

Chemistry of Vegetable Physiology and Agriculture.

Destruction of Bacteria [in Water] by Aëration and by Hydrogen Peroxide. KÜSTER (*Arch. Hygiene*, 1904, 50, 364—387).
—The number of germs in water is considerably diminished by

aëration when the water is at the same time cooled by means of ice. Cooling alone had a slight effect.

Hydrogen peroxide was found to have considerable value as a disinfectant, and its employment for purifying small quantities of water is recommended.
N. H. J. M.

Absence of Bacillus Coli in Unpolluted Water. A. C. HOUSTON (*J. Pathol. Bacteriol.*, 1904, 9, 456—471).—*Bacillus coli* is present in large quantities in sewage, and there is a broad parallelism between the number of the bacilli in sewage-polluted waters and the degree of contamination with sewage. In order to make the importance of the bacilli more evident, it is necessary to show further that the *B. coli* is absent from relatively large quantities of unpolluted sea water and the water of tidal rivers; this is what the bulk of the present paper is concerned in proving is the case.
W. D. H.

Detection of Bacillus Enteritidis Sporogenes in Water. R. TANNER HEWLETT (*Trans. Path. Soc. London*, 1904, 55, 123—126).—A modification in the manner of carrying out the milk test for this sewage microbe is suggested.
W. D. H.

Respiration-enzymes of Moulds. S. KOSTYTSCHIEFF (*Chem. Centr.*, 1904, ii, 48—49; from *Ber. Deutsch. Bot. Ges.*, 22, 207—215).—The following conclusions have been derived from the results of experiments. (1) The absorption of oxygen and the liberation of carbon dioxide by moulds in the process of respiration is at least partly due to the action of specific enzymes. (2) The formation of carbon dioxide when oxygen is excluded is effected by means of an enzyme which is not identical with Buchner's zymase. (3) Stoklasa and Czerny's theory of the formation of zymase by aërobic organisms is not quite correct (*Abstr.*, 1903, ii, 320). (4) Although the enzyme concerned in the process of "anaërobic" respiration also occurs in organisms which have lived under conditions in which they had access to oxygen, it cannot be assumed that anaërobic respiration is the initial stage of normal respiration, since (5) by drying the acetone preparation in absence of oxygen at 100° it may be rendered inactive, whilst if oxygen is not excluded the activity is not destroyed.
E. W. W.

Relation of Staphylococcus Pyogenes Aureus to Rheumatic Fever. F. J. POYNTON and W. V. SHAW (*Trans. Path. Soc. London*, 1904, 55, 126—140).—This micro-organism is not the cause of rheumatic fever either in simple or mixed infection. Rheumatic fever is not an attenuated pyæmia so far as *S. aureus* is concerned.
W. D. H.

Action of Salts of the Alkaline Earths on Living Substance. N. C. PAULESCO (*Compt. rend.*, 1904, 139, 158—160).—The doses of salts of calcium, barium, and strontium necessary to prevent the formation of carbon dioxide by yeast are proportional to their

molecular weights. One molecule of such a salt produces an effect equivalent to that of one molecule of a salt of the alkalis.

W. D. H.

Behaviour of Cultures of Some Races of Yeast at Different Temperatures in Reference to Activity of the Enzymes, Length of Life, Resisting Power, and Death. WILHELM HENNEBERG (*Chem. Centr.*, 1904, ii, 52—54; from *Zeit. Spirit. ind.*, 27, 96—97, 105—106, 116—117, 126—127, 135—136, 146—147, 160—161, 173, 182—183, 194—195, 205—207, 213—214, 226, 239).—The abstract contains a description of the behaviour of some different types of yeast under varying conditions of temperature, &c., together with a brief account of the glycogen, fat, peptase, catalase, zymase, and invertin contained in the cells and the changes which these substances undergo or effect. The liability of yeasts to putrefaction and its cause is also briefly discussed.

E. W. W.

Zymase and Alcoholic Fermentation. PIERRE MAZÉ (*Compt. rend.*, 1904, 138, 1514—1517).—Zymase is widely spread in living cells both in contact with air and without air. It accumulates, however, most readily in absence of oxygen.

