</td>
<td>2.506</td>
<td>0.441</td>
<td>1.733</td>
<td></td>
</tr>
</tbody>
</table>

PHYSIOLOGICAL EFFECTS.—At the commencement of its use it frequently causes nausea, disagreeable eructation, and occasionally vomiting. In the dose of a tablespoonful it acts as a laxative, aphroetic, and diuretic. But Taufflied declares that is dose of from two to four spoonfuls a day, he never found it "exert any salutary influence upon the urine or perspiration, or produce disturbance in the economy." The disagreeable flavour of the oil sometimes creates nausea and sickness, but when habituated to...
repugnance to it these effects cease. In several cases of emmenagogue; and on some occasions has given rise to eruption. Dr. Bardsley found that most patients were get fat under its use.

Though it has been used more or less successfully in a considerable number of diseases, the cases in which it has been most successful are those of a gouty, rheumatic, or scrofulous disease. But even in these it requires a very long-continued use to be really successful. The most recent writer on its employment ob-serves, however, that its use must be continued long, "at least a month, often two, and sometimes for years." As the oil contains iodine, and from this element most successful, it has been suggested that iodine is its active principle. Tanfyllion, however, denies this, and asserts that the properties which these subjects. In plethoric habits, and where a in of the stomach and bowels, or inflammation, exists, its use is indicated.

Satism and scrofula are the diseases in which its employment has been most successful. In rheumatism it is indicated in the chronic forms of this disease, where the muscles and tendons are affected, and the joints nearly inflexible. In chronic gout, it is said not efficacious. In scrofula it has proved successful in most of its forms, but especially when it affects the bones (as in caries, &c.), and in tabes mesenterica. In the latter most chronic form of the disease, its efficacy has occasionally been most striking. Even in phthisis, benefit is said to have been obtained by instituting a daily, or even a daily, oil has also been employed in some other diseases, with more success. In chronic skin diseases attention was drawn to its efficacy by Dr. Marshal. Hall. In tinea favosa, and chronic eczema, it has been found efficacious as a topical application. In chronic ophthalmia, especially of a scrofulous kind, it has been given internally, and, in some cases, applied to the eye in ointment form. In paralysis also it has been found beneficial by B.

ADMINISTRATION.—For an adult, the dose at the commencement is one table spoonful, which may be gradually increased to six times this amount. This dose is to be repeated two, three, or four times a day, each dose being taken between meals. One patient consumed thirty-
Essential Characters.—Vertebrated animals, with red  
ning by lungs, and the young of which are produced 1  
with feathers, and general conformation organized for

ORDER I. GALLINÆ, LINNAEUS.—GALLIN

Essential Characters.—Bill short, convex, in some  
Upper mandible bending from its base or only at the  
covered by a membrane, naked or feathered. Tarsus 1  
united at their base by a membrane; hind toe articula  
the junction of the anterior toes.

GALLUS DOMESTICUS, TEMMINCK.—THE 
AND HEN.

Phasianus Gallus, LINN. L. E.
(Ovum, L.—The Egg, E.)

History.—No mention is made of this animal. Both the male and female are referred
ment.

Aristotle calls the cock δικτηρωτης.—th

ZOOLOGY. Gen. Char.—Bill of medium size,  
Upper mandible arched convex, bent towards the  
mounted by a crest or plume. Ears naked.  
united to the first joint; the hind toe raised from  
with a long and bent spur. Middle feathers  
Wings short.

Sp. Char.—Comb dentated. Throat wattled.  
linear and elongated. Body variegated with be  
compressed and ascending. Comb and wattle  
than those of the male.
Structure of the Ovarium and Development of the Egg.—The Ovarium (ovarium vitellorum) or egg-organ, consists of a cluster of ova, in a hen beginning to lay, about 500 in number. The stalk by which each ovum is attached to the ovarium is called the petiolus. The size of the ova is exceedingly various: when quite ripe, they are as large as the yolk of an egg; the smaller ones are white, the larger ones yellow. Each ovum, when ripe, is composed of a calyx, the yolk-bag, and the yolk. The calyx constitutes the outer coat or covering of the ovum, and consists of two layers—an outer one, derived from the peritoneum, and an inner one, which is somewhat thicker. Between these two coats the vessels ramify. The petiolus is merely a prolongation of the calyx: it is studded with a number of small ova resembling vesicles. On that part of the calyx of a ripe ovum which is opposite the petiolus, is a whitish curved stripe, called the stigma, indicating the spot where the calyx bursts, to allow the escape of the yolk. The yolk-bag, or membrana propri vitelli, is within the calyx, and closely invests the yolk. It is a flocculent, delicate, fine coat. In the early state of the ovum, the yolk is constituted of a tellucid fluid lymph, and is hardly distinguishable from the vesicula ciatricula. It then becomes whitish, and subsequently yellow, globules of oil making their appearance. In a ripe ovum, it is viscid, tenacious, and of an orange-yellow colour; and lies in the calyx, with its long axis towards the petiolus. It is composed of three layers, the middle one having the deepest colour; the innermost enclosing a white fluid called the albumen centrale (or substantia alba vitelli), from which passes a little canal to that part of the surface of the yolk called the cicatricula.

The internal surface of the yolk-bag is lined with a very thin stratum of globules, in form and figure like those of the blood, but arranged organically. The cicatricula, or tread (as it is improperly called), is formed by an accumulation of these globules forming a mammiform heap, the convexity of which is towards the centre of the yolk, and is usually situated nearer the petiolus than the stigma. In the top of this is the so-called tellucid pore, which is occupied by a small vesicle discovered by Parkinje’s, and called by him the vesicula germinativa, or vesicula ciatricula. It is found in all the ovarian ova, and seems to be a natural organ, since it is found in the ova of fowls which have never had access to the male. When the yolk falls into the infundibulum, this vesicle disappears. The Oviduct has some resemblance to a convoluted intestine. It is situated on the left side of the animal. Its superior expanded free extremity is called the

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* Symb. ad ovi avium histor. ante incub. Lipsia, 1830.
**Fig. 341.**

The spiral chalaze are seen at the extremities of the yolk; the circular cicatricial in the middle; and the zona albinca extending from one chalaza to the other.

**Fig. 342.**

Polygonal pieces (crystals?) of Chalazae rudiments of the Shell of the Egg.

---

receives fresh deposits of albumen; and, as it undergoes spiral rotation, the above-mentioned processes become curved spirally, and affect the egg constitute the chalaze, grandines, appendices albuminis, or treddles. From one chalaza to the other are observed, in many eggs, white striae, formed by a thickening of the membrana chalazifera. This is called this appearance the zona albicans.

The albumen, glaire, or white of the egg, is not uniform in its consistence, but there is a thick thickest portion is that which is first deposited around the yolk. If from without inwards, the three layers of albumen are denominated primum, a. secundum, and a. tertium. Just before the egg arrives at the oviduct called the uterus, it receives its outer coat, the gelatinae or middle, or so-called uterine portion of the oviduct, is formed the calcose. Some eggs are expelled without it; these are termed ovo eggs. The first deposited in small polygonal pieces, having a crystalline aspect, but, when the deposit has attained a certain thickness, all traces of crystallisation are lost.

**Hab.**—Domesticated in all the four quarters of the globe.

**Description.**—Eggs (ova) are too well known to need description. Their specific gravity varies from 1:080 to 1:000, the keeping they become lighter, by the evaporation of a portion of water. Dr. Prout found, that in two years an egg lost 33½.

The relative weights of the different parts of the egg are, according to the same authority, as follows:—shell and membrane,
albumen, 604·2; yelk, 288·9; (total, 1000). By boiling in water an egg loses two or three per cent.

1. Egg-shell (Testa Ovi; Putamen Ovi).—This consists, according to Prout, of carbonate of lime, 97; phosphate of lime and magnesia, 1; animal matter, with traces of sulphur and iron, 2. The chalk renders the egg absorbent and antacid; hence its use to neutralize the acidity of wines.

2. Pellucida Ovi (Membrana Putaminis).—An albuminous membrane which lines the shell. It is soluble in alkalis, and from its solution is precipitated by acids. It weighs about 2·35 grains (the whole egg being supposed to be 1000 grains). At the larger end of the egg it forms the follicula ovaris; the air of which, according to Bischoff, contains 23·475 per cent. of oxygen.

3. White or Glaire (Albumen seu Album Ovi) consists of two or three laminae, which are not homogeneous, as two parts at least are discernible,—viz. a solid, probably organized albumen, having the appearance of a very fine delicate membrane, forming a series of cells, in which is contained the liquid albumen. Glaire or white of egg consists, according to Gmelin, of albumen 120, mucus 2·7, salt 8·3, and water 89·0. The coagulability of albumen by heat distinguishes it from casem. Albumen or glaire (or ovalbumen) is distinguished from albumen or the serum of the blood (seralbumen) by its being conglutated by ether. The membraneous tissue in which the liquid albumen of eggs is contained is said by Concerbe to be devoid of nitrogen; he calls it albumenin or ovin.

4. Yelk (Vitellus Ovi) is a kind of yellow emulsion, consisting of oil suspended in water by means of albumen, and inclosed in a sac called the yolk bag. On its upper surface is seen the cieartica. At the extremities are the twisted chalazae. The yelk consists of yellow oil, with crystallizable fat, 28·75, albumen containing phosphorus 17·47, and water 53·8. The yellow oil (oleum ovi) may be obtained by boiling the yelk hard, and digesting in ether or alcohol, which dissolves the oil. By distilling off the alcohol from the filtered tincture, the oil is left behind.

Physiological Effects and Uses.—Both the glaire and the yelk are highly nutritious; the latter, on account of the oil which it contains, is somewhat less easy of digestion than the white. Both are more readily assimilated when in the soft state than when hardened by heat. Considered as medicinal agents, they are emollient and demulcent. The glaire is a valuable agent in the treatment of poisoning by bichloride of mercury (see p. 754), sulphate of copper (see p. 776), and the bichloride of tin. Its efficacy in these cases depends on its chemical properties. The glaire is also used as a demulcent or sheathing agent in all cases of corrosive or acrid poisons. The yelk is a constituent of the mistura spiritus vini gallici (see p. 363). It is also used for preparing emulsions. Its oil has been applied to cracked nipples.

