

A MUNICIPAL "MICROBE FARM."

BY HAROLD J. SHEPSTONE.

What has come to be known as London's Municipal "Microbe Farm" is an up-to-date bacteriological laboratory, situated in the center of the Borough of Lambeth. It was established some six years ago by Dr. Joseph Priestley, the medical officer of the district, and the report of its work just issued has called Londoners' attention to this interesting institution. Strictly speaking, of course, no sanitary administration can be regarded as complete without institutions of this kind, but the value of an up-to-date bacteriological laboratory, presided over by a competent chief, and possessed of the latest scientific appliances, is at once apparent after a study of the report, and a brief *résumé* of the work and methods of this institution cannot fail therefore to be of interest.

When a doctor is at all doubtful as to the nature of the disease his patient is suffering from, he sends a drop of blood, or a piece of membrane, or some sputum from the invalid to the institution. If the patient be suffering from any dangerous disease, this blood, or membrane, or sputum will contain the germs of it. Dr. Priestley examines the suspected matter under the microscope, and if it contains the bacteria they are promptly recognized, and the doctor is within a few hours informed without any possibility of mistake exactly what his patient is suffering from.

The laboratory, which consists of a large room, is fitted up with due regard to aseptic principles, and all dust, as far as practicable, excluded therefrom. The tables are covered with hard teak, and the water supply is passed through a Chamberlain-Pasteur filter. The incubator in which the germs are cultivated and isolated is of the Hearson pattern, consisting of a box of copper with double walls, the intervening space being filled with water, and the outside covered with wood and felt to prevent the conduction of heat. In appearance it resembles a safe. The water between the walls is heated by an ordinary gas burner.

The incubator is the most important outfit in connection with the laboratory, for micro-organisms under observation have to be grown on certain suitable foods, or nutrient media as they are called. To make sure that this is done carefully, they must be grown at a constant temperature. The different foods, or nutrient media, in use vary with the micro-organisms

steak, free from fat, chopping it very fine, or mincing it, adding a certain quantity of water, and allowing it to simmer in a saucepan or *dain-marie* for an hour, cooling it, removing any solidified fat that may rise to the surface, and afterward filtering it through filter paper into a clean flask. The flask is then plugged with cotton wool, placed in its neck, and submitted to the action of steam for about one hour on two successive days, so as to sterilize it thoroughly. A stock of this beef broth is kept to be used in small quantities, as required, for the preparation of the commoner forms of nutrient media. In place of beef, veal is sometimes used, being powdered with flour, and the

hospital the doctors were able to stamp out the outbreak, whereas had the victims not been discovered they might have helped to spread the disease. Consumption has also been discovered in its earliest stages and checked. Diphtheritic victims have been discovered in the same way, and, strange to say, several supposed diphtheria patients were prevented from going into the hospital; for microscopic examination showed that the diagnosis was mistaken, and the patients were not suffering from the disease.

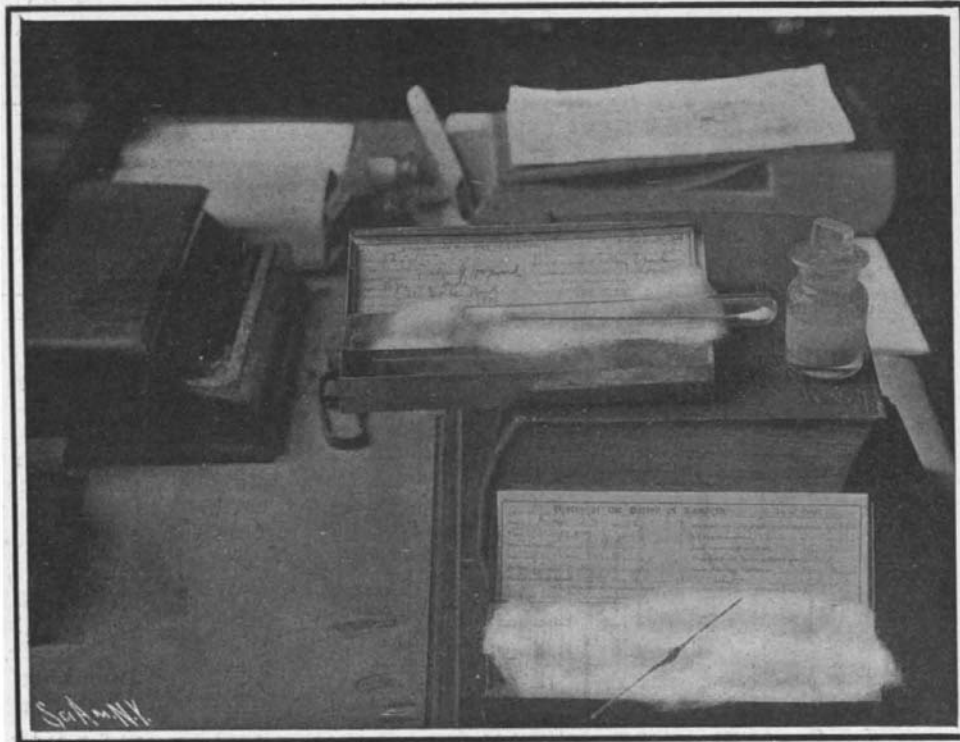
One of the most interesting discoveries made at the institution showed that some children in the borough were infected with a skin disease through some mice in the house in which they lived. This was proved by microscopic examination of the skins of the children and the skins of the mice. The doctor advised the people to get a cat to destroy the diseased mice, and then the virulence of the germs was shown in the most extraordinary fashion. The cat, through eating the mice, contracted the same skin disease that had affected the mice and the children, and had to be destroyed.

