Chemistry of Vegetable Physiology and Agriculture.

An Automatic Pipette. Carl Permin (*Centr. Bakt. Par.*, 1911, i, 57, 575—576).—The pipette is designed for bacteriological and serological work, and consists of an ordinary graduated pipette connected by a side opening with an india-rubber ball, which is situated on the stem just below the top. The ball serves to fill the pipette, the opening at the top of the stem being closed with the finger. The liquid is run out by removing the finger from the top of the pipette in the usual manner. W. J. Y.

Action of the Bulgarian Ferment on Monobasic Acids Derived from Reducing Sugars. Gabriel Bertrand and R. Veillon (*Compt. rend.*, 1911, **152**, 330—332).—The Bulgarian ferment has no action on solutions of calcium gluconate, galactonate, mannonate, maltobionate, or lactobionate. The first four salts have no influence on the lactic fermentation of dextrose or lactose. In the case of solutions containing lactose and calcium lactobionate, however,

the ferment produces more lactic acid than corresponds with the weight of sugar present. This may be explained by supposing that an endolactase is only liberated in media containing lactose; under these conditions the lactobionic acid becomes hydrolysed, the resulting galactose then forming lactic acid. W. O. W.

Fungicidal Properties of Liver of Sulphur. Frederick W. Foreman (*J. Agric. Sci.*, 1911, **3**, 400—416).—Liver of sulphur contains various oxidation products, and usually free sulphur, in addition to potassium or sodium hydrosulphide, sulphide, and polysulphides. Experiments with spores of *Botrytis cinerea* showed that the oxidation products have little or no fungicidal properties in weak solutions, and that saturated hydrogen sulphide solution and free sulphur have no effect. The chief agent in the mixture is the sodium hydroxide. Potassium hydroxide is less poisonous.

Methods for the analysis of liver of sulphur are described.

N. H. J. M.

Influence of Manganese on the Development of Aspergillus niger. Gabriel Bertrand and Maurice Javillier (*Compt. rend.*, 1911, **152**, 225—228. Compare Abstr., 1908, ii, 124).—*Aspergillus niger* was cultivated in a manganese-free nutrient solution, to which definite quantities of pure manganese sulphate were added. Special precautions were taken to avoid the presence of metals, such as zinc and iron, which favour the growth of the organism. It was found that manganese had a favourable influence on the development of the mould, the yield increasing with the proportion of metal added, from dilutions of 1/1,000,000 to 1/100. At higher concentrations manganese exerted a prejudicial action. W. O. W.

Calcium Requirements of Plants. Different Relations of the Calcium and Magnesium in Nutritive Solutions. Iwan Konowaloff (*Landw. Versuchs-Stat.*, 1911, **74**, 343—360).—Results of water-culture and sand-culture experiments with varying amounts of calcium showed that the yields increase up to a certain point with the increase in the amount of calcium. In most cases the highest yield was obtained with solutions containing 0·2% CaO.

With varying relations of calcium (as nitrate) and magnesium, the highest yield was obtained with the ratio CaO : MgO = 1 : 1. When, however, the calcium was in the form of sulphate or carbonate, equally good, or better, results were obtained with the ratio 6·7 : 1.

Comparing different calcium compounds (with a ratio CaO : MgO = 6·7 : 1), it was found that tricalcium phosphate gave the best results. Calcium carbonate (marble) had no injurious effect when the ratio was 53·6 : 1. N. H. J. M.

Basic Components of Bamboo Shoots. Ginzaburo Totani (*Zeitsch. physiol. Chem.*, 1911, **70**, 388—390).—Fresh bamboo shoots are shown to contain betaine and choline, in addition to tyrosine, asparagine, guanine, xanthine, hypoxanthine and adenine.

E. F. A.

Waxes of the Coniferæ. J. Bougault (*J. Pharm. Chim.*, 1911, [vii], **3**, 101—103).—In addition to juniperic and sabinic acids, already isolated from the wax of *Juniperus sabina*, a small quantity of thapsic acid, which has been shown to be an oxidation product of juniperic acid, has been obtained (compare Abstr., 1909, i, 82; 1910, i, 297). Sabinic acid has also now been obtained from the wax of *Thuja occidentalis*. This wax may also contain a trace of thapsic acid. T. A. H.