The white or glaire is employed as a clarifying agent for wines and some other liquids. Its efficacy depends on its coagulation, by which it entangles in its meshes the impurities, with which it either rises to the surface or precipitates. When the liquid to be clarified does not spontaneously coagulate the albumen, it is necessary to apply heat. Bookbinders use the glaire as a varnish.

Class X.—Mammalia, Linnaeus.—Mammals.

Essential Characters.—Vertebrated animals with red and warm blood, breathing through lungs, viviparous, and suckling their young with milk formed in their breasts or mammae.
ORDER I.— CETACEA, LINNAEUS.—THE CETACEANS.

Essential Characters.—Body pisciform, terminated by a caudal appendage, cartilaginous, and horizontal. Two anterior extremities formed like feet, having the bones which form them flattened and very soft. Head joined to the body by a very short thick neck. Two pectoral or abdominal mammae. Four very small external openings. Brains large. Pelvis and bones of the posterior extremities represented by two rudimentary bones lost in the flesh.

PHYSETER MACROCEPHALUS, LINN. L. E.—GREAT HEADED CACHALOT.

Concretum in propriis cellulis repertum, L.—Cetine nearly pure, E.—Cetacenum, B.)

History.—Cuvier is of opinion that this animal is perhaps the Physeter of Pliny,—the Orca of some other Latin writers.

Zoology. Gen. Char.—Inferior teeth eighteen to twenty-three on each side of the jaw. Upper jaw broad, elevated, without teeth; with these short and concealed in the gum; lower jaw elongated, narrow, corresponding to a furrow of the upper, and armed with thick and conical teeth entering into corresponding cavities in the upper jaw. Spiracular orifices united at the upper part of the snout. A dorsal fin in some species, a simple eminence in others. Cartilaginous cavities in the superior region of the head, filled with oily matter.

Sp. Char.—Lower teeth twenty to twenty-three on each side, recurved and pointed at the extremity. Small conical teeth concealed in the upper gums. Tail narrow and conical. A longitudinal eminence on the back above the anus. Upper part of the body blackish or slate blue, a little spotted with white. Body whitish. Length forty-five to sixty feet.

The snout of the cachalot, notwithstanding its prodigious length, is formed only by the maxilla on the sides, by the intermaxillare towards the median line, and by the vomer on this line. The intermaxillæ project to form the interior part of the snout. Posteriorly the right one ascends higher than the left. The spout hole is single (in most cetacea it is double), and directed towards the left side, so that whenever the animal spouts water, it is to that side only.

* Hist. Nat. ii. 8, and xxxii. 33, ed. Valp.
GREAT HEADED CACHALOT.

Spermaceti.—Spermaceti is found in several parts of the body of the whale, mixed with the common fat. The head, however, is the grand reservoir of it. Here it is found (mixed with oil) in a large excavation of the upper jaw, anterior to, and quite distinct from, the true cranium which contains the brain. Hunter states that the spermaceti and oil are contained in cells, or cellular membrane, in the same manner as the fat in other animals; but that besides the common cells there are larger ones, or ligamentous partitions going across, the latter to support the vast load of oil, of which the bulk of the head is principally composed.

There are two places in the head where this oil lies; these are situated along the upper and lower part: between them pass the nostrils, and a vast number of vessels going to the nose and different parts of the head. The purest spermaceti is contained in the smallest and least ligamentous cells. It lies above the nostrils, along the upper part of the head, immediately under the skin and connective membrane. These cells resemble those which contain the common spermaceti in the other parts of the body nearest the skin. That which lies above the mouth, or between it and the nostril, is more intermixed with a liga-

These chambers are smaller the nearer to the nose, becoming larger and larger as they go towards the back part of the head, where the spermaceti is more pure. Hunter discovered about the nose, or anterior part of the nostril, a great number of vessels having the appearance of a plexus of veins, some as large as a finger: examining them, they were found loaded with spermaceti and oil; and had corresponding arteries. They were most probably lymphatics, and had been absorbed from the cells of the head.

Pacific Ocean, Indian and Chinese Seas. Especially off Borneo and parts adjacent, Timor, Australasia, Polynesia, and Parts of the South Sea Islands.

ACTION OF SPERMACEI.—In the right side of the nose and cavity of the head of the whale is a triangular-shaped cavity, the whalers calling it the “case.” Into this the whalers make an incision and take out the liquid contents (oil and spermaceti) by a syringe. The dense mass of cellular tissue beneath the case and nose which is technically called “junk,” also contains spermaceti, and oil. Its tissue is infiltrated with oil. The spermaceti from the morose is carefully boiled alone, and placed in separate casks, when it is “head matter.”

PROPACTION.—The substance called “head matter” consists of spermaceti and sperm oil. Its colour is yellow. Its consistence is like that of honey. In cold weather it consists of a congealed mass (spermaceti) surrounded and infiltrated by oil. To separate the latter as much as possible, it is put into filter bags. The solid is obtained by compression in hair bags, placed in a hydraulic press. It is then melted in water, and the impurities are washed off. Subsequently it is remelted in a weak solution of salt. It is then fused in a tub by the agency of steam, laddled into pans, and allowed slowly to concretize into large, white, translucent, crystalline masses.

PROPERTIES.—Commercial spermaceti (cetaceum; sperma ceti) generally contains a minute portion of sperm oil, which is best removed by treatment with strong solutions of alkalies.

*Phil. Trans. vol. lxxxvii. 300.*

by boiling in alcohol. Absolutely pure spermaceti (called cetine) is a white laminated substance, without taste, and almost odourless. By the addition of a few drops of alcohol or almond oil, it may be reduced to powder. It is insoluble in water, and slightly soluble only in alcohol, even at a boiling temperature. By saponification with potash, 100 parts of spermaceti yield 60-96 parts of margaric and oleic acids, 40-64 parts of ethal, and 0-9 parts of a yellow extractable substance.

Ethal is a crystalline solid, composed of C\textsubscript{16} H\textsubscript{17} O. By distillation with phosphoric acid, it yields an oily substance called cetene, composed of C\textsubscript{16} H\textsubscript{18}. So that ethal may be regarded as a hydrate of cetene.

**Composition.**—The ultimate analysis of pure spermaceti or cetine was made by Chevreul *. The proximate composition of the same substance has been ascertained by Dumas and Peligot *.

<table>
<thead>
<tr>
<th>Chevreul's Analysis</th>
<th>Dumas and Peligot's Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>At.</td>
</tr>
<tr>
<td>Carbon .............</td>
<td>81.650</td>
</tr>
<tr>
<td>Hydrogen ...........</td>
<td>12.929</td>
</tr>
<tr>
<td>Oxygen .............</td>
<td>5.478</td>
</tr>
<tr>
<td>Water ..............</td>
<td>3</td>
</tr>
<tr>
<td>Cetene .............</td>
<td>100.000</td>
</tr>
</tbody>
</table>

**Physiological Effects and Uses.**—Emollient and demulcent. Internally it has been employed in irritation and inflammation of the alimentary canal (as diarrhoea and dysentery) and of the bronchial membrane (catarrh); but its internal administration is now nearly obsolete. Its principal medicinal use is in the preparation of cerata and ointments.

**Administration.**—When employed internally it is generally exhibited in the form of an emulsion (spermaceti mixture) made with the yolk of egg. Or it may be made with mucilage.

1. **Ceratum Cetacei, L.; Ceratum simplex, E.; Unguentum Cetacei, D.; Spermaceti Cerate.** (Spermaceti, 5ij.; White Wax, 3/iij.; Olive Oil, Oj. L.—Olive Oil, 6 parts; Bleached Bees'-wax, 3 parts; Spermaceti, 1 part, E.—White Wax, lb. ss.; Spermaceti, lb. j.; Prepared Hogslard, lb. ij. “Heat the oil gently, add the wax and spermaceti, stir the whole briskly when it is fluid, and continue the agitation as it cools,” E.)—If cold oil be added to the wax and spermaceti, the preparation is apt to be somewhat lumpy. As the white wax of commerce is always largely mixed with spermaceti, this preparation has never the precise composition intended by the College. Practically, however, this is of no consequence.—This preparation is employed as a mild and simple dressing for blisters and excoriated surfaces.

UNGUENTUM CETACEI, L.; Spermæcti Ointment. (Spermactezi; White Wax, 5ij; Olive Oil, 13ij. Having melted them together with a slow fire, stir assiduously until they become cold).—A better preparation than the preceding, but used in the same cases.

AMBERGRIS.—The substance called Ambergris (Ambra grisea) is procured in the Cachalot or Sperm Whale. In this country it is used as a perfume; on the continent it is employed in medicine. It appears to be the indi-
der excreta (perhaps somewhat altered by disease) of the animal. Mr. Beale collected some of the semi-fluid excreta, and found that the dried mass had all the properties of ambergris. It is a solid, opaque, greyish, striated substance, having a pleasant musk-like odour, and which is supposed to be derived from the id (Sepia moschata) on which the animal feeds; and in support of this notion it must be mentioned that the horny beaks of this animal are found imbedded in the masses. Its sp. gr. is 0.908 to 0.922. John analyzed it, and found it consist of a peculiar non-saponifiable fat (ambreine) 85, sweet balsamic alcohol extract, with benzoic acid, 25, aqueous extract, benzoic acid, and chloride of bismuth 1-5. Ambreine is soluble in alcohol, and by the action of nitric acid furnishes a peculiar acid called ambreic acid. The effects of ambergris on the system said to be analogous to those of musk. In the shops is kept an alcoholic tincture (called essence of ambergris) which is employed as a perfume only.

ORDER II.—RUMINANTIA, Cuvier.—RUMINANTS.

PECRORA, Linnaea.

ENTAIL CHARACTERS.—No incisors in the upper jaw; in the lower usually eight; a vacant space between the incisors and molars, but in which, in some genera, are found one or two canines. Molars twelve in each jaw, the crown marked with two double crescents of enamel, of which the convexity is outside in the lower jaw, and inwards in the upper. No clavicles. Extremities supplied for walking. Two toes furnished with hoofs; metacarpal and metatarsal bones united. Four stomachs; intestines long. Two or four inguinal ammæ. Horns in the males, and often in the females of most species.

