BACTERIOLOGY

Chairman: L. S. McClung, Indiana University

The Bacteriology Section met with the Indiana Branch, Society of American Bacteriologists.

Dr. Lyle A. Weed, Indiana University Medical Center, was elected chairman of the section for 1944. Dr. C. M. Palmer, Butler University, was elected vice-chairman.

A comparison of the action of sulfa-drugs on the growth of a bacterial virus and of its host. M. Delbrück and S. E. Luria, Vanderbilt University, Nashville, Tennessee, and Indiana University.—These experiments were performed to attempt to dissociate the growth of bacterial viruses from the growth of their host by blocking certain enzymes of the bacterial cell. The growth of both host and virus in a synthetic medium was quantitatively studied, and the action of sulfathiazole (ST) investigated. As shown by previous authors, ST (10^{-6}–10^{-5}M) reduces the bacterial growth rate after a latent period of a few hours. Whether the growth continues at this reduced rate or is replaced after a few hours by rapid death of bacteria depends on the size of the initial inoculum. Para-aminobenzoic acid (PAB) inhibits the action of ST; the antagonism is strictly quantitative. Normal growth takes place with ratios PAB/ST higher than 1/7. The experiments on the effect of ST on virus growth, as yet incomplete, show a strict correlation between inhibition of bacterial growth and of virus growth; this is reduced in the same proportion as is the growth rate of bacteria. The reduction in virus growth takes place only when the host has been grown in presence of ST long enough to show an appreciable reduction of its growth rate. Possible interpretations of these results in connection with the role of bacterial enzymes in the growth of virus are suggested.

War-time immunization. W. A. Jamieson, Lilly Research Laboratories.—The most recent methods of preparation of vaccines against cholera, plague, yellow fever and typhus fever are described. These vaccines are of particular interest for troops leaving the United States.

This laboratory has made its greatest contribution to the immunization program of the war effort in the preparation of typhus vaccine. Different forms of typhus vaccine preparation will be presented, and the current fertile egg method will be dealt with in some detail. Methods of assay of typhus and other vaccines in the laboratory, also primary and re-immunizations as developed during the last year or two, will be referred to.

Dissociation of the growth of bacterial viruses and of their host by means of temperatures above optimum.[1] S. E. Luria, Indiana University.

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[1] Experiments done in the Department of Biology, Princeton University, under the tenure of a Guggenheim Fellowship.

—For two coli-viruses, temperatures between 15° C and 40° C affect the growth of both host and virus in a strictly parallel manner. At temperatures of 43 and 45° C the bacteria can grow at reduced rates; if, however, bacteria infected at 37° C are transferred to 43 or 45° C, no liberation of virus takes place. If the bacteria are then returned to 37° C, virus is liberated, in small amount, and after a delay increasing with increased stay at high temperature. These results seem to suggest that one or more of the reactions involved in the production of new virus are inhibited at or above 43° C. The inhibition must take place through a reaction with a very high temperature coefficient. Some essential reagent is probably removed or inactivated, as indicated by the delay and incompleteness of the restoration of virus production after return to normal temperature. There is as yet no indication as to whether the inhibition concerns the actual multiplication of the virus in the host or only its liberation from the host (lysis).

Effect of various concentrations of iron on the production of riboflavin by certain clostridia. ALLEN SAUNDERS *and* L. S. MCCLUNG, Indiana University.—In a study of riboflavin production by various aerobic and anaerobic bacteria, Rodgers (1942) reported that fortification of the iron content of the corn mash used for fermentation by *Clostridium acetobutylicum* increased the production of riboflavin. Confirmation of this stimulatory effect of iron has been noted in the case of 4 out of 5 strains of this species in corn mash fermentations to which Fe as $FeSO_4$ was added in 2, 4, and 6 x 10^{-6}M concentrations. The effect appears restricted to *C. acetobutylicum,* however, as *C. roseum, C. felsineum,* and other pigmented anaerobes including certain yellow butyric types do not respond to the addition of iron.

Natural bactericidins in the plasma of the domestic fowl. E. E. SCHNETZLER, Purdue University.—The plasma of the domestic fowl contains natural bactericidins capable of killing *Salmonella pullorum* organisms. Wide differences in resistance to the bactericidal action were found between the eight strains of *S. pullorum* employed. Those strains that had been isolated most recently were more resistant to bactericidal action. However, there was considerable variation between the strains within this group.

The plasma of White Leghorns of two different strains showed higher bactericidal activity than that of Rhode Island Reds and White Rocks. The greater bactericidal action of the plasma of White Leghorns may partially account for less infection being observed in this breed.

Wide differences in bactericidal activity have been found between fowls of a given strain. These wide differences observed among stock reared in the same flock indicate genetic differences. After three generations of selection two lines of Rhode Island Reds have been produced differing in bactericidal activity. The results obtained indicate that the bactericidal action is in part at least influenced by heritable factors.

The bactercidal action of the plasma apparently involved a natural antibody and complement. The plasma of fowls showing low bactericidal activity was apparently not deficient in complement.