The Chromogenic Substances of White Grapes. Serafino Dezani (*Chem. Zentr.*, 1910, ii, 1141—1142; from *Staz. sperim. agrar. ital.*, 1910, **43**, 428—438).—Two chromogenic substances were found in white grapes, of which one only is precipitated by lead acetate. By the action of hydrochloric acid, colouring matters are obtained, which are analogous to the "œnocyanins." The conversion of these substances into colouring matters is due not to oxidation, but probably to hydrolytic scission with simultaneous formation of a reducing substance. In the residue from the chromogenic substances there are other substances which give a red coloration with alkalis. N. C.

The Tonic Effect of Certain Organic Substances in Solution and as Vapours. Hermann Stadler (*Arch. Hygiene*, 1911, **73**, 195—217).—The toxicity of the aliphatic alcohols increases as the molecular weight increases; on the other hand, the toxicity of the aliphatic aldehydes falls off with increasing molecular weight. Replacement of oxygen by sulphur in aliphatic compounds leads to a marked increase in toxicity. The effect depends only on the amount of the substance present, and not at all on the form in which it occurs; the compounds examined were equally toxic whether they were used as solutions or as vapours, provided only the partial pressure was the same; indeed, knowing the toxicity of a substance in the liquid form, its toxicity in vapour form is readily calculated from Henry's law. But this rule breaks down when the substance reacts with the nutrient medium on which the organisms are growing; in this case vapours act more powerfully than solutions of the same partial pressure.

A table is given showing the concentrations at which a number of alcohols, aldehydes, and other substances totally inhibit the growth of *Staphylococcus pyogenes aureus*, *Bact. pyocyaneum*, and *B. coli commune*. On the latter organism experiments were made both with solutions and vapours. E. J. R.

Action on Green Plants of Some Substances Extracted from Coal-tar and Employed in Agriculture. Marcel Mirande (*Compt. rend.*, 1911, **152**, 204—206. Compare Abstr., 1909, ii, 824; 1910, ii, 884; this vol., ii, 64).—Insecticides prepared from coal-tar are liable to bring about anæsthesia or blackening of the leaves of plants. Direct contact with the liquids is more injurious to the plants

than exposure to the vapours. The action on the chlorophyll appears to be due principally to the phenols present in such preparations.

W. O. W.

Influence of Different Amounts of Water, Different Manures, and Consolidation of the Soil on the Root Development of Wheat and Barley in the First Period of Growth. R. Polle (*J. Landw.*, 1910, **58**, 297—344; from *Inaug. Diss. Göttingen*).—Vegetation experiments are described in which wheat and barley were grown in boxes containing loam and sandy soil respectively, both without and with manure, and with low and higher percentages of water. In some the soil was consolidated by pressure, whilst in others it was employed in a looser condition.

Full particulars as to length and weight of the main roots and side roots produced under the different conditions are given, as well as the amounts of growth above ground.

N. H. J. M.

Amounts of Ammonia and Nitric Acid in Rain-water in Tonquin. M. Aufray (*Bull. Économ., Hanoi-Haiphong*, 1909, **12**, 595—616. Compare Leather, Abstr., 1906, ii, 487; Brünnich, 1910, ii, 647).—The amounts of nitrogen as ammonia and as nitrates were estimated in 123 samples of rain-water collected in the Botanic Gardens, Hanoi, from April, 1902, to March, 1905, and in 313 samples collected from June, 1906, to September, 1909, in an open space in the middle of the same town. Assuming the composition of the samples to approximately represent the whole rainfall, the average amounts of nitrogen per million, and the total amounts per acre, for the six years would be as follows:

		N per million		N per acre (lbs.)		
	Rainfall, inches.	as ammonia.	as nitrates.	as ammonia.	as nitrates.	Total.
1902–3	90·55	0·71	0·66	14·74	13·47	28·21
1903–4	59·68	0·99	0·80	13·34	10·89	24·23
1904–5	84·72	0·64	0·43	12·25	8·26	20·51
1906–7	49·92	0·54	0·36	6·13	4·06	10·19
1907–8	57·91	0·33	0·27	4·39	3·54	7·93
1908–9	77·72	0·23	0·15	4·04	2·65	6·69

Of the total rainfall, about 82% falls from May to October, and this contains about 84% of the total nitrogen.

N. H. J. M.