Dr. Priestley is now conducting some experiments with the germs of typhoid. He is drying them up, and then, after several months, will endeavor to revive them. In this way he will show the danger of germ-laden dust, which may lie about in an old house for years, and then infect people with disease.

Up to date over 5,000 examinations have been conducted with doubtful cases of consumption, typhoid fever, and suspected diphtheria, or for the purpose of proving the bacteriological composition of such foods as milk, ice cream, etc. This number gives a yearly average of about 700, or a daily

average of two examinations since the opening of the laboratory. Before the laboratory was established the death rate in the borough was eighteen per thousand; to-day it is less than fourteen per thousand. It is interesting in conclusion to note that the "microbe farm" is practically self-supporting, only costing the borough council \$250 a year for rent and gas.

The substitution of a cheap and indestructible material for timber used in mines is a problem which sooner or later will come forcibly before mine owners and engineers. Experiments have been carried on in



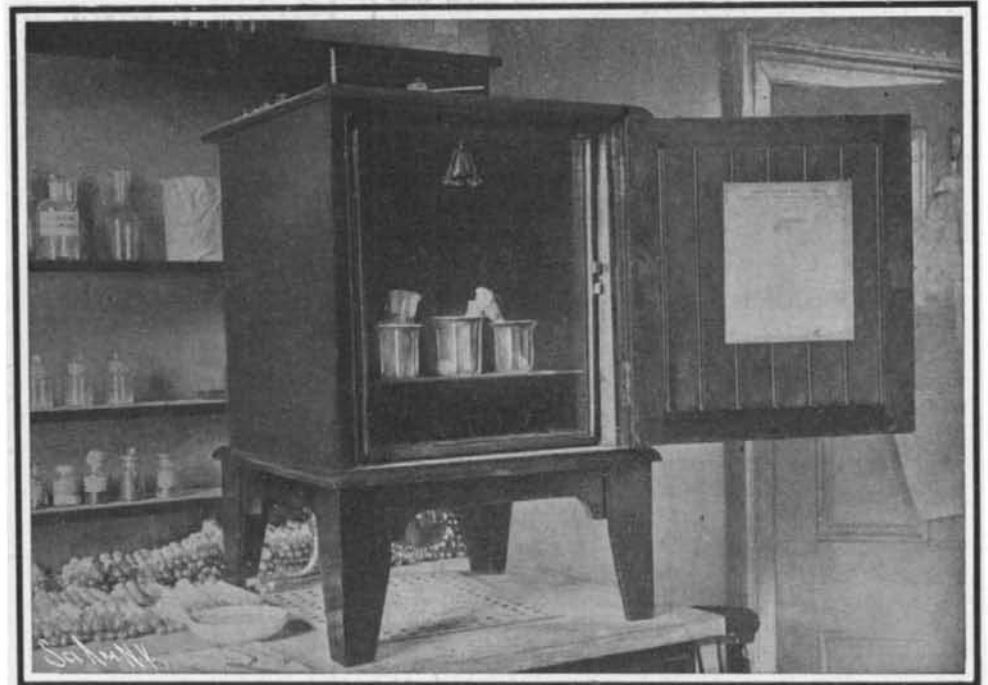
Specimens Sent to the Laboratory for Examination.

infusion afterward clarified with white of egg. This veal broth, when mixed with a small proportion of glycerine, is found to be specially useful for the growing of the germ of consumption.

Other nutrient media employed are milk, sliced potato, blood serum, and other fluids obtained from the human body in health and disease, eggs, etc. By means of these various foods, or nutrient media, different micro-organisms can be grown, and their life histories in that way studied. For this purpose test tubes, or plates, are generally used, into which is placed a certain quantity of the particular food or medium needed. Further, it is, at times, necessary to



A Corner of the Bacteriological Laboratory.



Incubator in Which the Germs Are Cultivated.

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to be grown, and require careful preparation. Thus, the commonest form may be popularly described as a beef broth, and this constitutes the basis of most of the nutrient media in general use, which are prepared by mixing this beef broth with other substances, such as peptone, glycerine, grape sugar, common salt, beer wort, together with an admixture of gelatine or agar-agar for solidifying purposes—the latter (agar-agar) being used where the temperature required for the micro-organism is 37 deg. C., the former (gelatine) remaining solid only at temperature below 22 deg. C.

This beef broth is an infusion of meat, usually beef, and is prepared by taking a certain quantity of rump

grow the micro-organisms on their media (a) in oxygen, (b) without oxygen, (c) in an atmosphere of carbonic acid, (d) *in vacuo*, or (e) in the presence of very small quantities, or traces, of different chemicals, etc. The laboratory also boasts of a hot-air oven, a steam sterilizer, and a number of exceedingly powerful microscopes.

The institution has done much to improve the health of the borough, and has undoubtedly been the means of saving many lives. For instance, during an outbreak of typhoid fever, tests showed that many people were suffering from the disease who did not display the ordinary symptoms. By sending these cases into

England with reinforced concrete beams, which point to the possibility of using this material largely as a substitute for wood, especially for work which is intended to be of a relatively permanent nature, and in which the increased cost of the concrete beam is justified by its indestructibility and freedom from decay. As the cost of Portland cement tends to fall, while that of timber rises, it is, says the Times Engineering Supplement, only a question of time when concrete will become a very effective means of construction for mining operations. In this country, at the present time, reinforced concrete beams are manufactured and sold for mining purposes in the mining districts of Colorado,