

it feeds, (2) that its eggs are laid in dead and dying logs on or near the ground, early in April, and (3) that the larvæ appear as perfect beetles in June and July.

The spruce gall aphid (*Chermis abietis*) is very abundant all over England, and this season in particular its depredations have been increased to an alarming extent. When abundant, the general health of the trees is seriously affected, while in every case crippling and distorting of the branches is brought about by this much-dreaded insect. Having passed the winter in crevices of the bark, the Chermes appear in the spring as ocher-colored wingless insects, and attach themselves to the young and tender leaves of the spruce. A mass of eggs is laid on the tender shoot, usually where two twigs meet, the larvæ of which, when hatched, tap the shoot with their beaks, this causing the swelling known as the spruce gall, and which resembles a small fir cone. In August the winged insects leave the "cones." To cope with this insect is a by no means easy task, although in the case of single specimens, hand picking and destroying the galls in June or July will be found productive of a great amount of good.

Probably the worst enemy to young conifers, and one that unfortunately is by no means uncommon, is the pine weevil (*Curculio (Hylobius) abietis*). The beetle attacks nearly all the pine tribe, as well as the larch, spruce, and at least two species of cypress, the depredations consisting in the eating of the bark of the shoots and tender twigs. To such an extent is this gnawing of the bark carried on that frequently whole branches are rendered barkless in a few days, an unusual flow of resin being the result. Usually only young fir trees are attacked, up to, say, the age of ten years, and nursery stock often suffer to a great extent.

By keeping the woods free of dead and dying twigs and logs, no breeding places will be found, and so the extermination of this, like most other beetles, is a matter of no great difficulty. Another occupant of our woods and forests is the pine saw fly (*Lophyrus Pini*), its damages being extended to the partial devouring of the needles of the infested tree.

The larch miner (*Coleophora laricella*) feeds on the center of the larch needles, which it mines into, causing these to turn yellow and drop off in great quantity. This may not kill the tree, but going on for year after year the attacked specimens rarely have a healthy appearance. It is very plentiful in England.

Another very common occurrence in our pine woodlands is to see the shoots deformed and twisted, and the terminal buds stunted and falling off—an evil that is due to the attacks of the pine shoot moth (*Retinia buoliana*). The larvæ live in the trees through the winter.

There are many other insects that cause considerable damage to our coniferous trees, but the above may be considered as the principal or worst forms with which the forester has to cope. The "larch disease," or "larch canker," as it is commonly known, is, unfortunately, very much on the increase in this country; indeed, during my experience I have never seen such widespread devastation as is to be met with this season. It is due to a minute fungus known as *Peziza Wilkommii*, and which spreads wherever a footing can be got, with terrible rapidity.

The main point to attend to in coping with this malady is to preserve the larch plantations in as healthy a state as possible, and to do this, the following rules should be rigidly observed, remembering that the fungus can only find a footing where the bark of the tree has met with injury in one way or another.

1. Plant the tree only on suitable soils.
2. By careful management, keep the trees in as healthy a condition as possible.
2. Choose healthy, strong stock to start from; and—
4. In collecting larch seed for propagating purposes, select only such as has been matured by a winter's frost, and from healthy trees in the prime of life. (No. 4 should be rigidly observed, for owing to neglect of these precautions deterioration of the larch has long been going on.)

As showing the widespread damage that has been inflicted on coniferous trees of late I might specially refer to a case in South Wales, where thousands of larch trees have been destroyed by the above fungus; to numerous cases in England, where the pine beetle is causing widespread devastation in the Scotch fir woods; and to serious damage in Ireland by several of the other insects named in this paper.

Abroad many striking examples might be mentioned, such as in East Prussia, Poland and Russia, where in the fifteen years, from 1853-68, the spruce was killed over an area of 7,000 square German miles; and two years ago in Bavaria, where damage to the trees amounted to fully £40,000. In both instances that destructive insect, of which we are by no means free in this country, *Liparis monacha*, was entirely to blame.

The great importance of the attack has caused owners of woodlands in this country to look better to the general health and cleanliness of their woods and plantations than has ever before been the case; and the numbers of specimens of insects that have been sent for inspection and naming also proves that a great additional interest is being awakened in the matter.

In conclusion, it may be stated that, as a rule, so as to keep these insect pests in check, no loppings or windfalls should be allowed to lie about in the woodlands, such only affording the best of all breeding grounds, and consequent spread of the evil.—*A. D. Webster, in the Gardeners' Chronicle.*

A POISONOUS FUNGUS.