FIG. 344.

The four Stomachs of the Sheep.

The gall.—b, The paunch.—c, The honeycomb.—d, The mangles.—e, The reed.—f, The commencement of the duodenum.

HOCUS MOSCHIFERUS, Linna. L. E. D.—THE MUSK ANIMAL.

Homo in folliculo praepulii secretum, L.—Inspissated secretion in the follicle of the prepuce, B.—Concretum Moschus dictum, D.)

HISTORY.—Aristotle, Pliny, Ælian, and Oppian, make no mention of this animal. Ælius* is the earliest writer who notices the perfume. None of the etymologies hitherto given for the word Musk (μυκ) are satisfactory.

* Phil. Trans, vol. lxxii. p. 226, for the year 1783.
* Norn. xxvi. t. 11, cap. cxxii.

Sp. Char.—Fur of a gray-brown; hair coarse. A pouch before the preputial orifice, filled with an unctuous musky substance. Size of the roebuck.

The absence of horns and the presence of canine teeth distinguish the animal from the Deer (Cervus). The Stylæcus moschatus is the connecting link between the deer and the musk. It has the horns of the one, and the canine teeth of the other.

The most interesting part of the musks is the preputial musk sac. Cuvier says no other species of Moschus possesses a musk sac; but this statement is not correct. M. Altaicus Eschscholtz (M. Moschiferus Altaicus Brandt), M. Napu, and M. Javanicus, are also said to possess musk sacs.

Anatomy of the Musk Sac.—The sac is peculiar to the male animal. If he be supposed to be laid on his back, and the belly examined, we observe behind the navel, and immediately in front of the preputial orifice, a small aperture (external aperture of the musk sac) leading into the musk canal, which terminates in the cavity of the musk sac. The aperture is about half an inch from the umbilicus, and usually about a line, or a line and a half, from the preputial orifice. In some preparations in my possession the distance is much greater. The preputial orifice is somewhat more prominent, and has a number of longish hairs projecting from it, in the form of a brush or hair-pennt; whereas the external musk aperture is

\[\text{Fig. 345.} \quad \text{Moschus moschiferus.} \]

\[\text{Fig. 346.} \quad \text{Skull of Moschus moschiferus.} \]

\[\text{Fig. 347.} \quad \text{Belly of Moschus moschiferus.} \]

\[\text{From Pallat.}\]
placed in a depression, and is smooth. The relative position of the parts is shown by the subjoined sectional view of the musk sac in situ (from Brandt):

**Fig. 348.**

*Vertical Section of the Musk Sac in situ.*

- `e`. Urethra.
- `d, d`. The hide.
- `c`. Glans penis.
- `f`. Scrotum.
- `g`. Spot where the apermatic cord is cut off.
- `h`. Aperture of the musk-sac.
- `l`. Preputial orifice.
- `k, k`. Muscular coat of the sac.
- `y`. Position of the anus.

The musk sac is of an oval form, rather broader at the anterior than at the posterior part. It is flat and smooth above, where it is in contact with the abdominal muscles, but convex below (supposing the animal standing). Its breadth is from 1 to 1½ inches; its length from 2 to 2½ inches; its depth varies, being greatest anteriorly, where it is about one-half or 3-4ths of an inch. The external aperture of the musk sac is placed in the median line, but nearer to the anterior than the posterior extremity of the sac. The musk canal is about 1 or 1½ lines long, its diameter being about one line. The internal aperture of the musk sac is surrounded by fine hairs, which readily fall off, and are found in the musk of commerce.

**Fig. 349.**  
**Fig. 350.**  
**Fig. 351.**

- **Musk Sac.**
  - `a`. Truncated Penis.
- **Musk Sac, deprived of its hairy coat and circular muscular fibres.**
  - `a`. Portion of the truncated Penis.
  - `c`. Aperture of the Musk Sac.

The following are the parts of which the musk sac consists:

**Outer or hairy coat or skin.**—This is a continuation of the hide, and covers the convex portion of the sac. Its hairs are stiff but smooth, and disposed in a circular manner around the external musk orifice.
2. **Muscular coat.**—This consists of two strata of fibres which surround the penis in a circular form. Pallas\(^8\) states, that they arise from the groin and unite anteriorly with the panniculus carnosus. He regards them as the compressors or retractor of the follicle and of the prepuce when the genital organ is thrust out. The same naturalist has described two retractors of the penis.

Between the two strata of muscular fibres is placed the penis, which is remarkable from the circumstance of the urethra projecting beyond the extremity of the glans. In its usual state, the penis is rolled up within the belly.

On the inner surface of the muscular fibres is a number of small oblong or roundish glands (see Fig. 352), compared by Pallas to the meibomian glands of the palpebra.

**3. Fibrous coat.**—This is the most external of the proper coats of the musk sac. On its internal surface are numerous depressions or cells, surrounded by ramifying folds, with which the blood-vessels ramify. This coat is continuous through the musk orifice with the corium.

**4. Pearly coat.**—A soft delicate membrane, shining like mother-of-pearl. It lines the cells, and covers the folds of the fibrous coat.

**5. Epidermoid coat.**—It is the inner lining of the sac. Its external layer is silvery white; its internal one yellowish or reddish-brown.

**6. Musk glands.**—In each of the depressions observed on the internal coat of the musk sac, are found two or more irregular shaped bodies of a yellowish or reddish-brown colour. These bodies consist of a central brownish mass (supposed to be glandular), covered by a fine membrane.

**7. Contents of the Musk Sac.**—Pallas found, that, in young animals, the sac was empty and contracted. In the adult animal it contained about a drachm and a half of musk, and in old animals more than two drachms. But these quantities must be below the average, since the dried pods of commerce contain on the average more musk than this. Mr. Campbell\(^4\) describes the musk found in the sac as soft, reddish-brown, granular, and having the appearance of soft gingerbread.*

**Hab.**—Asia, between 16° and 58° north latitude, and 92° and 145° of east longitude. Especially on the Atlas and Himalayan ranges. China, Cochin-China, Tonquin, Tartary, and Siberia, have all been celebrated for the musk. The animal is timid, and dwells in cold mountainous districts, where coniferous plants abound.

**Capture of the Animals.**—Various methods of catching the animals are adopted. Sometimes they are taken by snares or gigs, sometimes by pitfalls, sometimes by shooting them. The Tunguses, one of the native tribes of Siberia, employ the bow and arrow only.

**Description.**—Three kinds of musk are described, viz. Chinese, Russian (or Kabardine), and Bucharian. I am acquainted with the two first only.

**1. China, Tonquin, or Tibet Musk, (Moschus tunkinensis see below).**—This is imported in small rectangular boxes (cartons), about 7 ¼ inches long, 4 3/8 inches broad, and 4 ½ deep; covered externally by silk, and lined with sheet-lead and paper. These boxes contain about twenty-five sacs or pods, each wrapped separately in paper. (In the

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\(^8\) Spielbg. Zool. fasc. xiii.
* For further details respecting the structure of the musk sac consult Brandt and Bataillon, Abhand., Zool. Bd. 1.
outside of the lid of some of the boxes is marked "Lingchong Musk;" and on the inside of the lid is a rude Chinese representation of the musk hunters, some shooting the animal, others cutting out the musk-bag. On the paper, which envelopes each pod, are similar rude representations in blue or red ink.

Pod musk (moschus in vesicis) consists of roundish, or somewhat oval pods, which are generally broader at one end than at the other. The hairs are brownish yellow, or greyish, or whitish, bristle-like, and stiff; arranged in a concentric manner around the orifice of the sac. A careful examination will always discover the remains of the penis. The pods are about 2½ inches long, and 1½ inches broad. The weight of each pod, as well as of the contained musk, is very variable.

I am indebted to Mr. Noakes, druggist, of Snow Hill, for the following account of the weights of six pods, and of the grain musk obtained herefrom:

<table>
<thead>
<tr>
<th>Pods of Musk</th>
<th>Weight</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2vss</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>5vss</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>5vij. grs. xxxvij.</td>
<td>Grain musk, 5xvij. grs. xv.</td>
</tr>
<tr>
<td>1</td>
<td>5x. grs. xlvias</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>5f. grs. xx.</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>5ff. grs. xii.</td>
<td></td>
</tr>
</tbody>
</table>

Total, 6. 5xxvij. grs. xv. 3xvij. grs. xv.

Average, 1. 5vij. grs. xii. 5f. grs. xii.

Grain musk (moschus in granis; moschus ex vesicis) is granular, viscous to the feel, mixed with hairs, of a dark reddish-brown colour, of a bitter aromatic taste, and a strong, remarkable, very persistent smell (musk odour). Its odour can scarcely be called peculiar, since it is common to several animals and vegetables. Thus, the musk-ox and the musk-cat evolve it. The submaxillary gland of the crocodile secretes an unctuous musky substance. Among plants, Erodium moschatum, Malva moschata, and Centaurea moschata, may be referred as possessing a musky odour. When mixed with other scents, it has the remarkable property of augmenting and improving their quality, without much imparting its own; hence it is extensively used by perfumers. A few drops of potash added to musk increases its activity, by setting free, it is supposed, ammonia.

Siberian, Russian, or Kabardine Musk (Moschus sibiricus, rossicus, cabardinus). This is an inferior kind. The pods are said to be longer or oval than those of the China kind; the hairs longer and whiter. But I have examined large quantities of Siberian musk, the pods of which are not distinguishable from those of the other by any of these characters. The only invariable distinction observed is in the scent, which is remarkably different: it is much less powerful, and more nauseous and disagreeable, being of somewhat empyreumatic. Geiger says, it is sometimes accompanied
by an odour similar to that of the sweat of a horse. This kind of musk is imported in wooden boxes, and all the pods that I have examined were in a good state of preservation; but frequently, I am told, this is not the case.

Bucharian Musk (Moschus bucharicus) is described by some pharmacologists, but I have never met with it. The hairs are said to be yellowish or reddish-brown. The musk has a weak odour, and is of very inferior quality.

