

The solutions to which the bacteria were exposed contained respectively, calcium chloride alone, sodium chloride alone, and a mixture of the two salts in the ratio of five molecules of sodium to one molecule of calcium. The tonicity varied from nothing to a ten times isotonic condition.

It is evident that the calcium salt alone exerts a marked lethal action. Even a 0.1 isotonic solution shows a distinct reduction in bacterial numbers and increasing proportions grow more deadly till a 5.0 times isotonic solution produces sterility in 6 hours. The sodium salt is less harmful. Tonicities of 0.5 and 1.0 show a slight effect, and a tonicity of 5.0 a marked effect, but the latter concentration does not completely sterilize even after 52 hours. A mixture of the two salts in proportion of 5 parts of sodium to one of calcium is much more favorable than either salt alone. Up to and including a tonicity of 5.0 the bacteria actually increase in numbers. Line *D* of Table III shows that 3.5 per cent. sodium chloride plus 1.3 per cent. calcium chloride had no harmful influence, while in Table II .4 per cent. of sodium chloride alone, and in Table I less than .2 per cent. of calcium chloride alone exerted a demonstrable lethal effect.

The toxic effect of calcium and sodium salts and their antagonistic influence upon each other seem to be much the same among the bacteria as in the higher forms of life; and the viability curve in water would seem well suited for the study of such phenomena.

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Protein sparing by glucose in experimental diabetes.

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In diabetes there are abnormalities not only in carbohydrate but also in protein and fat metabolism as well. There is frequently a marked loss of protein in this disease, which may be either direct or the result of a failure on the part of carbohydrate to spare protein. Our experiments deal with one phase of protein metabolism in experimental diabetes, the influence of the removal of the major portion of the pancreas on the characteristic protein sparing action of glucose. For this purpose several female dogs

weighing between nine and fifteen kilograms each were selected. Both the fasting nitrogen elimination and the effect of glucose feeding on this excretion were determined. During the fasting period the animals received only 40 c.c. of water per kilo. On the sugar days they received in addition 15 gm. of glucose per kilo. An after-period during which the glucose feeding was withdrawn was then introduced. Dr. Allen, of the Rockefeller Institute, then removed surgically about 90 per cent. of the pancreas. The wounds healed aseptically and the animals were allowed from two to five weeks to recuperate. The procedure consisting of fore-glucose and after-periods just described was repeated. In spite of the large loss of pancreatic tissue the protein-sparing action of glucose was not diminished in any of the animals. It appears that pancreatic tissue is provided far in excess of actual requirements or that this gland is not solely responsible for the protein-sparing action of carbohydrates. Dr. Ringer found this function intact in dogs made completely diabetic by means of phlorizin.

150 (1328)

Studies in experimental shock.

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The experiments were made on etherized dogs. The intestines and stomach were dislocated and frequently handled. Two manifestations were studied, the blood pressure and the pain sense. We shall state merely the facts obtained.

About one third of the dogs were given a preliminary injection of morphin. Some of the animals were given ether by cone, others by the method of intratracheal insufflation. These factors had no apparent influence on the results.

There were 42 dogs which received surgical narcosis. In 15 the blood pressure never reached a level below 95 mm. even when the experiment lasted 4 hours or longer, and sensation returned as soon as the animals came out of ether. In 13 dogs the blood pressure reached a level below 70 mm. of mercury within two and