

Beroe, the specimen was laid on a glass plate. In a moment the luminescence from mechanical stimulation ceased. The animal was now brought as near as possible to the spark discharge; no effect in a luminescent reaction was observed. If the arrangement of the experiment was altered by connecting one of the poles of the machine by means of a wire with the glass plate, then, by bringing the other terminal near the animal, a spark 1 or 2 cm. long could be played over the surface of the animal. The result in the case of Beroe was again negative—no stimulation of luminescence. With Mnemiopsis a slight stimulation occurred when the spark was applied.

For these reasons the question may be raised whether the mechanism of electrical stimulation of luminescence in Ctenophores does not differ from that of electrical stimulation of the neuromuscular system of higher forms.

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Further studies on so-called bacteriophage.

By J. BRONFENBRENNER

[From the Laboratories of the Rockefeller Institute for Medical Research, New York, N. Y.]

D'Herelle's hypothesis as to the parasitic nature of the "bacteriophage" is questioned by a number of investigators. However, the evidence which would definitely disprove its animate nature is still lacking. It seemed to us that the question of the nature of the bacteriophage might be approached by the study of its metabolism. The behavior of the bacteriophage with regard to respiration was first studied.

Different amounts of bacteriophage, representing from 5×10^{10} to 1×10^{15} active units, were placed in a microrespirometer, constructed on the general principle of the respirometer of Professor Osterhout, for varying periods of time up to 96 hours at 22° C. It was found that neither entire active filtrates nor the precipitated substance produce any CO₂ in the presence of oxygen. The method used was sensitive enough to indicate production of CO₂

under similar conditions by several viruses and bacteria, some of which had been kept in dry state for a period of years. In many instances, particularly in the case of fresh tissue emulsions and of bacteria dried over H_2SO_4 for 24 hours, CO_2 production could be detected 2 to 3 hours after placing minute amounts (0.001 gm.) of material in the apparatus.

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Blood reaction and respiration.

By D. D. VAN SLYKE, A. B. HASTINGS, L. D. MURRAY, and
H. W. DAVIES.

[From the Rockefeller Institute for Medical Research, New York City.]

Experimental and clinical observations indicate that when the respiratory mechanism is normal, increase in alkaline reserve is only partially compensated by increase in CO_2 tension, so that increase in pH also occurs. In the same way decrease in alkaline reserve is accompanied by decrease in pH. There is a decrease in CO_2 tension but not sufficient to prevent pH change. The usual percentage change in hydrion concentration is about twice that in CO_2 tension. The arterial CO_2 tension is kept normally between 35 to 45 mm., which is a much narrower range than would be necessitated for the maintenance of normal pH. The conception of the CO_2 tension as a factor physiologically important only from its relationship to blood pH is not consistent with these facts. When conditions force the organism to choose between change in CO_2 tension and change in pH it tends to compromise between the two, and acts in a manner to indicate that maintenance of normal CO_2 tension is in itself an important factor.