Adulteration.—The great sophisticators of musk are the Chinese. I have seen several artificial pods of musk which had been imported from Canton. T. W. C. Martius calls this artificial kind Wampo Musk, and says that, for some years past, it has been extensively introduced into commerce. The hairy portion of the sacs is formed of a piece of the skin of a musk animal, readily distinguished by its remarkable hairs, coarsely sown at the edges to a piece of membrane, which represents the smooth or hairless portion of the sacs. These pods are distinguished from the genuine ones by the following characters:—the absence of any aperture in the middle of the hairy coat; the hair not being arranged in a circular manner; and the absence of remains of the penis (found in every genuine musk sac). These false sacs, as well as the genuine ones, are sometimes enveloped in papers marked, "Musk collected in Nankin by Jung-then-chung-chung-kee." The odour of the mass of the false sacs is ammoniacal.

Grain musk is sometimes imitated by dried blood, and perhaps by other substances. The fraud is to be detected by a careful examination of the appearance and odour of the particles, and by their chemical characters. An infusion of genuine musk gives no precipitate with a solution of bichloride of mercury, but does with tincture of nutgalls, and acetate of lead. By incineration genuine musk leaves behind a greyish white ash, whereas blood yields a reddish one. Artificial musk is said to be prepared by rubbing in a mortar dried bullock’s blood with caustic ammonia, and mixing the half-dried mass with genuine musk. Another kind of artificial musk has been already described (see p. 426).

Commerce.—"At an average of the three years ending with 1832, the imports of musk, from all places eastward of the Cape of Good Hope, with the exception of China, amounted to 4,965 cwt. a-year." In 1839, duty (6d. per ounce) was paid on 2,389 cwt.

Composition.—In 1803, Thiemann analysed musk. In 1804, Bucholz examined it. In 1820, Blondeau and Guibourd published an analysis of it. Afterwards, Westler, Bucher, and Geiger and Reimann submitted it to chemical investigation.

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2 McCallum’s Dict. of Commerce.
5 Jour. de Pharm. vi. 105.
7 Ibid. Bd. xxii. S. 152. 1835.
8 Hmelin, Hand. d. Chem. ii, 1442.
Guibourt and Blondeau

1. Volatilized by water .......................... 0.25
   drying ........................................ 0.25
2. Extracted by ether—Stearine, oleine, cholesterine, fatty acid with ammonia, traces of a volatile oil .......................... 1.00
3. Extracted subsequently by alcohol—Cholestereine, fatty acid with ammonia, sal ammoniac, chlorides of potassium, sodium, and calcium, and an undetermined acid combined with the same bases .......................... 0.00
4. Extracted subsequently by water—Greasing, carbonaceous matter soluble in water, the preceding chlorides, and an undetermined combustible acid .......................... 0.00
5. Extracted subsequently by ammonia—Albumen and phosphates of lime .......................... 0.00
6. Fibrous tissue, carbon and phosphate of lime, hairs, and sand .......................... 0.00

1.00

Geiger and Reinmann

2. Ammonia .......................... Ditto
3. Peculiar, fixed, uncrystallizable acid .......................... Ditto
4. Stearine and oleine .......................... 0-0
5. Cholesterol (with some oleine and resin) .......................... 0-0
6. Peculiar bitter resin .......................... 0-0
7. Osmazone (with sal ammoniac, chlorides of sodium and calcium, and the above acid, partly free, partly combined with the bases) .......................... 0.0
8. A mouldy-like substance, in part combined with ammonia, by which it is made soluble in water, with small quantities of phosphates of lime and magnesia, sulphate of potash, chlorides of potassium and sodium, carbonate of potash or soda, and trace of iron .......................... 0.0
9. Sand .......................... 0-0
10. Water, some volatile odorous matter, the above acid in part combined with ammonia, and loss .......................... 0.0

1.00

Odorous Principle.—Has not hitherto been isolated. The strong and diffusive odour of musk would lead us to expect that its odorous matter was highly volatile. Yet such is not the fact; for we cannot deprive musk of its peculiar odour by distillation, though the distilled liquid has a musky smell. As it is destructible by heat, it is obviously organic. It is not peculiar to musk, since many other substances exhale an analogous odour. Some have suggested that it is the result of putrefaction of one or more of the constituents of musk; and in support of this statement it is asserted that, by Leslie's method of desiccation, musk may be dried and rendered odourless. I have repeatedly performed this experiment with every care, but without obtaining odourless musk. Boquet was of opinion that many odorous substances owed their odour to a certain quantity of ammonia, which, being disengaged, carried off with it substances not otherwise volatile, which masked the ammoniacal smell. In applying this hypothesis to musk, it must be admitted that it harmonizes well with several of the circumstances observed. Thus musk evolves ammonia; water distilled from musk contains ammonia; and potash added to a solution of musk heightens its odour (by facilitating the evolution of ammonia?).

Physiological Effects.—Musk disturbs the functions of the stomach, acts as a stimulant to the vascular system and brain, and afterwards proves narcotic. Jörg and his pupils submitted themselves to its influence in doses of from 2 to 15 grains in water or mixed with magnesia. Its primitive effects were eructation, weight at the stomach, diminution or increase of appetite, dryness of the oesophagus, heaviness of the head, vertigos, and headache. The secondary effects were more marked on the encephalon than on the digestive canal: disposition to sleep, faintness, and a feeling of heaviness in the whole body. Lastly, deep and long-continued sleep. In very large doses the action on the nervous system was very marked; trembling in the limbs, and even convulsions, were observed.

by an odour similar to that of the sweat of a horse.

Bucharian Musk (Moschus bucharicus) is described to be of a dark red colour, but I have never met with it. The hairs are of a brownish grey. The musk has a weak odour, and is said to be astringent.

ADULTERATION.—The great sophistry of the musk trade has been well described by Dr. Wall, to whom I am indebted for the following information. Musk is said to be caused by the influence of musk imported from Canton. T. W. C. Wampo Musk, and says that, extensively introduced into commerce, it is manufactured into a large part of the musk trade. The musk is formed of a piece of skin, distinguished by its remark of a piece of membrane, which is a portion of the sacs. The musk is the middle of the hair follicles; and the genuine musk ones, are sometimes found in Nankin by Jung of the false sacs.

Grain musk is another substance, and is also of the same system by the excretories. Barbiere observes that the sweat of persons who have taken this substance, becomes impregnated with its odour—now and then very strong. The chemical character of the grain musk, has been applied for the purpose of feeling the pulse, and in some time. On post-mortem examination, the grain musk was sometimes found in the lungs, spleen, and portal veins; but they failed to detect musk, as a case of the lacteals. Trousseau and Pidoux mention the excretion of musk in the blood of the spleen, andday.

The effects of musk, already alluded to, show its uses which will be useful where we want to excite and, vice versa, that it will be hurtful where the consumption of blood to the brain, and in those cases in which musk is sometimes useful are the following:

Musk, which, therefore, are called spasmodic. Such, as

* Traité de Thérap., t. i. p. 25.
* Traité des maladies de la peau, 2nd ed. 1809.
* Vér. de. Wege auf weich. Sedat. in Gen, g. I. 83, 61.
changes, or on plethora), chorea, and even in
the employment of musk here has led to its
information I place great reliance, genuine) is one of the most
perplexed with. I have found
many convulsive and
peculiar kind. I had
the pharynx, preventing
when other remedies had
musk, which often showed its
recurred at times for some years
proved by the use of musk.”
accompanied with delirium, twitchings
quivered pulse, and convulsions, musk has
found with benefit. Like opium, its use
uncertain—in one instance relieving, in
malady, though the cases may be to all ap-
gout, as where gout attacks the stomach or the
headache or delirium, musk has been found bene-
which sometimes occurs in pneumonia, but which
the intensity of the latter, and is accompanied
Recamier has found it beneficial.
the late severe visitation of malignant cholera,
of the remedies tried. I saw it employed several
obvious relief. The experience of others was
result is, that the profession has formed a very low
ower in this disease.
Musk should be given in substance, either in
ices, or suspended in water by means of saccharine
substances. Its dose is from eight to fifteen grains,
be sometimes used in the form of enema.

OSCHII, L.; *Musk mixture.* (Musk; Gum Arabic pow-
egach, 5ij; Rose Water, Oj. Rub the Musk, with
with the Gum, the Rose Water being gradually
ounce of this mixture contains nine grains of
ce it will be sometimes found convenient to employ
um, and half as much again of musk.—Dose, f 5j. to

OSCHII, D.; *Tincture of Musk.* (Musk in powder,
irit, Oj. Digest for seven days, and filter.)—Prin-
as a perfume. Each f 5j. is prepared with only gr.

* Mat. Med.
* Jacquet, Biblioth. Méd. t. lix.
The pulse was increased in frequency, and somewhat fuller. The effects show that musk belongs to the cerebro-spinants (see p. 174). It is a stimulant to the nervous and vascular systems, and is important to the stomach. Its effects are by no means uniform. Trousseau and Pidoux, suffered from its use neither excitement of the vascular system nor sleep. Its influence is more manifested in some constitutions (those, for example, commonly termed nervous, in whom there is a very sensible or excitable condition of the nervous system), than in others (as the phlegmatic). Moreover, its effect are more marked in some morbid conditions of the cerebral functions (of the hysterical kind), than in the healthy condition of these functions. In some persons the nervous system appears to be peculiarly susceptible to the odour of musk; for it is reported that headache, giddiness, and even fainting, have been induced by it. When the digestive apparatus is previously in a state of irritation, musk increases the local disorder, giving rise to pain, nausea, vomiting, and diarrhoea. Sometimes the stimulant influence of musk is directed to the sexual organs. Trousseau and Pidoux experienced from it "une assez vive excitation des organes génitaux." In the female it has occasionally provoked the catamenial discharge. In persons disposed to epistaxis it has at times appeared to bring on the hemorrhage. Occasionally diaphoresis or diuresis has seemed to result from its use.

