

RESEARCH ITEMS

Biological Estimation of Vitamin P Activity

A. L. Bacharach and M. E. Coates discussed this subject at a meeting of the Society of Public Analysts and Other Analytical Chemists held on April 1. Modifications of Zecho's method for measuring capillary resistance in guinea pigs having revealed its suitability as a basis for biological estimation of vitamin P, a provisional laboratory standard has been assigned the value of 1,000 units per gram: this material (W.S.P.1) is a water-soluble concentrate, similar to Szent-Györgyi's 'citrin', made from citrus peel. Recrystallized hesperidin has been found to have an activity of 95 units (probable limits of error, for P = 0.95, 73-138 per cent), while a water-soluble concentrate made from blackcurrants has the high value of 10,600 units per gm. (probable limits of error, 79-126 per cent). Tests of this degree of accuracy are conducted on thirty to forty young guinea pigs, using two doses of standard and two doses of unknown. Rough exploratory tests, using six animals, have confirmed the presence of vitamin P in other citrus concentrates, in a reaction mixture obtained by partial esterification of highly purified hesperidin, in rose-hips and rose-hip syrup, in blackcurrant juice (pasteurized) and in blackcurrant *purée*.

A Modified Hilger Vitameter A

At the meeting of the Society of Public Analysts and Other Analytical Chemists held on April 1, R. J. Taylor described a modified instrument for estimating vitamin A. Greater accuracy of calibration is attained by using, instead of a standard glass test piece, a dilute solution of a dyestuff, benzene-azo-*p*-cresol. This has an absorption curve resembling that of vitamin A with a maximum at 325 m μ ; its *E* (1 per cent, 1 cm.) value can be determined accurately by means of a spectrophotometer, and its use automatically eliminates any small error in cell thickness. The modifications made in the instrument itself are: (a) a more versatile electrode holder, which reduces fluctuations of the copper arc, (b) a light-tight photographic paper holder, and (c) a pendulum type photographic shutter, giving a succession of short exposures instead of a single longer exposure at any one setting. After approximate visual setting, records are taken on a piece of gas-light paper at a series of neighbouring settings, from which the correct setting is ascertained. The instrument need not be operated in a darkened enclosure. The overall error has been reduced from about ± 10 per cent to about ± 3 per cent.

Constitution of Yeast Mannan

YEAST mannan, which is a polysaccharide extracted by alkali from baker's yeast, was shown by W. N. Haworth, Hirst and Isherwood in 1937 to be essentially homogeneous and composed exclusively of mannose residues, and its acetate and methylated derivative were studied. A further examination of the substance has been made by W. N. Haworth, R. L. Heath and S. Peat (*J. Chem. Soc.*, 833; 1941). It is shown that tetramethyl mannose, trimethyl mannose and dimethyl mannose are produced on methylation and that the tetra-fraction consists of tetramethylmannose and the di-fraction of 3:4-dimethyl mannose. The tri-fraction, however, is not constituted entirely of 2:3:4-trimethyl mannose; this sugar, in fact, does not make up more than 10 per cent of the tri-fraction. The main constituents

are 3:4:6-trimethyl mannose and 2:4:6-trimethyl mannose, which are present in equimolecular proportion and together constitute 90 per cent of the fraction. This result throws light on the probable structure of yeast mannan, which is considered in the paper. The repeating unit of yeast mannan would appear to be composed of six mannose residues linked in such a way that two residues give rise to tetramethyl mannose, two yield 3:4-dimethyl mannose, one gives 3:4:6-trimethyl mannose, and one forms 2:4:6-trimethyl mannose. Alternative formulæ are discussed.

Geology of the Weald

THE geology of the Weald was formerly much studied, but then largely dropped as exhausted of interest. In the last few years, however, a good many valuable contributions have appeared, and a recent paper by P. Allen, "A Wealden Soil Bed with *Equisetites lyelli* (Mantell)" (Weald Research Committee, Pub. No. 31), is one of the fruits of the more intensive modern studies (*Proc. Geol. Assoc.* 52, 362; 1941). One of its main findings is that fossil soil beds containing the underground parts of a large reed-like plant, *Equisetites lyelli*, in position of growth are widespread, thus proving the existence of terrestrial even if swampy conditions; and there are indications that these conditions occurred repeatedly. The underground organs of *E. lyelli* had been previously described, but their nature was not fully realized, and the species was ill characterized although it had been reported from the lowest Cretaceous rocks of various European and American localities. The present description of the rather thick elongated rhizome and the unbranched aerial stems makes this one of the best-known species of its genus.

A High-Voltage H.R.C. Cartridge Fuse

IN a paper read on April 15 in London before the Institution of Electrical Engineers, K. Dannenberg and W. J. John describe the construction of the two-element, powder-filled cartridge fuse and its effect on protection technique. The provision made for adapting the fuse for oil-immersion, and the striker-pin mechanism which ensures tripping on all three phases should only one fuse be blown, are described in detail. Discrimination in operation between fuses and other protective gear is discussed. Experiments are mentioned which show the ability of powder to prevent corona formation on the fusible conductor. A reduction in the magnitude of the transient voltages produced on fuse operation can be obtained by changing the section of the fusible conductor in one or more places. A series of tests on the behaviour of high-voltage fuses on short-circuit in an ordinary 50-c./s. system is presented and typical oscillograms are given. A test is also described which reproduces the operating conditions obtained when a rectifier backfires, and oscillograms are given showing the behaviour of the fuse under such a test. Fuses like those described have been developed for a rupturing capacity up to 1,000 Mva. at 66 kv. It is suggested that h.r.c. fuses can be used to improve fuse-switches, to act as a back-up to safeguard old circuit-breakers in cases where the short-circuit burden has been increased, and in combination with a simple load-breaking switch in which the switch deals with small overloads only, all short-circuits and heavy overloads being cleared by the fuse.