Zymase may be considered as being formed by the union of two diastases, one of which transforms sugar into lactic acid, the other converting lactic acid into alcohol and carbon dioxide. This is confirmed by the results of Buchner and Meisenheimer, who consider that lactic acid is an intermediate product between fermentable hexoses and alcohol.

N. H. J. M.

Variations in the Composition of Seeds during Maturation. GUSTAV ANDRÉ (*Compt. rend.*, 1904, 138, 1510—1512).—The seeds examined were white lupins, haricots, and maize. The total nitrogen increased in the dry matter during the whole period, but the percentage amounts both of nitrogen and ash are higher in very young seeds than when maturity is approached.

During maturation there is a conversion of carbohydrates soluble in water into insoluble carbohydrates saccharifiable by dilute acids.

N. H. J. M.

Mathematical Expression for the Velocity of Flow of Water through a Cell, according to Pfeffer's First and Third Schemes. W. W. LEPECHKIN (*Zeit. physikal. Chem.*, 1904, 48, 596—600).—A mathematical paper, chiefly of interest to botanists. The formula has been applied to the secretion of water in uni- and multi-cellular plants, and has given results in complete accord with the experimental data.

J. C. P.

Distribution of Some Organic Substances in Orange Flowers. EUGÈNE CHARABOT and G. LALOUE (*Compt. rend.*, 1904, 138, 1513—1514).—The greater part of the essential oil of orange flowers is contained in the petals. The formation and accumulation of odoriferous substances in the flower is most active when the flower is fully developed.

In the flowering period, the essential oil becomes richer in ethers of terpenic alcohols, in methyl anthranilate, and in total alcohol. Esterification is distinctly less complete in the flower than in the leaves and stems. The proportions of geraniol and linalool increase and diminish respectively.

The essential oil present in the proteids is very similar in composition to that of the other floral organs after the flowers have opened out; the former contains, however, rather more methyl anthranilate than the latter.

N. H. J. M.

Invertase of the Beet. MAX GONNERMANN (*Beitr. chem. Physiol. Path.*, 1904, 5, 512—514).—A question of priority in the discovery of this ferment in the sugar-beets raised by a recent paper by Stoklasa and others. It was described by the author six years ago.

W. D. H.

Lipolytic Action of the Cytoplasm of Ricinus Seed. MAURICE NICLOUX (*Compt. rend.*, 1904, 138, 1288—1291).—The saponification of fats by the cytoplasm takes place at a rate which accords with the dynamic equation for a unimolecular reaction. The cytoplasm remains unchanged during the process, but the glycerol and fatty acids produced exert a retarding action. When the quantities of cytoplasm are small, the amounts of fat saponified in a given time are proportional to the quantities of active substance present. The rate of saponification increases with the temperature up to about 35° and then decreases. Exposure to 55° for 10 minutes stops the saponification. The phenomena observed are very similar to those already noted in connection with the action of the various diastases.

H. M. D.

Hydrolysing Properties of Ricinus Seed. ED. URBAIN and L. SAUGON (*Compt. rend.*, 1904, 138, 1291—1292).—The conversion of starch into sugar and the process of inversion are both effected by the action of ricinus seed. Quantitative experiments indicate that the cytoplasm is the active constituent of the seed in both cases. The amounts of starch or sugar transformed in 24 hours are the same whether the experiments are carried out with the seed itself or with a quantity of the cytoplasm equal to that contained in the seed. The authors demonstrate further that the two processes mentioned, as well as the saponification of fatty substances, can be simultaneously effected by the action of the cytoplasm.

H. M. D.

The Lipolytic Property of the Cytoplasm of Ricinus Seed is not due to a Soluble Ferment. MAURICE NICLOUX (*Compt. rend.*, 1904, 138, 1352—1354).—The lipolytic agent, of which the cytoplasm is probably only the support, is not a ferment soluble in water, and thus differs from the known lipases. Water at once deprives the saponifying agent of its hydrolysing properties when no longer protected by the oil (compare this vol., ii, 508).