The odorous principle of musk is absorbed, and subsequently thrown out of the system by the excretories. Barbier observes that the urine and the sweat of persons who have taken this substance are powerfully impregnated with its odour—now and then so strongly that the hand, applied for the purpose of feeling the pulse, retains the odour for some time. On post-mortem examination, the brain and the cavities of the chest and abdomen, in those who have taken it during life, sometimes emit a strong smell of musk. Tiedemann and Gmelin recognised the odour of musk in the blood of the mesenteric, splenic, and portal veins; but they failed to detect it in the contents of the lacteals. Trousseau and Pidoux mention that in their experiments, the excretions acquired a feeble odour of musk. Jörg, however, denies that the excretions of those who have taken musk have the smell of this substance.

Uses.—The effects of musk, already alluded to, show that it is a remedy which will be useful where we want to excite the nervous system; and, vice versa, that it will be hurtful where there exists a determination of blood to the brain, and in those constitutions denominated phlegoric. The cases in which experience seems to have shown that musk is sometimes useful are the following:—

1. Those diseases which are attended with convulsive movements and which, therefore, are called spasmodic. Such, for example, as hysteria, epilepsy (especially of children, and where the disease is...
not depend on organic changes, or on plethora), chorea, and even in some cases of tetanus. The employment of musk here has led to its denomination of antispasmodic.

Dr. Cullen, on whose practical information I place great reliance, says, “I maintain that musk (when genuine) is one of the most powerful antispasmodics that we are acquainted with. I have found it, with Dr. Wall, to be a powerful remedy in many convulsive and spasmodic affections, and in some of a very peculiar kind. I had once a gentleman affected with a spasm of the pharynx, preventing deglutition, and almost respiration. This, when other remedies had failed, was relieved by the use of musk, which often shewed its power; for the disease continued to recur at times for some years after, and was only obviated or relieved by the use of musk.”

2. In low fevers which are accompanied with delirium, twitchings of the muscles, a small contracted pulse, and convulsions, musk has been occasionally employed, and with benefit. Like opium, its use in these cases is always uncertain—in one instance relieving, in another increasing the malady, though the cases may be to all appearances parallel.

3. In retrocedent gout, as where gout attacks the stomach or the head, giving rise to headache or delirium, musk has been found beneficial. Cullen relates a case where immediate relief was obtained by the exhibition of fifteen grains of genuine musk.

4. In the delirium which sometimes occurs in pneumonia, but which bears no relation to the intensity of the latter, and is accompanied with adynamia, Recamier has found it beneficial.

5. Lastly, during the late severe visitation of malignant cholera, musk was one of the remedies tried. I saw it employed several times, but without obvious relief. The experience of others was various; but the result is, that the profession has formed a very low estimate of its power in this disease.

Administration.—Musk should be given in substance, either in the form of boluses, or suspended in water by means of saccharine or mucilaginous substances. Its dose is from eight to fifteen grains. In children it may be sometimes used in the form of enema.

1. Mistura Moschi, L.; Musk mixture. (Musk; Gum Arabic powdered; Sugar, of each, $\frac{3}{10}$; Rose Water, Oj. Rub the Musk, with the Sugar, then with the Gum, the Rose Water being gradually added).—One fluidounce of this mixture contains nine grains of musk. In practice it will be sometimes found convenient to employ twice as much gum, and half as much again of musk.—Dose, $\frac{3}{10}$ to $\frac{3}{5}$ij.

2. Tinctura Moschi, D.; Tincture of Musk. (Musk in powder, $\frac{1}{10}$; Rectified Spirit, Oj. Digest for seven days, and filter.)—Principally valuable as a perfume. Each $\frac{3}{5}$ij. is prepared with only gr.
viijss. of musk; or each f3j. with somewhat less than one grain. It is obvious, therefore, that a dose of the tincture which contains a medium dose of musk, would be dangerous, from the large quantity of alcohol it contains.

Essence of Musk, used as a perfume, is ordinarily prepared from the musk pods from which the grain musk has been extracted. The following formula has been furnished me, as one in common use:—Grain Musk, 3xvi.; Molasses, 3viij.; Boiling Water, Oss. Digest until cold; then add, of Rectified Spirit, Ovjs.; Carbonate of Pottash, 5ss.; Digest.

2. CERVUS ELAPHUS, Linn. L. E.—THE STAG.

(Cornu, L.—Horn, E.—Corona Cervina Ramenta, D.)

History.—Both the hart and the hind (the male and female stag) are repeatedly mentioned in the Bible. The stag is also noticed by Hippocrates, Aristotle, Pliny, Galen, and Avicenna.

Zoology. Gen. Char.—Incisors 6, canines 6 — 1, or 6 — 3, molars 9 — 6 = 32 or 34. Canines, when they exist, compressed and bent back. Head long, terminated by a muzzle. Eyes large, pupils elongated transversely. A lacrimal sinus in most. Ears large and pointed. Tongue soft. Body slender. Four inguinal mammae. Horns solid, deciduous, palmed, branched, or simple, in the male; females, with one exception, without horns.

Sp. Char.—Horns with three anterior antlers, all curved upwards, the summit forming a crown of snags from a common centre. Lacrimal sinuses. Fur red-brown in summer, brown-grey in winter. A pale disc on the buttocks.

FIG. 333.

Skull and Antlers of Cervus Elaphus:

a. Crown of the antlers with the velvety covering.

The stag usually begins to shed his antlers in February or March, immediately after which their reformation begins, and by July he has completely renewed them. The first sensible phenomenon of the formation of these parts is the muscular excitement about the frontal bone. The antlers are observed to pegs, and to project more strongly than usual; the heat is increased, and, in fact, all the

Deut. xiv. 5, and Psalms, xviii. 33.
symptoms of active inflammation come on. Very soon we perceive two cartilaginous tubercles, one on each side; these enlarge and elevate the skin, by which they acquire, from the distension of the latter, a velvety covering. These tubercles are soon converted into real bone; but the deposit of ossific matter does not stop here: it continues around the base of the antlers, thus giving rise to what has been usually termed the burr. These osseous prominences, the antlers, are supplied with two sets of vessels—an external or cutaneous, which is the most efficient, and an internal. By the pressure made on the former by the burr, they are obliterated: the covering of the antlers no longer receiving a supply of blood, soon ceases to live, dries up, and falls off. The internal vessels continue to keep up the life of the bone for a few months longer, when death takes place. This occurrence may be in part owing to the imperfect nutrition, and partly, perhaps, to the exposure of the bone to the air without any envelope; but it arises principally from some unknown changes in the vital actions. The antlers being now dead, nature soon sets about their separation. To effect this, the living parts at the base are rapidly absorbed, so that the antlers being left but slightly adherent to the frontal bone, readily fall off by a gentle knock. A few hours only elapse before the irregularity on the surface of the os frontis is covered by a thin pellicle, and shortly afterwards the formation of a fresh pair of antlers is commenced. Castration stops the growth of the antlers.

Hab.—Europe, Asia, and North of Africa.

Description and Composition.—The antlers of the stag are commonly called hartshorn (cornu cervi vel cornu cervinum). Though simply designated cornu (horn) in the London and Edinburgh Pharmacopoeia, their composition is very different to that of the horns of the ox or the sheep, and which are sometimes called true horn. The latter consists principally of coagulated albumen; whereas hartshorn has the same composition as bone. According to Merat-Guillot it consists of soluble cartilage (gelatine) 27.0, phosphate of lime 57.5, carbonate of lime 10.0, water and loss 14.5.

Hartshorn shavings or raspings (rasura vel ramenta cornu cervi) readily give out their gelatine by boiling in water.

Physiological Effects and Uses.—Decoction of hartshorn is nutritive, emollient, and demulcent. It does not possess any superiority over calf’s foot or other gelatinous liquids. It has been used in intestinal and pulmonary irritation. It is generally taken flavoured with sugar, lemon, or orange juice, and a little wine.

Hartshorn shavings are directed to be used in the manufacture of Antimonial Powder (see p. 661), but manufacturers generally substitute bone sawings.

Brewers and others sometimes employ decoction of hartshorn for fining beer and other liquors. It is preferable to isinglass on account of its cheapness. The gelatinous matter of bones being less soluble

* Quoted by Berzelius, Traité de Chim. vii. 693.
than than that of antlers, bone sawings or shavings do not and substitute for hartshorn.

**CORNUS USTUM.** L. *Pulvis Cornu Cervini Usti.* D.; Burnt horn. (Burn pieces of horn in an open vessel until they perfectly white; then powder and prepare them in the same as directed with respect to chalk.)—Burnt hartshorn is in its composition to bone-ash (see p. 600). It has been used same cases, but its employment is now nearly obsolete. Its 3j. to 5j.

3. **O'VIS ARIES, Linnaeus, L. E. D.—THE SHEEP.**

**(Serum, L.—Fat, E.—Aepis Orillus, D.)**

**History.**—The sheep is one of the anciently known animals, is mentioned by Moses?, by Herodotus?, Aristotle, and other writers.

**Zoology.** Gen. Char. *Incisors ½, canines ½—½, molars ½—½*—Horns common to both sexes, sometimes wanting in the thick, angular, wrinkled transversely, pale coloured, turned in a spiral form. Ears small. Legs slender. Hair of two. Tail more or less short. Two mammae.

Sp. Char. [O. Musimon.]*Horns very strong, arched back and curved downwards, and towards the point. General—fawn, more or less brown, white on the face and legs, and under belly; a darker streak on the dorsal line, on the flanks, and black about the neck.

The immense number of races of this animal in cultivation

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**Fig. 354.**

**Ovis Ammon.**

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**Fig. 355.**

**Ovis Musimon.**

* Genesis iv. 2.
* Thalia, cxxiii.
THE OX.

well known; and it is now difficult, perhaps impossible, to determine its native condition. Modern zoologists, however, ascribe our domesticated sheep to *Ovis Ammon*, called the *Argali* of Siberia, or to *Ovis Musimon*, termed the *Mouflon* or *Muflon* of Sardinia.

Hab.—Domesticated everywhere.

Description.—Mutton suet (*sevum; sevum ovillum; adeps ovillus*) is the fat from the neighbourhood of the kidneys of the animals. It is prepared (*sevum preparatum*) by melting it over a slow fire, and straining through linen or flannel in order to separate the membranous portions.

