BOSTON MEETING OF THE AMERICAN CHEMICAL SOCIETY. II

FERTILIZER DIVISION

J. E. Breckenridge, *Chairman*

F. B. Carpenter, *Secretary*

A new fertilizer: ALFRED H. COWLES and ALFRED W. SCHEIDT. Mr. Cowles referred to a paper read by him before the World's Congress of Chemists in 1912 entitled "Alumina, hydrochloric acid, caustic alkalis and cement by a new process from salt, clay and lime" and explained that a product of that process that he had been intended to convert into cement, has proven itself of greater value as a fertilizer than calcium hydrate. This increased value being due to a discovery made by him that silica in soluble form when either added to the soil by itself or added to the soil as a calcium silicate proved itself to be an essential fertilizer. He explained why clay and zeolitic minerals in the soil would lock up in insoluble form silica when added to the soil in the form of soluble alkali silicates, while the silica would not be thus locked up or bound in insoluble form when added as a soluble type of silica or as an alkali earth silicate. Mr. Cowles gave the quantitative results of a very large number of experiments showing very large gains in luxuriance of growth in a great majority of the plants experimented with, thus confirming the discovery made by Mr. Cowles and his theoretical explanation of the same.

Potash production in United States: H. A. HUSTON. The American production for 1916 was 3.6 per cent. of the imports in 1913. The agricultural effect of impurities in some of the potash from American sources is mentioned.

The synthesis of ammonia by the Haber process: R. O. E. DAVIS and HARRY BRYAN. The use of a catalytic reagent to bring about the union of hydrogen and nitrogen under pressure and at increased temperature is the fundamental idea underlying the Haber process. About one third of the ammonia used in Germany at present is reported to be produced by this method. This is a preliminary report of the study of the process undertaken in the laboratories of the Bureau of Soils, U. S. Department of Agriculture. The apparatus devised for the work is described. This consists essentially of a heating chamber containing the catalytic reagent through which the mixture of hydrogen and nitrogen is passed, a condensing chamber for the removal of the ammonia formed by liquefaction and a circulating pump for the return of the non-combined gases to the reaction chamber. Granular iron reduced by hydrogen is one of the best and most convenient catalyzers.

Effect of fertilizers on composition of strawberries: H. A. HUSTON. Experiments on six varieties of strawberries. Analyses are given showing the effect of nitrogen, phosphoric acid and potash on the density of the juice and on the percentage of acid, invert sugar and sucrose.

The recovery of potash as a by-product in the cement industry: WILLIAM H. ROSS and ALBERT R. MERZ. Analysis of samples of raw mix and of cement from 113 cement plants in the United States and Canada shows that the potash in the raw mix varies from 0.20 to 1.16 per cent., and that the percentage of potash volatilized in the different plants varies from 24.5 to 95.9 per cent. From the results thus obtained it has been calculated that the potash escaping from the kilns of these plants ranges from 0.35 to 5.14 pounds per barrel of cement produced, with an average for the plants of this country of 1.93 pounds. On the basis of an average production of 90,000,000 barrels, the total potash escaping from the cement plants of this country amounts to about 87,000 tons annually. It has been demonstrated commercially that 90 per cent. of the potash escaping in the dust is recoverable, and from experiments made in this laboratory it would appear that 95 per cent. of the recoverable potash is, or may be made, available. The recoverable potash in the cement industry therefore amounts to approximately 78,000 tons and the available recoverable potash to 75,000 tons, or to 71,000 tons when plants losing less than 1 pound of potash per barrel of cement are omitted.

