

acid. The former does not coagulate milk, and the amount of acid produced is very slight, or none at all. In the Smith test the colon bacillus causes a turbidity, as in the case of the typhoid organism, but gas is also produced. Mr. Fuller found that both bacilli reduce nitrate to nitrite in a peptone solution. In examining water for the typhoid bacillus the author follows the practice of other bacteriologists who make a specialty of water analysis, and uses agar cultures, at 38°C., instead of gelatine plates. In this way the growth of many water species is inhibited, and the work of isolation much shortened. Samples may be fished from a colony on such a plate, and at once transferred to Smith's tubes, when the diagnosis may be soon after made and confirmed by the other tests.

Some of the characters of *B. typhi abdominalis* may be usefully reproduced. When grown on agar, for a week, at 20°C., it appears as a plump bacillus, about one micron in length, and six to eight in diameter, and with rounded ends. In bouillon, at blood temperature, after two days, it is rather more slender, and from one and a half to two and a half times larger. Neither spores nor involution forms have been observed. Although the bacillus generally shows lively movements of rotation and translation it is much influenced by conditions of growth, and in agar cultures, at 20°, motility is sometimes sluggish or absent. The bacillus will grow at temperatures ranging from 10° to 45°C., but its optimum is between 37° and 39°. It grows better in liquid than solid media. On gelatine plates, at 20°, after 48 to 72 hours, the deep colonies are small, white, spherical, or spindle-shaped, and sharply outlined. Superficial colonies are larger, bluish white, with slightly irregular outline, and, under the microscope, show ridges or folds. In tube cultures there is a moderately conspicuous, gray growth in the stab, with a thin, gray superficial growth and irregular outline, spreading to the wall of the tube. On the agar plate at 38°, the surface colonies are slightly irregular, bluish white, sometimes, as in the gelatine plate, with a white centre. Deep colonies are yellowish white, and usually oval. The bacillus never liquefies gelatine.

The demonstration of the cilia of bacteria is not only a test of skill in staining, but also of the excellence of a microscope. A clever operator, a good method, and a perfect objective, are essentials

to success. Loeffler's method is generally adopted, but has the disadvantage of not being applicable to all kinds of organisms, and thus requires modifications in the degree of acidity or alkalinity of the solutions used. MM. Nicholle and Morax have recently published (*An. de l'Inst. Pasteur*) a method, based on that of Loeffler, but said to be adaptable to all cases. A mordant is prepared by mixing 10cc. of an aqueous 20 per cent. solution of tannin; 5cc. cold saturated solution of ferrous sulphate; and 1cc. of a saturated alcoholic solution of fuchsin. A little gelatine culture is diluted with water, spread on a cover glass and allowed to dry. A drop of the mordant is put on, heated to staining and then washed. This is repeated three times. Finally, Ziehl's carbol-fuchsin is applied, and heated till vapors arise, as in staining *B. tuberculosis*. The specimen may be now washed and examined.

The necessity for the presence of moisture, in rooms subjected to disinfection, is emphasized by the recent experiments of Chamberland and Fernbach (*An. de l'Inst. Pasteur*), in which dry germs were found to be much more resistant to heat than those which were moist. The former retained their vitality for several hours, at 40° to 50°C., while a few minutes' exposure sufficed to destroy moist organisms. *B. subtilis* was selected as being exceedingly resistant—of course, principally from its spores—and other hardy forms, as *B. anthracis* and *B. typhi abdominalis*, were also made the subject of experiment. The organisms were soaked in water for about an hour. A practical lesson to be derived from this observation is the necessity of spraying the walls of rooms before the application of disinfectants. A rather curious statement is made by the authors—that concentrated solutions of chlorinated lime are less active than those which are diluted ten or twenty times. A 1 in 12 solution, diluted to ten times its volume, was found very effective.

A suggestion which promises some advantages is made by Beneke (*Cent. f. Bakt.*), who recommends that the stab in gelatine tube cultures be made down one side, close to the glass, instead of down the axis of the cylinder. He claims that in this way the various manifestations of development may be more easily made out. Of course, against this, there is the disadvantage that, heretofore, all described characters and illustrations