Composition.—The ultimate analysis of mutton suet has been made by Chevreul and by Bérard*. The first of these chemists also ascertained its proximate composition.

<table>
<thead>
<tr>
<th>Ultimate Analyses.</th>
<th>Proximate Analysis.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stearine principally</td>
</tr>
<tr>
<td>Carbon.............</td>
<td>78-996... 65-9</td>
</tr>
<tr>
<td>Hydrogen...........</td>
<td>11-700... 21-5</td>
</tr>
<tr>
<td>Oxygen.............</td>
<td>9-394... 13-5</td>
</tr>
</tbody>
</table>

Mutton Suet........... 100-000... 100-0

Physiological Effects and Uses.—Like other fatty bodies, mutton suet is nutritious, but difficult of digestion. Its local effects are emollient and demulcent. In medicine it is used as a basis for ointments, cerates, and some plasters; being preferred, in some cases, to hog’s lard, on account of its greater consistence.

4. **BOS TAU’RUS, LINNAEUS.—THE OX.**

_Lac._

History.—An animal very anciently known and highly valued. It is repeatedly mentioned by Moses.

Zoology. Gen. Char.—Incisors ², canines ², molars ² — ² = 32. Body large. Members strong. Head large; forehead straight; muzzle square. Eyes large. Ears generally funnel-shaped. A fold of skin, or dew-lap on the under side of the neck. Four mammae; tail long, tufted; horns simple, conical, round, with different inflections, but often directed laterally, and the points raised.

Sp. Char.—Horns round, lateral arched, with the point turned outwards. Face flat, or a little concave. Occipital crest in the same line as the base of the horns. Mammae disposed in a square form. Hair fawn-coloured, brown or black, not sensibly longer at the anterior than the posterior parts. About seven feet long.

Longitudinal Section of a Teat.

a a a. Principal milk ducts.
c e e. Granular glandular substance.
d d d. Duct of the teat.
e e e. Aperture of the teat.

The milk consists of myriads of globular particles floating in a globule of exceedingly minute; according to of the largest does not exceed in size the 0°000 of an inch). They instantly disappear by solution in a drop of caustic alkali. Both Données and separated the globules by repeated filtration: the transparent. The milk globules consist essentially of casein, since they do not dissolve in alcohol and ether, which do not dissolve casein, lighter than the liquor in which they are suspended separate by standing. They, therefore, rise to the top with some casein, and remaining some cream forming what is called cream. The milk from separated is termed skimmed milk.

Cream (cremor lactis; flos lactis) has a very different specific gravity, perhaps, is 1°0244. The upper stratum in butter, the lowest in casein. By agitation, termed churning, the fatty globules unite to form
The Ox.

Milk may be taken at 10848. If left to itself, it readily acquires acid properties, while white coagula, commonly termed curds, separate from it. If an acid or rennet (an infusion of the fourth stomach of the calf) be added to it, this change is immediately effected. The milk separated by rennet is called caseum. But after rennet has ceased to produce any more coagula, acetic acid will cause a further quantity to be formed. The curd thus separated by the acid is termed zeger or sera. The whey (serum lactis) left after the separation of the caseum and sera, yields, on evaporation, sugar of milk, or more nitrogenous substances, lactic acid, and some salts.

Composition.—Milk has been the subject of repeated chemical investigation. The recent analysis of several kinds of milk, published by MM. O. Henry and Chevallier, has been already stated (see p. 57).

The following table shews the composition of several domestic preparations of milk:

<table>
<thead>
<tr>
<th>Constituents</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butter</td>
<td>solid fat</td>
</tr>
<tr>
<td></td>
<td>liquid fat</td>
</tr>
<tr>
<td>Cream</td>
<td>caseum</td>
</tr>
<tr>
<td></td>
<td>serum or whey</td>
</tr>
<tr>
<td>Butter-milk</td>
<td>by rennet</td>
</tr>
<tr>
<td></td>
<td>not by rennet, but by acetic acid</td>
</tr>
<tr>
<td>Skim-milk</td>
<td>saccharine matter</td>
</tr>
<tr>
<td></td>
<td>albuminous matter</td>
</tr>
<tr>
<td></td>
<td>soluble in alcohol</td>
</tr>
<tr>
<td>Whey or serum</td>
<td>salt soluble in water, not in alcohol</td>
</tr>
<tr>
<td></td>
<td>insoluble in water</td>
</tr>
</tbody>
</table>

Caseum or Casein; Albumen of Milk; Lactalbumen.—An albuminous substance distinguished from the albumen of the egg and of blood by its not coagulating when heated, and by the products of its spontaneous decomposition. Dried it is yellowish and transparent, like gum; it is odourless, and has a slightly sweet taste. It is soluble in water. If its solution be boiled in contact with a vessel, it becomes covered with a white pellicle insoluble in water. The acids form with it, when they are in excess, insoluble compounds. Various sulphate of copper, bichloride of mercury, nitrate of silver, bichloride of form insoluble compounds with it. Its composition has been already stated (see p. 53).

Butter.—This well-known substance consists of three fatty bodies, stearine, oleine, and butyrine. The latter substance is characterised by yielding, on hydrolysis, three volatile, odorous, fatty acids, viz. butyric, caprylic, and caprylic acids. A small quantity of these acids exists in ordinary butter, especially when it has been exposed to the air, and gives butter its peculiar odour.

Sugar of Milk; Lactin; Saccholactin.—Obtained from whey by evaporation. As used in commerce it occurs in cylindrical masses, in the axis of which cord which serves as the nucleus for the crystals. It is extensively made in Switzerland. M. Hess has shown that, under certain conditions, caseum is capable of fermentation, as was before inferred from the fact that the Tartars use a vinous liquid, called Konis, from mares’ milk. It is gritty under the teeth, and is very slightly soluble in alcohol. It is much less sweet, and less
CHARACTERISTICS OF GOOD MILK.—The quality of the milk by diseased conditions of a malady called the *cocote*, among the cows following are the essential morbid changes in milk:—want of homogeneity, liquidity, capability of becoming thick or ammonia, and presenting, when examined by globules (agglutinated, tuberculated, or mulberry globules) not found in healthy milk. Hence be quite liquid and homogeneous; not viscous, only spherical transparent globules, soluble should not become thick when mixed with form a flocculent precipitate with acetic acid, by heat. The relative quantity of cream as measured by a graduated glass tube, called a *lactometer*.

I have repeatedly submitted the milk supplied to this metropolis, to examination by the lactometer, been unsatisfactory, as the quantity of cream which I proper cent. by measure. I have usually found the after cream than the milk supplied me in the morning. Only per cent. of cream in the morning milk, but only 5 per cent. milk.

PHYSIOLOGICAL EFFECTS.—The dietetical the been already considered (see p. 57). As a regarded as a demulcent and emollient.

USES.—The dietetical uses of milk have been p. 77).

As a *demulcent* milk is an exceedingly valuable of the pulmonary and digestive organs, soothing agent in poisoning by caustic or aci-
ce, which requires to be frequently renewed on account of the

ity with which it undergoes decomposition, and acquires acidi-

ies. It is a constituent of the Mistura Scammonii, E. (see p. 1270).

ey is an excellent diluent and nutritive. Wine whey (serum vinosum) taken warm, and combined with a sudorific regimen, powerfully on the skin, and is a valuable domestic remedy in colds and febrile disorders. I have already referred to the uses of tartar whey (see p. 527), alum whey (see p. 619), and

iand whey (see p. 1597).

ACTIC ACID. C₈ H₅ O₃ + Aq. This acid has been introduced into

me by Magendie. As it is one of the constituents of the gastric juice he

ed its use in dyspepsia, and as it is a ready solvent of phosphate of lime

gested its employment in phosphatic deposits in the urine. An Italian

ian has more recently recommended it in gout, in consequence of its

a special solvent of the phosphate of lime. It has been exhibited in the

of lozenges, or in solution in water flavoured with sugar.

OX BILE (Ful Bovinum seu Tauri). Formerly extract of ox bile (ful tauri

tum) was employed in medicine as a tonic. It consists of biliary matter,

imentary extract, chloride of sodium, lactate and phosphate of soda, and

ate of lime. The dose of it is a few grains in the form of pills.

ER III.—PACHYDERMATA, Cuv.—THE PACHYDERMS.

ENTIAL CHARACTERS.—Three kinds of teeth. Four extremities, with

able in number, and furnished with strong nails or hoofs. No clavicles.

so of digestion not disposed for ruminating.

SUS SCROFA, Linna. L. E. D.—THE HOG.

(Adeps preparatus, L.—Fat, E.—Adeps ovillus, D.)

ATORY.—The hog is an animal very anciently known. By the

ical law the Jews were forbidden to eat its flesh 38; on account

er the filthy habits of the animal, or its supposed tendency to

der skin and other diseases, more especially leprosy. The

etans are also interdicted from eating it.

OLOGY. Gen. Char.—Incisors, 8 or 8; canines, 4 — 4; molars,

2; = 42 or 44. Canines bent upwards and laterally; molars

tuberculous; lower incisors bent forwards. Four toes on all the

et, the two middle ones only touching the ground, armed

with strong hoofs. Nose elongated, cartilaginous. Body

ered with bristles. Twelve teats.

Sp. Char.—Tusks strong, triangular, directed laterally. No

otubercane under the eyes. Colour blackish-gray in the

ild animal, but varying much in the domesticated races.
The varieties of this animal are almost innumerable. They are most conveniently reduced to the following:—

1. S. Seraferus. The wild hog, or wild boar.
2. S. Seruferus domesticus. The domesticated hog, which varies in its form and colour.
3. S. Seruferus pedibus monangulis. The hog with solid and undivided hoofs.

This variety was noticed by Aristotle and Pliny.

Hab. — The temperate parts of Europe and Asia; the northern parts of Africa; America; the Islands of the South Sea, &c.