Agaricus (amanita) phalloides. *Fries.*—There is rather strong evidence that this is one of the most poisonous of British fungi, if not really the very worst. It resembles a little the celebrated fly agaric, but the brilliant red of that species is in itself a warning, while the present is more subdued in its coloring, and much more common. In the autumn nearly every wood produces them in plenty, and there is no doubt that Dr. Plowright traced some case of mushroom poisoning to this source. It is rarely that the species causing the mischief can be accurately determined after these accidents, but fortunately Dr. Plowright was a practical mycologist, and soon discovered the cause. We have considered it of advantage to give a figure of this enemy of the unwary, with a few particulars of its history. The pileus, or cap, is from three to four

inches broad, with rather a viscid skin, soon becoming expanded and rather flat. Sometimes the top is quite naked, at other times patches of the volva-membrane, irregular in size and shape, are adherent. When growing exposed to the sun, the color is whitish, or pale lemon yellow, but in more shady places with a dull greenish tint, or pale olive. The gills are free from the stem and white, broadest in the middle, and narrowed toward each end. The stem is from three to five inches high, solid at first, but becoming hollow, bulbous at the base, with a large drooping white collar or ring toward the top, and a volva or sheath at the base, the lower portion of which is grown to the bulb, the upper margin being torn and loose. When quite young, the cap is inclosed within a membranaceous coat or volva, with the form of an egg, but with the growth and elongation of the stem, this volva is broken irregularly, and the young cap rises on its stem, carrying up with it fragments of the torn volva attached to its surface, while the residue remains like a ragged membrane attached to the bulbous base. While still fresh, this fungus has very little odor, but soon after being gathered it smells more strongly, becoming more or less stinking in decay. The odor faintly resembles that of the stinkhorn (*phallus*), and hence the name.

There is a variety which is pure white, sometimes called a distinct species, under the name of *Agaricus vernus*, which only seems to differ in color, and less fetid odor, but it is equally dangerous. In both forms



STINKING WARTED CAPS—*AGARICUS PHALLOIDES*, PALE YELLOW OR GREENISH.

the spores are white and the substance rather soft and fragile, so that we cannot imagine how any sane person can possibly confound them with the common mushroom.—*M. C. Cooke, in The Gardeners' Chronicle.*

THE KADAMBA TREE.

This tree is indigenous to Ceylon, and is known among botanists as *Anthrocephalus Cadamba* (the Kadamba of the Tamils). It has an erect stem with many branches, the flowers, which have a peculiar sweet smell, forming a small globe. The fruit is about the size of an orange. This is eaten by the poor natives in India, while the leaves are given to cattle as fodder. The bark is considered to be of great value as a febrifuge and tonic. Its taste is bitter and astringent. The fresh juice of the bark is applied to the fontanelles of children when that soft portion of the head sinks. At the same time a small quantity mixed with cumin and sugar is given internally. The juice of the bark mixed with an equal quantity of lime juice, opium, and alum has been applied with great benefit round the orbit of the eye to subdue inflammation. The tender leaves, when applied in the form of a paste, resolve glandular swellings, and the large leaves prove an efficacious remedy for eczema. A decoction of the leaves is used as a gargle in cases of aphthæ and stomatitis. The fruit is considered to be cooling, a destroyer of phlegm and impurities of the blood. The wood of the Kadamba tree is of great economic importance, is soft, yellow-colored, and even-grained, weighing about 40 pounds per cubic foot. It is used for building purposes in Assam, and may be used as material for beams and rafters, being also good for joiner's work. In Calcutta it is one-third as cheap as mango wood. Kadamba trees grow wild throughout India, and are principally used for fuel. The closely allied *Manjal-Kadamba*, the *kolon* of the Sinhalese (*Adina Cordifolia*), and *Nir-Kadamba* or *Chelemba*, the *Helamba* of the Sinhalese (*Stephogyne parvifolia*), are sometimes used by carpenters in Ceylon. The wood of the former is extremely fine and like that of the box tree, being light and durable, though it does not stand damp well. It is used in Bombay for planking for the floors of houses. The former, which is of a light chestnut color, fine and close grained, has also been used for flooring planks, packing boxes, and similar purposes.—*Indian Agriculturist.*

THE Scientific American Supplement.

PUBLISHED WEEKLY.

Terms of Subscription, \$5 a Year.

Sent by mail, postage prepaid, to subscribers in any part of the United States or Canada. Six dollars a year, sent, prepaid, to any foreign country.

All the back numbers of THE SUPPLEMENT, from the commencement, January 1, 1876, can be had. Price, 10 cents each.

All the back volumes of THE SUPPLEMENT can likewise be supplied. Two volumes are issued yearly. Price of each volume, \$2.50 stitched in paper, or \$3.50 bound in stiff covers.

COMBINED RATES.—One copy of SCIENTIFIC AMERICAN and one copy of SCIENTIFIC AMERICAN SUPPLEMENT, one year, postpaid, \$7.00.

A liberal discount to booksellers, news agents, and canvassers.

MUNN & CO., Publishers.

361 Broadway, New York, N. Y.

TABLE OF CONTENTS.

