

represent the behavior of organisms to changes of density of sea water, and that the differences in the behavior of these three organisms can hardly be correlated with the differences in concentration of the sea water in which they normally live.

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Variations in the amount of transformed atoxyl (trypanotoxyl) produced by varying the strength of atoxyl incubated with blood.

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A 10 per cent. solution of atoxyl in blood incubated for 1 to 3 hours at 37° C. is more than 10 times as toxic for *Trypanosoma brucei* as a 1 per cent. solution in blood similarly incubated. To avoid misleading results due to the transforming action of red blood corpuscles upon unaltered atoxyl continuing after the dilutions are made, immediately after incubation all red blood corpuscles should be removed by centrifugalization from the fluid containing the transformed atoxyl.

62 (758)

Some observations on bacteria of the duodenum.

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The duodenal tube was sterilized by boiling in water for ten minutes and the lower end was covered with a tightly-fitting gelatin capsule which had been soaked in alcohol for several days. The gelatin capsule was finally coated with shellac and dried. The tube was ordinarily given late at night and the sample of fluid aspirated on the following morning, usually without any food being taken in the interval. In a few cases the fluid was obtained an hour after giving an Ewald test meal.

The study of the fluid included inspection, direct microscopic count of the bacterial cells, plating of measured amounts on litmus lactose agar and ascitic-fluid agar, separation cultures of measured quantities in tall tubes of ascitic-fluid agar and fermentation-tube cultures of measured quantities in dextrose broth and lactose broth. In addition, a portion of the fluid was heated to 80° C. for ten minutes and inoculated in measured quantities into tall tubes of glucose ascitic-fluid agar and into fermentation tubes of glucose broth and lactose broth.

Thirty-five samples were studied, of which the first nine were unsatisfactory because of defects in technic. The results obtained on the remaining twenty-six serve as a basis for this report.

The results can be presented here only in summary form. In general, the number of bacterial cells seen microscopically varied from 600,000 to 960,000,000 per c.c. and their number bore no evident relation to the number of colonies obtained in cultures nor to the clinical condition of the patient. On the other hand, the results of the culture work indicate that the normal duodenal fluid is practically free from living bacteria when food is absent, and that the number of cultivable bacteria obtained in a given case is a rough index of the digestive derangement. Gas-forming microbes developed in the fermentation tubes in ten of the twenty-six fluids examined, all from cases with gastro-intestinal disturbance. Bacterial spores capable of resisting a temperature of 80° C. for twenty minutes were not found in any examination.

One hundred ten subcultures were isolated and studied. Forty-three of these were Gram-positive, non-liquefying cocci. These were isolated from a majority of the samples and doubtless are the organisms most frequently present in health and in slight disturbances. Gram-negative, gas-forming bacilli which liquefy gelatin were isolated from five of the twenty-six fluids, all derived from cases of severe gastro-intestinal disorder. In some cases these bacilli were very abundant. Liquefying cocci, yeasts and various kinds of bacilli were isolated in less abundance. Only three of the 110 strains belonged in the *B. coli* group. Four of the twelve strains isolated from the one case of typhoid relapse proved to be *B. typhosus*.