DIVISION OF AGRICULTURAL AND FOOD CHEMISTRY

T. J. Bryan, *Chairman*

Glen. F. Mason, *Secretary*

The influence of season upon the deterioration of food samples: C. A. BROWNE. The influence of season upon the deterioration of raw sugar and butter-fat is discussed. The deterioration of sugar is due to microorganisms, among the most active of which are the budding fungi, such as the Torulæ and Moniliæ, which exert their activity only when the temperature maximum is above 20°

C. This temperature for New York City is from about May fifteenth to October first; from October to May deterioration is quiescent. The deterioration of butter-fat is not due to microorganisms but to auto-oxidation, in which the unsaturated fatty acids act as oxygen carriers. The process is most active for samples exposed to daylight between March and September, when there is a gain in weight; from September to March there is a loss in weight due to volatilization of decomposition products. Chemical action of light, which is greatest about June twentieth, is a pronounced factor in auto-oxidation, although temperature and humidity also play an important part.

DIVISION OF WATER, SEWAGE AND SANITATION

E. H. S. Bailey, *Chairman*

H. P. Corson, *Secretary*

The diffusion of sea water in the Puget Sound and Lake Washington Canal: E. VICTOR SMITH and THOS. G. THOMPSON. The canal was constructed between Puget Sound and Lakes Union and Washington to give a fresh-water harbor to Seattle. A dam built to control the flow of water during the cutting of the canal was swept away twice, permitting sea water to enter Lake Union. Three years after the second breaking of the dam this lake showed a chlorine content varying from 5,200 parts per million at the bottom, 50 feet, to 17 parts at the surface. Six months later tests showed a decided reduction of chlorine in the upper 40 feet of Lake Union. The difference is due to the inflow of fresh water from Lake Washington and control of tide-water by the lock system. From considerable data authors conclude that an apparently efficient means has been introduced by the government engineers which will prevent the diffusion of sea water into the fresh-water lakes.

On the bactericidal efficiency of soap solutions in power laundering: H. G. ELLEDGE and W. E. MCBRIDE. An investigation of the above mentioned subject conducted by the Mellon Institute in behalf of the Laundry Owners' National Association resulted in the following conclusions: The results of these experiments indicate that an infusion-method for testing the bactericidal effect of any agent on an inoculated piece of cloth must not be considered to give more than a relative indication of the actual number of organisms present; that a count on the effluent from any washing bath does not give a true indication of the quantity of organism remaining in the clothes being washed; and that plating a portion of the cloth in question in agar gives a more positive indication. They also show that soap solutions at a temperature of 40° C. have a real bactericidal value. Considering the omnipresence of organisms that, under certain conditions, may be considered pathogenic, it appears absurd to demand that a clothes-washing process should render fabrics absolutely sterile; but it has been demonstrated that such results are actually obtained in the case of all garments that are finished by ironing or drying at high temperatures, and that, in the case of those not so treated, the washing with soap produces a bactericidal efficiency comparable to that obtained by pasteurization.

Manganese in water supplies: J. W. SALE. The water supply of Pierre, South Dakota, contains 2.3 to 3.0 milligrams per liter of manganese and 0.07 milligrams per liter of iron. Water mains in the vicinity of the well become clogged with a deposit of oxids of manganese in a short time. Solubility of the deposit in carbonated water is given. Laboratory experiments on removing the manganese are described and the general subject of manganese in water supplies is discussed.

RUBBER SECTION

L. E. Weber, *Chairman*

John B. Tuttle, *Secretary*

The Rubber Section of the American Chemical Society held its meeting on September 12, the program being as printed in the regular program of the society. About 90 members and guests were present. The meeting authorized the chairman and secretary of the section to appoint an executive committee, the purpose of this committee to be of assistance to the officers in the preparation of programs, meetings and such other matters as may arise. It was decided that a committee should be appointed, to investigate the subject of the poisoning effect of the organic accelerators used in the vulcanization of rubber, the report of this committee to cover a list of such substances, with a description of their effect on the workmen who come in contact with it, and the precautions which should be adopted in the mills to prevent fatal or even serious injury.

Effect of copper on crude rubber: CHAS. P. FOX. Reviews the work done along this line. Shows by exhibit of specimens results of experiments with copper acetate on crude rubber. Sustains the work of Dr. Morgan, director of the Rubber Planters' Association, Federated Malay States.