

of this work, and the present edition calls for little further notice. The author has added some twenty pages on the subject of generators, and has somewhat expanded the chapter on "Generation of Acetylene"; otherwise the volume is little changed.

A misplaced decimal point on p. 37 makes the theoretical yield of acetylene from 100 pounds of carbide 5.81 instead of 581 cubic feet. The author confuses benzine with benzene, referring to the former as a polymer of acetylene. The limits between which acetylene forms an explosive mixture with air are much greater than those stated by the author. The figures given apply more nearly to ordinary coal-gas.

E. G. LOVE.

LAVAS AND SOILS OF THE HAWAIIAN ISLANDS. BY WALTER MAXWELL, Director and Chief Chemist of the Experiment Station of the Hawaiian Islands. 186 pp.

The work is an important contribution, perhaps the only contribution, to our knowledge, of the composition of the soil of the islands, which have lately come into the dominion of the United States. The total area of the islands where agriculture is possible is 6,740 square miles. The islands of the Hawaiian group are of pure volcanic origin. Fifteen volcanoes of the first class have existed at different times and been in action in the islands. The group of islands therefore represents a portion of the great mass of matter due to volcanic action, which has been projected above the water's level. The composition of the soil is, therefore, what would be expected from the decomposition of basaltic lavas. In type the soils differ from those of our country in being essentially basic instead of acidic. In the ordinary soils of the United States the acidic element, namely, silicic acid, is the predominating factor, while in Hawaiian soils, lime, alumina, and iron make up almost, if not quite, half of the total weight of the soil.

In the decay of these lavas, in the activity of the usual forces which produce the disintegration of rocks, the functions of water, steam, and air have been extremely prominent. In addition to this the vapors of sulphuric acid, which find their way by means of the steam into the crevices and broken surfaces of the lava masses, has added greatly to the power of water and steam in disintegrating the rock masses. In one instance where a quantity of steam was condensed and preserved for analysis, it was

found to contain 4.92 per cent. of sulphuric acid. The steam contains practically no chlorine, which leads to the belief that the sea-waters do not penetrate into the depths whence the heat of the volcanoes comes.

Two distinct types of soils have arisen from the decay of these volcanic lavas. These are distinguished chiefly by their color and are known as the "yellow" and "red soils." In regard to fertility the dark red soils are much more productive than the light red or yellow soils.

The Hawaiian soils are remarkably rich in phosphoric acid and in iron, about twenty-five per cent. of the weight of the soil consisting of iron oxide. Thus it is seen that the silica of American soils is largely replaced by the iron and aluminum of Hawaiian soils.

The chief agricultural crop of the Hawaiian Islands, as is well known, is sugar, and there is no country in the world where so great a quantity of sugar can be grown per acre. In general, it requires two years to produce one crop, inasmuch as the crop is allowed to grow about eighteen months, and the other six months are consumed in harvesting, preparing the lands, and replanting.

The average yield of sugar, per acre, for the "dark red soils" is a little over 10,000 pounds, and for the "yellow soils" a little over 6,000 pounds. Very much larger yields are occasionally reported; namely, from 20,000 to 25,000 pounds per acre in some instances.

In the methods of analysis for determining the available plant food in soils, Dr. Maxwell has introduced an interesting innovation. He has proposed the use of aspartic acid, as a solvent for the available plant food in soils; namely, the phosphoric acid and the potash.

In a comparison of the amount of plant food removed by successive cropping with sugar-cane and that removed by digestion with a one per cent. solution of aspartic acid for twenty-four hours, he has shown that in ten years of cropping practically the same quantity of plant food is removed, as in the digestion of the soil for twenty-four hours with a one per cent. solution of aspartic acid. He therefore proposes to measure the available plant food present in the soil by digesting with a one per cent. solu-

tion of aspartic acid for twenty-four hours and dividing by ten the quantity of phosphoric acid and potash obtained.

Under the conditions of rainfall, which prevail in the parts of the islands studied by Dr. Maxwell, he has found that the quantity of plant food removed by cropping is practically the same as that removed by the drainage waters.

The student of soil chemistry and physics as well as the practical farmer will derive much benefit by carefully reading Dr. Maxwell's pamphlet.

H. W. WILEY.

TESTING MILK AND ITS PRODUCTS. BY E. H. FARRINGTON AND F. W. WOLL. Fourth revised and enlarged edition. Madison, Wis.: Mendota Book Company. viii + 256 pp.

The general introduction of the Babcock method has been one of the most important aids to the producer of dairy products, and as a natural result, there has been a demand for a work which would enable one to understand and apply the processes connected with modern dairy practice. This demand has been met by the authors in an admirable little volume upon the subject which is now in its fourth edition. Consideration is given to the principles of the Babcock method, followed by many aids and apt suggestions in order that one may become familiar with the method and its application. The testing of milk is treated in a thorough manner and especially is the treatment of the methods for the determination of the acidity of milk and cream to be recommended. The chemical analysis of dairy products is a section of the work which is of interest to the chemist as well as to one who has not had the advantage of laboratory training. The appendix contains many useful tables and helpful suggestions on practical creamery work. A very complete index closes the volume. The volume, as a whole, is a helpful one, and should be in the hands of those interested in the application of improved methods in the dairy industry of the country.

J. B. WEEMS.