Great improvements have been made in the effectiveness of the absorbent materials used in the canisters, and this, in turn, has increased several fold the general efficiency which it was possible to attain at the time when the manufacture of the masks was first undertaken, and hence to diminish the amount of material to be placed in the canisters. The significance of this will be understood when it is realized that there is a considerable friction to overcome when the inhaled air is drawn through the canister. This was so great in the earlier masks, that it made necessary a suction on the part of the wearer of the mask equal to that required to raise a column of water in a tube to a height of six inches; an effort not incomparable with that made by many asthmatic sufferers to draw air into the lungs. This frictional resistance has been materially lessened by the improvement in the protective materials, and every reduction, however slight, is a great boon to the troops. The materials used in the canisters are selected to react with gases of an acid character, and with those capable of destruction by oxidation, a process like that generally known as combustion. Much reliance is, however, placed upon the absorptive power toward gases exhibited by many porous substances, notably, high grades of charcoal. The principle is the same as that utilized in the "charcoal filters" sometimes attached to our faucets to clarify water supplies.

Of late a new problem has been presented, because of the use of gases in the form of "smoke-clouds," which easily pass through the protective materials contained in the canisters. This has necessitated the addition of another filtering medium, and has necessarily added somewhat to the resistance to be overcome.

How serious this "neutralization" of troops through the continuous wearing of masks may be, is illustrated by the condition which obtained before one of the recent violent attacks on the Western Front. It has been stated that the enemy fired gas-shells (mainly mustard-gas) at the rate of two hundred thousand shells per day for four days, each shell probably averaging about five pounds of material. While the gas-masks will protect the wearer from the inhalation of this gas, they must have required one or more renewals during this period. This attack was followed by a smoke-cloud attack which necessitated the use of the extension filters, thus subjecting the troops to added labor in breathing, after days of constant use of the mask. The physical strain under such conditions can not fail to have been severe. It is not, however, to be supposed that the enemy was allowed to spend his time in full comfort.

As a means of detecting the approach of a toxic gas, canaries and white mice are placed in the trenches, as they are peculiarly sensitive to these chemicals and show signs of distress from dilutions which are unnoticed by man, especially when the gases are nearly odorless.

Of the offensive side of this gas-war it is obvious that little can properly be made public. There is reason to believe that our American chemists are making valuable contributions in this field.—Henry P. Talbot in the *Atlantic Monthly*.

SCIENTIFIC BOOKS

Agricultural Bacteriology. By W. H. Conn. Third edition, revised by Harold Joel Conn. Philadelphia, P. Blakiston's Son & Company. 1918. Pp. x + 357. Illustrated. with 63 figures. $2.00.

The first part of the book is taken up with a discussion of the general characters of microorganisms and their rôle in the decomposition of organic matter. The second part, which occupies practically one fourth of the volume, is devoted to the relations of bacteria to soil fertility. The cycles of carbon and nitrogen are presented. This section includes a chapter on 'The Manure Heap and Sewage" and on one "Bacteria in Water." In the latter the rôle of water in the distribution of disease-producing organisms is discussed. The third part presents the relation of bacteria to milk and to butter and cheese.

The use of microorganisms in industrial processes directly related to agriculture as in the manufacture of alcohol and of vinegar, the preparation of sauer kraut and silage, and in the retting of flax is discussed in the fourth part.

The fifth part includes a chapter on resistance against parasitic bacteria. Tuberculosis is discussed in some detail. Only fourteen pages are devoted to the other transmissible diseases of animals and fifteen pages to the parasitic diseases of plants.

The last part presents 39 laboratory exercises designed to supplement the text.

The second edition was marred by many mistakes, both in fact and statement. Many of these have not been corrected in the present edition. Errors in fact are illustrated by the statement that ordinary soils contain 0.1 to 0.2 per cent. of nitrate (p. 53); that H_2S may unite with water to form sulphuric acid (p. 78); that the sulphur appears within the cells of sulphur bacteria as minute reddish dots, and because of the color produced by the sulphur the bacteria are frequently called the "red bacteria" (p. 124). In fact the reddish color noted in some of the sulphur bacteria is not due to sulphur but to a pigment, purpurin. If the red color were due to sulphur, all bacteria that store sulphur would be red. Such is not the case.

It is stated that any product that contains much sugar is more likely to undergo alcoholic fermentation than putrefaction. A true statement as far as it goes, but likely to create confusion in the mind of the student, for a product containing much sugar practically never undergoes putrefaction and an alcoholic fermentation only when the product is so acid as to prevent bacterial development. In sugar containing liquids, the reaction of which will permit bacterial growth, an acid fermentation is constantly noted as in milk, maple sap, beet juice, etc.

The construction is often loose and in error, one part of a sentence being written in the present tense and another in the past, *e. g.*, "But the bacteria which are isolated from such soil by ordinary methods showed no power of nitrification" (p. 65). Errors in spelling are frequent, *e. g.*, volitization (p. 80), seradella (p. 112), urase (p. 60).

An example of the use of an incorrect word is found on page 63 where it is stated that "The addition of another atom of nitrogen to the nitrate, giving a nitrate," etc. The formulæ used in this connection are correct.

The reader of the present volume will find the essential facts concerning the relation of microorganisms to agricultural processes presented in a most interesting manner.

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BIRTH STATISTICS IN THE REGISTRATION AREA OF THE UNITED STATES: 1916

IN the recently established birth-registration area of the United States—comprising the six New England states, New York, Pennsylvania, Maryland, Michigan, Minnesota and the District of Columbia, with an estimated population of 33,000,000, or about 32 per cent. of the total population of the United States—818,983 infants were born alive in 1916, representing a birth rate of 24.8 per 1,000 of population. The total number of deaths in the same area was 486,682, or 14.7 per 1,000. The births thus exceeded the deaths by more than 68 per cent. For every state in the registration area, for practically all the cities, and for nearly all the countries, the births exceeded the deaths, usually by substantial proportions. The mortality rate for infants under one year of age averaged 101 per 1,000 living births. The foregoing are among the significant features of the report. "Birth Statistics in the Registration Area of the United States: 1916," soon to be issued by Director Sam. L. Rogers, of the Bureau of the Census Department of Commerce, and compiled under the supervision of Dr. William H. Davis, chief statistician for vital statistics.

The birth rate for the entire registration area fell below that for 1915 by one tenth of 1 per 1,000 population; while the death rate exceeded that for 1915 by seven tenths of 1 per