Preparation. — The fat of the animal is employed in medicine. That about the loins being firmer and denser than the fat of the other parts of the animal, is selected for medicinal use. In order to separate it from the membranes in which it is contained, it is melted in a slow fire, then strained through flannel or linen, and poured while liquid into a bladder, where it solidifies by cooling (aides preparata). Occasionally salt is added to preserve it; but unsalted lard should be employed for medical purposes. By melting in boiling water, it may be deprived of any salt which may have been mixed with it. While solidifying, lard should be kept stirred, to prevent the separation of stearine and elaine.

Properties. — Hog’s lard (aides suillus vel porci) or elastum (axungia, so called from the use anciently made of it, namely, greasing the axle of a wheel,—unguendi axem) is at ordinary temperature a white or yellowish white solid. Its melting point varies from 78.5° F. to 87.5° F. In the liquid state it should be perfectly clear and transparent; but if be intermixed with water it has a whitish or milky appearance. It should have little or no taste or odour. By exposure to the air, however, it acquires an unpleasant odour and acid properties. In this state it is said to be rancid. This condition is induced by the oxygen of the air, part of which is absorbed, while a small portion of carbonic acid is evolved. As stearine does not become rancid in the air, while elaine does, the rancidity of lard is referred to the latter constituent. But it has been found that the purer the elaine the less readily does this change occur; whence it is assumed that some foreign substance in the elaine is the primary cause of rancidity, either by undergoing decomposition or by acting on the elaine.

Composition. — The ultimate composition of lard was ascertained by Chevreul, as well as by Saussure and Berard. The first of these chemists also made a proximate analysis of rancid lard; and Boussingault determined the composition of fresh lard.

<table>
<thead>
<tr>
<th>Ultimate Analysis</th>
<th>Chevreul</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon</td>
<td>79.99%</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>11.16%</td>
</tr>
<tr>
<td>Oxygen</td>
<td>9.76%</td>
</tr>
<tr>
<td>Lard</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Proximate Analysis of Fresh Lard</th>
<th>Braccionet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stearine</td>
<td>38%</td>
</tr>
<tr>
<td>Margarine</td>
<td>2%</td>
</tr>
<tr>
<td>Elaine or Oleine</td>
<td>62%</td>
</tr>
<tr>
<td>Lard</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Proximate Analysis of Rancid Lard</th>
<th>Chevreul</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stearine and Elaine</td>
<td></td>
</tr>
<tr>
<td>Volatile non-acid matter having a rancid odour.</td>
<td></td>
</tr>
<tr>
<td>Caproic (?) acid.</td>
<td></td>
</tr>
<tr>
<td>Another volatile acid.</td>
<td></td>
</tr>
<tr>
<td>Obolic, margaric, and perhaps steric acid.</td>
<td></td>
</tr>
<tr>
<td>Yellow colouring matter.</td>
<td></td>
</tr>
<tr>
<td>Non-acid, non-volatile matter, stable in water.</td>
<td></td>
</tr>
</tbody>
</table>

* Correspond, Handbook. d. Chema. R.
The Beaver.

Physiological Effects.—Lard, like other animal fats, is nutritious, but very difficult of digestion. Its topical effects are demulcent and emollient. Both the flesh and fat of the hog have been long supposed to dispose to cutaneous disease; but it is no easy matter either to prove or disprove this opinion.

Uses.—In medicine lard is principally employed as a basis for unguents. It has been used, by friction, as an emollient; but the practice is now obsolete. In pauper establishments it is sometimes employed, as a substitute for spermaceti ointment, to dress blisters; but the salt which lard sometimes contains, as well as the facility with which this fat becomes rancid, are objections to its use. I have seen it occasion considerable irritation.

Order IV.—Rodentia, Cuvier.—The Rodents.

Glisser Linnaeus.

Essential Characters.—Two large incisors in each jaw, separated from the molars by a vacant space. No canine teeth. Molars with flat crowns or blunt tubercles. Extremities, the posterior longest, terminated by ungualated toes, the number varying according to the species. Mammary variable in number. Stomach empty. Intestines very long.

Castor Fiber, Linnaeus.—The Beaver.

(Castoreum in folliculis praputii repertum, E.—A peculiar secretion from the preputial follicles, E.—Castoreum, D.)

History.—Castoreum was employed in medicine by Hippocrates, who considered it to possess the power of acting on the uterus. It was an ancient opinion that the castor sacs were testicles, and that when closely pursued by the hunter, the animal tore them off, leaving them behind as a ransom. Hence, it was said, arose the name of the animal, à castrando. This absurd notion seems to have been long ago disbelieved; for Pliny tells us that Sextius derided it, and said it was impossible the animal could bite them off, since they were fastened to the spine. Thus was one error confuted by another; the truth being, the testicles are so placed in the inguinal region, on the external and later part of the os pubis, that they are not discernible until the skin be removed. Moreover, female beavers also have castor sacs.

Zoology. Gen. Char.—Incisors $\frac{2}{2}$, canines $\frac{2}{2}$—$\frac{2}{2}$, molars $\frac{4}{4}$—$\frac{4}{4}$ = 20. Molars composed of flat crowns, with sinusous and complicated ridges of enamel. Five toes on each foot, the anterior short and close, the posterior longer and palmed. Tail broad, thick, flattened horizontally, of an oval form, naked, and covered with scales (Stark).

Sp. Char.—Fur consisting of two sorts of hair, one coarse and brownish, the other downy, more or less grey. About two feet long. The ordinary colour of the animal is brown; but yellow, black, spotted, and white beavers, are met with. The two latter are very

* Juvenal, Sat. xii. v. 34.
rare. Richardson has never seen either of them, though he has met with black beavers which were kept as curiosities. The tail is remarkable for its scaly appearance. Its great breadth (oftentimes 3 inches) depends, not on the width of the caudal vertebrae, but on numerous strong tendons inserted into these vertebrae. Incisor teeth smooth, orange-coloured anteriorly, white posteriorly.

There is some reason for supposing that the European and American beavers are distinct species. The former are burrowers, the latter are for the most part builders.

Anatomy of the Castor Sac.—It has been before stated, that both male and female beavers are furnished with castor sacs: hence it will be convenient to consider them in the two sexes separately.

1. Of the Male Castor Sac.—If the animal be placed on its back, we observe, near the tail, a hollow (called by some a cloaca) inclosed by a large wrinkled, somewhat hairy, cutaneous protuberance, which according to Pernot is easily contracted and dilated, not by a sphincter, as the anus, but simply like a slit. In this hollow the anus, the prepuce, and the oil sacs open.

When the skin of the abdomen is removed, four eminences, covered by their proper muscles, are brought into view. They are placed between the pelvic arch and the so-called cloaca. The two nearest the pubes are the case sacs while those next the cloaca are the oil sacs. Between the two castor sacs, in the male, lies the penis with its bone (os penis); it is lodged in a long prepuetal canal which terminates in the clitoris, and has some analogy to a vagina; so that there is some difficulty to determine, until the skin be removed, whether the individual be male or female.

The penis points towards the tail, not towards the navel as in the dog. Its surface is covered with longitudinal wrinkles and pits: in each of the latter is found a dark-colored warty-like body. The testicles, vasa deferentia, and seminal vesicles, present nothing remarkable. There is no scrotum. Like most other Rodentia, the beaver has vesiculae acuatorum, blind ducts, which open into the urethra near its commencement. Just at the point where the urethra joins the penis are secreted Cowper’s glands. The castor sacs open by a common orifice into the prepuetal canal. This aperture is about one inch in width, and is placed opposite the extremity of the glans penis in the relaxed condition of the organ, and about one inch from the orifice of the prepuce. Between this common orifice of the castor sacs and the glans penis is a semilunar fold. There is also a second, similar, but thicker, fold covering the rectum.

The castor sacs are pyriform and compressed. They communicate with each other at their cervical portion; but their

---

5 Fauna Borzalli-Americana.
* See some remarks on the distinctions between the burrowing and non-burrowing beavers, in James’ Journal, vol. xxvii. p. 68.
Sexual organs of a male beaver.

- a. Spermatic vessels.
- b. Anus.
- c. Anal glands.
- d. Openings of the anal glands.
- e. Urethra cut off.
- f. Lobes of the prostate gland.
- g. Testicle.
- h. Penis.
- i. Cowper's glands.
- j. Urethra laid open.
- k. A portion of the epidermis of the skin.
- l. A portion of the bladder, showing the opening of the ureters.
- m. Caruncula seminalis.
- n. Opening of the left vesicula seminalis.
- o. Opening of the left vas deferens.
- p. Vesicle accessory.
- q. Whole vas deferens.
- r. Seminal cord.

Castor and oil sacs, with their appropriate muscles.

- a. Spermatic vessels.
- b. Anal glands.
- c. Anal glands.
- d. Openings of the anal glands.
- e. Urethra cut off.
- f. Lobes of the prostate gland.
- g. Testicle.
- h. Penis.
- i. Cowper's glands.
- j. Urethra laid open.
- k. A portion of the epidermis of the skin.
- l. A portion of the bladder, showing the opening of the ureters.
- m. Caruncula seminalis.
- n. Opening of the left vesicula seminalis.
- o. Opening of the left vas deferens.
- p. Vesicle accessory.
- q. Whole vas deferens.
- r. Seminal cord.

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diverge outwards and towards the pubes. Each castor sac is composed of an external or cellular coat which incloses muscular fibres. The latter are a continuance of the panniculus carnosus: their function appears to be to compress the sac. Within these fibres lies a very vascular coat, which covers the scaly or glandular coat, and sends processes in between the convolutions of the latter. Scaly or glandular coat forms numerous folds or convolutions, which are most numerous in the fundus of the sac. Externally, it is shining, and iridescent. Internally, it presents numerous, small, lanceolate, semi-lunar scales, which are mostly toothed at their margin, and envelop a brown body, supposed to be a gland, and which is lodged in a small cavity. The inner surface of the castor sacs is lined with epithelium (a continuation of the epithelium of the prepuce), which invests the glands and scales of the scaly or glandular coat. In the cavity of the castor sac is found the castor gum, when recent, is thin, fluid, highly odorous, yellow or orange coloured, being deeper by exposure to the air. The quantity of this secretion is liable to variation. The oil suae are conglomerate glands, placed one on each side of the castor sac and anus: their ducts terminate in the cloaca. The secretion of these glands is a fatty matter, having the consistence of syrup or honey, a peculiar odour, and a yellowish colour. It was formerly used in medicine under the name of pinguedo seu anxia castoris.