N. H. J. M.

Sulphurous Acid in Wine. I. General. WILHELM KERP (*Chem. Centr.*, 1904, ii, 56; from *Arb. Kais. Ges.-A.*, 21, 141—155).—The original paper contains a *résumé* of previous work in reference to the presence of sulphurous acid in wine, from which the results of the analyses of 1071 wines have been collected. Of these wines, 460 contained up to 0.05 gram of sulphur dioxide per litre; 366, 0.051 to 0.1; 150, 0.101 to 0.15; 63, 0.151 to 0.2, and 32 more than 0.2 gram per litre. The largest quantity detected was 0.466 gram per litre. The data show, however, that, generally speaking, wines do not contain more than 0.02 gram per litre. E. W. W.

Sulphurous Acid in Wine. II. Aldehyde-sulphurous Acid in Wine. WILHELM KERP (*Chem. Centr.*, 1904, ii, 56—57; from *Arb. Kais. Ges.-A.*, 21, 156—179).—The original paper contains a description of the properties of the acetaldehyde-sulphurous acid compound contained in wine (*Abstr.*, 1903, ii, 326). The presence of acetaldehyde in wine may be detected by means of the sodium hydrogen sulphite compound or benzeneazoformazyl; Lewin's reaction (*Abstr.*, 1900, ii, 179) is also applicable. The acetaldehyde-sulphurous acid compound is also contained in wine. In aqueous solution it is partially hydrolysed, forming sulphurous acid and aldehyde, but even in very dilute solutions the amount of decomposition is extremely small. The "free" sulphurous acid may be titrated directly with iodine solution. The velocity of combination of sulphurous acid and aldehyde depends on the concentration of the solution, and for this reason Ripper's method of determining sulphurous acid in wine (*Abstr.*, 1893, ii, 189) only gives approximate results. In fermented wines which have had only a moderate treatment with sulphur, the combined sulphur dioxide is contained in the form of the acetaldehyde compound, but in sulphurated musts and strongly sulphurated sweet wines the excess of sulphur dioxide must be assumed to be in combination with dextrose and lævulose. Since the latter compounds are more readily hydrolysed in aqueous solution, it follows that in certain cases the sulphurous acid contained in must cannot be regarded pharmacologically as identical with that contained in wine. E. W. W.

Progressive Ripening of Cheeses. LEON LINDET and LOUIS AMMANN (*Compt. rend.*, 1904, 138, 1640—1643).—Three types of cheese, camembert, Port-salut, and gruyère, were examined with regard to the rate of degradation of the casein into soluble nitrogenous matter, and its conversion into ammonia and ammonium compounds; these changes are much more complete in the camembert than in either of the other two cheeses, the amount of soluble nitrogen after 34 days being 86.1 per cent. of the total nitrogen in the case of camembert, and only 20.2 after 49 days in the case of Port-salut, and 15.1 after 87 days in the case of gruyère.

Camembert cheese contains no lactic acid, but a small constant quantity of butyric acid (0.09 to 0.07 per cent.), due to the rapid transformation of lactose, is present throughout the ripening process.

The ripening of gruyère cheese is accompanied by an increasing proportion, 0.08 to 0.64 per cent., of the volatile fatty acids, acetic, propionic, and lactic, due to the degradation of the casein and not to the saponification of the fats, for a gruyère made from milk entirely free from cream contained the same proportions of the same fatty acids.

M. A. W.

Calcium Sulphide for Dodder and other Injurious Parasites. FÉLIX GARRIGOU (*Compt. rend.*, 1904, 138, 1549—1550).—Calcium sulphide proved to be effective in destroying animal and vegetable parasites. In dry weather, the powder must be made slightly damp.

N. H. J. M.

Complete Humic Manure. J. DUMONT (*Compt. rend.*, 1904, 138, 1429—1431).—The manure was prepared by treating a black soil, containing 2 per cent. of nitrogen, with a concentrated pearl ash solution containing aluminium phosphate. The dry matter contained: soluble humates, 50.4; insoluble substances, 49.6; organic nitrogen, 1.6; P_2O_5 , 2.9; and K_2O , 5.5 per cent.

The results of experiments in which lucerne, sugar beet, potatoes, wheat, and mangels were manured with the humic preparation (600—1000 kilos.) showed increased yields, whilst in the case of sugar beet the percentage of sugar was raised 30 per cent. It is, however, uncertain to what extent the benefit must be attributed to the humic acid and the phosphoric acid respectively.

N. H. J. M.