	PAGE
I. ARCHEOLOGY.—Restorations of the Pantheon of Rome.—A very important and striking contribution to Roman archaeology, based on recent researches.—2 illustrations.....	14882
II. BIOGRAPHY.—A Newly Discovered Portrait of Mozart.—An undoubtedly authentic portrait of the great musician, with notes on the same.—1 illustration.....	14871
III. CHEMISTRY.—Chemistry at the British Association.—Resume of the proceedings of Section B.—Interesting notes on the work of British chemists.....	14893
IV. CIVIL ENGINEERING.—The Austro-Hungarian Maneuvers.—Construction of the great bridge across the Danube.—Construction of a pontoon bridge across the Danube in two hours.—1 illustration.....	14879
Transmission of Power.—By R. S. ALLAN.—A prize essay of the Aberdeen Mechanical Society.—Short and long distance transmission of power.....	14879
V. ELECTRICITY.—A New Method of Electric Culture.—Utilization of the magnetism of the earth and air for purposes of agriculture, with results attained in a actual use.—1 illustration.....	14878
The Chloride Electrical Storage Battery.—By HERBERT LLOYD.—An important innovation in the construction of storage batteries, will full description of the process of manufacture.....	14877
VI. ENTOMOLOGY.—Insects Injurious to Forest Trees.—Insects injuring forest trees in Great Britain.—A serious question for entomologists.—4 illustrations.....	14885
VII. HYGIENE.—American Life and Physical Deterioration.—The future of the American race and probabilities of its deterioration.....	14873
The Moral Effects of Physical Exercise.—How exercise should be taken.—The value of association therein.....	14873
Vocal Physiology and Systematic Voice Training for the Prevention of Diseases of the Larynx.—By J. WALTER PARK.—How to preserve the voice, with special reference to the life habits and hygiene of musicians.....	14872
VIII. METEOROLOGY.—On Rainmaking.—By ALEXANDER MACFARLANE.—A scientific review of this question, with criticism of different efforts as made and of the suggestions of various inventors.....	14880
IX. MISCELLANEOUS.—The Brazilian Revolution.—Notes on the recent rebellion, with portraits of the President and of the leader of the revolt.—2 illustrations.....	14883
X. MYCOLOGY.—A Poisonous Fungus.—One of the most poisonous of British mushrooms described and illustrated.—1 illustration.....	14886
XI. NATURAL HISTORY.—Whalebone and Whalebone Whales.—By R. LYDEKKER.—A popular account of whales and of the growth of whalebone, and probabilities of the future supply of the article.....	14884
XII. NAVAL ENGINEERING.—Who Invented the Screw Propeller?—An interesting contribution to the early history of the science of naval engineering.....	14880
XIII. PHYSICS.—A New Sclerometer.—An elaborate apparatus for the study of hardness of minerals, of metals, and of other substances.—1 illustration.....	14875
Muller's Calorimetric Shell.—Apparatus for determining the calorific value of fuels with great accuracy. 1 illustration.....	14874
Physics at the British Association.—Interesting summary of the proceedings in Section A of the British Association, including a discussion on education in physics.....	14875
The Dance of the Soap Bubbles.—An exceedingly pretty experiment in physics without apparatus.—1 illustration.....	14883
XIV. TECHNOLOGY.—A Visit to the Havemeyer & Elder Refinery, Brooklyn.—By Messrs. A. HEZZFELD and W. MARTZ.—A description of the American process from the European standpoint. The Invention of Lucifer Matches.—A curious question in the history of technology.—Early notes on the matches of our forefathers.....	14882

CATALOGUES.

A Catalogue of Valuable Papers contained in SCIENTIFIC AMERICAN SUPPLEMENT during the past ten years, sent free of charge to any address; also, a comprehensive catalogue of useful books by different authors, on more than fifty different subjects, has recently been published, for free circulation, at the office of this paper. Subjects classified with names of authors. Persons desiring a copy have only to ask for it, and it will be mailed to them. Address

MUNN & CO., 361 Broadway, New York.

PATENTS!

MESSRS. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN, continue to examine improvements, and to act as Solicitors of Patents for Inventors.

In this line of business they have had forty-five years' experience, and now have unequalled facilities for the preparation of Patent Drawings, Specifications, and the prosecution of Applications for Patents in the United States, Canada, and Foreign Countries. Messrs. Munn & Co. also attend to the preparation of Caveats, Copyrights for Books, Labels, Reissues, Assignments, and Reports on Infringements of Patents. All business entrusted to them is done with special care and promptness, on very reasonable terms.

A pamphlet sent free of charge, on application, containing full information about Patents and how to procure them; directions concerning Labels, Copyrights, Designs, Patents, Appeals, Reissues, Infringements, Assignments, Rejected Cases. Hints on the Sale of Patents, etc.

We also send, free of charge, a Synopsis of Foreign Patent Laws, showing the cost and method of securing patents in all the principal countries of the world.

MUNN & CO., Solicitors of Patents,

361 Broadway, New York.

BRANCH OFFICES.—Nos. 622 and 624 F Street, Pacific Building, near 7th Street, Washington, D. C.