Fig. 364.

Castor and oil sacs laid open.

Fig. 363.

Relative position of the castor and oil sacs and pelvis.

The relative position of the castor and oil sacs, with respect to the body of the animal, is shewn in fig. 364, taken from Perrault.

* For further details respecting the structure of the castor sacs consult Brumpt and Lenard.

Med. ZoöI."

NOTE: The page contains a diagram labeled as Fig. 363 and another labeled as Fig. 364, which are integral to understanding the description provided. The text elaborates on the structure and function of the castor and oil sacs, highlighting their anatomical features and their role in the animal's body. The text also notes the use of the oil as a medicinal agent. The diagrams are essential for visualizing the description.
OF THE FEMALE CASTOR SAC.—We are less perfectly acquainted with the anatomy of the female than of the male beaver. Indeed, I am acquainted with dissections only of the former; viz. one by Gottwaldt, a second by Hegæus, third by Mortimer. The subjoined description and figure is from the last-mentioned authority.

He says the animal had two ovaria, and an uterus dividing into two horns (uterus bicornis) as in the bitch. The bladder lay exactly over the body of the uterus. The meatus urinarius ran upon the vagina above two inches in length. Just below the os pubis, on each side of the vagina, above the meatus urinarius (supposing the animal laid on her back), a pair of pyriform bags were found, about 1½ inches long, and 1 inch broad, diverging at their fundi or broad ends, but approximating most closely at their necks or narrow extremities, which were canals communicating with the adjoining glands. The membranes which formed these bags were tough, wrinkled, and furrowed, of a livid dirty colour. They were hollow, and capable of containing about an ounce of water. Upon opening them a small quantity of dark brown liquor, like tar, was found, having an odour like castoreum, and in addition a smell of ammonia. It is probable that the emptiness of the sacs, and the unusual quality of their contents, arose from the youth of the animal. About an inch lower, on each side of the vagina, were a pair of glands (oil sacs), each about 1½ inches long, and ½ inch broad. Their form was oblong but irregular, and having several protuberances externally; their colour was pale flesh, like the pancreas. They seemed to communicate with the castor sacs, the sac and gland on each side opening externally by one common orifice, around which were long black hairs.

Hab.—North America, from 67° or 68° to about 33° north latitude; Europe, from 67° to 36° north latitude, but becoming very scarce. It appears to have been indigenous.

HABITATURE OF THE BEAVER.—The beavers are caught in various ways; sometimes in traps, sometimes in nets. But the usual method break up the beaver houses when the animals retreat to their holes, where they are easily taken.

COMMERCE.—Castoreum is imported from North America by the Hudson's Bay Company. The greater part of that brought over is for exportation. In 1839 duty (6d. per lb.) was paid on 801 lbs.
DESCRIPTION.—Two kinds of castor (castoreum) have long been known, viz. Russian and American. The latter, however, is the only one now met with in English commerce.

1. American Castor (Castoreum Americanum.)—It usually consists of two isolated sacs, frequently wrinkled, and which are connected so as to form two parts, like a purse, or like two testicles connected by the spermatic cords. The size of the sacs is liable to considerable variation. They are elongated and pyriform. The penis or the ejaculation sacs, or both, are sometimes attached to them. The colour and other external characters are variable. In December 1834, I examined between three and four thousand pounds of castoreum, which was offered for sale by the Hudson's Bay Company. A considerable quantity of it was covered externally with a bluish white mouldiness, while the remainder was of a brownish colour. The brown colour, however, varies considerably; sometimes being dark, in some cases yellowish, or even reddish. Some castor sacs are found nearly empty, and present, in their dried state, a very fibrous character that are of inferior quality. Others are found gorged with useless matter, and, when quite dry, break with a resinous character, presenting no fibres until they have been macerated in spirit of wine. In many well-filled sacs the castoreum is quite soft.

In English commerce, two varieties of American castoreum are made: one called the Hudson's Bay, the other the Canadian. Both are imported by the Hudson's Bay Company. The Hudson's Bay castoreum is usually considered the finest variety. The specimen of it which I examined at the house of the Company, in December, 1834, came from York Fort and Moose River. The finest samples were superior to any of the Canadian kind, though the average quality was much the same.

2. Russian Castor, (Castoreum Rossicum).—This is exceedingly scarce. When met with it fetches a very high price. I have paid for a museum sample £2 per oz., while American castor fetched only twenty shillings per lb. There are at least three kinds of castor sold as Russian. Chalky Russian castor occurs in smaller and more rounded sacs than the American kind. A pair of sacs in my museum weighs 557 grains. The specimens which I have seen had neither penis nor oil sacs attached. The colour is ash-brown. Its odour is peculiar, empyreumatic, and readily distinguishable from that of American kind. Under the teeth it breaks down like starch, has at first little taste, then becomes bitter and aromatic. It is readily distinguished from all other kinds by dropping it into diluted hydrochloric acid, when it effervesces like a lump of muscle. I have seen another kind of castor from Russia which may be termed Resinous Russian Castor. The sacs were large, well filled with resin, did not effervesce with hydrochloric acid, and had an odour very similar to that of American castor. The Russian castor is—

* See Loud. Med. Gaz. vol. xvi. p. 296, fig. 41.
cried by Guibourt appears to have been subjected to some preparation.

Composition.—Castoreum has been subjected to chemical analysis by several chemists. Those whose results deserve especial reference are Bonn and Brandes.

Brandes’s Analyses.

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<td>69</td>
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<tr>
<td>Osmazome</td>
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<tr>
<td>Mucus</td>
<td>230</td>
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<tr>
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<tr>
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<tr>
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<td>9.20</td>
<td>Moisture and loss</td>
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</tr>
<tr>
<td>Russian Castor</td>
<td>100.0</td>
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These analyses do not agree with my experiments and observations. The quantity of carbonate of lime assigned to Canadian castor is much too large. By incinerating 60 grains of American castor in a platinum crucible I found only 1.2 grains of ashes, which showed that the whole were lime, which if the whole were lime would be equal to little more than 3.5 per cent. of chalk.

1. Volatile Oil of Castoreum.—This is obtained by distilling the same matter several times with fresh portions of castor. It is pale yellow, and has the dour of castor, with an acid, bitter taste. Bonn says he obtained 34 per cent. of oil, but there must be some error in this statement.

2. Castorine; Castoreum Camphor, Gmelin.—A crystalline, fatty, non-saponifiable substance. It is fusible, and in the liquid state floats on water. When pure it is white. It is soluble in ether and boiling alcohol. By long ebullition with nitric acid, it is converted into a yellow crystallizable acid, called castoric acid. The supercastorate of ammonia is crystallizable, and forms white precipitate with the salts of silver, lead, and protoxide of iron, and green precipitate with the salts of copper. Castorine is obtained by boiling castor in alcohol; the castorine deposits when the liquor cools. Scarcely any can be got from American castor.

3. Resin.—This is dark brown, has an acid and bitter taste, and a slight dour of castor. It is insoluble in pure ether, but dissolves readily in alcohol. Water precipitates it from its alcoholic solution.

Physiological Effects.—Castor is usually denominated a stimulant and antispasmodic. Since the time of Hippocrates it has been regarded as endowed with a specific influence over the uterus.

In 1768, Mr. Alexander took it in various doses to the extent of two drachms; and the only effect he experienced from it was disagreeable constrictions. In 1824, Jörg and his pupils, males and females, submitted themselves to its influence; but the only effects were slight uneasiness in the epigastric region, and disagreeable contractions having the odour of castor, and which were not allayed by breakfast or dinner, and only ceased at night when sleep came.

These facts seem to shew that castoreum possesses but little me-
dicinal power: yet Dr. Cullen declares that on many occasions is certainly a very powerful antispasmodic. Its odoruous part become absorbed, for they have been recognized in the urine by the smell.

Uses.—Castoreum was formerly in great repute in those affections of the nervous system denominated spasmodic, such as hyste-ra, epilepsy, and catalepsy, more especially when these diseases occurred in females, and were attended with uterine disorder. In those kinds of fever called nervous, this medicine has also been recommended. In the northern parts of Europe it is used for its supposed uterine influence, as, to promote the lochial discharge, and the expulsion of the retained placenta. It is, however, little employed here, and perhaps, in consequence of its disagreeable taste and smell, its variable quality, and its high price; but, for the most part, I believe, because practitioners consider it an almost inert remedy.

Administration.—It is best given in substance, either reduced to powder or in the form of pills. The dose should be at least 5 ij.

1. Tinctura Castorei, L. E.; Tinctura Castorei Rossi, i. Tincture of Castor. (Castor [Russian, D.], bruised, 5 ijs. [5i. D.]
Rectified Spirit, Oij. [Proof Spirit, Oij. wine-measure, D.] Mace rate for fourteen [seven, D.] days, and filter. "This tincture may be prepared either by digestion or percolation, like the tincture of Cassia." [p. 1419], E.)—Rectified spirit, used by the London Pharmacopoeia, is a better solvent for castor than proof spirit employed by the Dublin College. The quantity of castor used in the processes is much too small. A fluidounce of the Edinburgh tincture contains three-fourths of a drachm, while the London preparation contains only half a drachm; so that to give a medium dose of castor (5ij.), it would be necessary to administer f3ij. of the tincture (rectified spirit) of the London Pharmacopoeia! Dr. Paris says the dose of this tincture is mxx. to f3ij.

2. Tinctura Castorei Ammoniata, E.; Ammoniated Tincture of Castor. (Castor, bruised, 5 ijs.; Asafoetida, in small fragments, 5.; Spirit of Ammonia, Oij. Digest for seven days in a well-closed vessel; strain and express strongly the residuum; and filter the liquor. This tincture cannot be so conveniently prepared by the method of percolation, E.)—Stimulant and antispasmodic. Spirit of Ammonia is a good solvent for both castor and asafoetida—thus f5ss. to f3ij.

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