BACTERIOLOGY

Chairman: LYLE A. WEED, Indiana University Medical Center

The BACTERIOLOGY SECTION met with the Indiana Branch, SOCIETY OF AMERICAN BACTERIOLOGISTS.

Dr. C. M. Palmer, Butler University, was elected chairman of the section for 1945.

The nature of "nibbled" colonies of bacteria resistant to bacterial viruses. S. E. LURIA, Indiana University. After the action of a bacterial virus (Bacteriophage) on a sensitive host, among the secondary colonies of resistant bacteria there often appear "nibbled" colonies. They are distinguished by irregular shape and texture, and are often reduced to thin, barely visible residues. Bacteria isolated from such colonies usually prove as resistant to the virus as the bacteria from regular secondary colonies.

We discovered recently the occurrence of virus mutants capable of attacking bacteria resistant to the normal viruses. It seemed possible that the nibbled colonies might result from the lytic action of some mutant virus particles on secondary colonies resistant to the normal virus. If so, then nibbled colonies should also be obtainable by plating a few cells of a pure resistant bacterial strain with a virus mutant active upon it. Experiments with several strains of resistant bacteria and of virus mutants fully confirmed this expectation. By plating together various amounts of bacteria and of virus, it was possible to duplicate all types of nibbled colonies (slightly nibbled, largely nibbled, thin), as appear in secondary growth after lysis of sensitive bacteria by normal viruses. Whenever nibbled colonies had been found in the resistant growth, it was possible to isolate from the virus at least one mutant active on the bacteria of the secondary growth. Several new mutant viruses were thus isolated from different coli-virus strains.

Interference between particles of closely related bacterial viruses. S. E. LURIA, Indiana University. Interference between different viruses has been described for many viruses, including bacterial viruses (Bacteriophages). Interference is also supposed to occur between particles of the same virus (self-interference), and, in plants and animals, is considered as being partly responsible for acquired immunity.

For bacterial viruses, occurrence of self-interference has been inferred indirectly. Direct proof is difficult to obtain, because particles of the same virus are indistinguishable and one cannot follow the growth of a certain virus particle in a culture. Our recent isolation of mutant bacterial viruses, indistinguishable from the normal viruses when acting on a common host but active on a new host resistant to the normal viruses, permitted a further study of self-interference. The mutant virus, while identical with normal virus in its action on the common host, is traceable through its activity on the new host.

Cells of *Escherichia coli* strain B, susceptible to virus γ and virus γ^1 (mutant), were infected with virus γ, and immediately after with virus γ^1. Then, before lysis took place, the infected bacteria were plated with strain Bγ, sensitive to virus γ^1 only. Those bacteria that liberate γ^1-particles should produce plaques. It was found that almost all the bacteria infected first with virus γ, then with virus γ^1, failed to liberate any virus γ^1. Since we know that viruses γ and γ^1 are indistinguishable in their action on strain B, these experiments prove the occurrence of interference between virus particles acting in the same way on the same host-cell.

A study of non-toxic strains of Clostridium tetani. RUTH TOABE and L. S. MCCLUNG, Indiana University. At the request of Dr. J. H. Mueller, from whom the culture was received, a study has been made of a strain of *Clostridium tetani* which lost the property of toxin production following a period of serial daily transfers in meat infusion glucose broth. In addition, 10 other non-toxic and 33 toxic strain mostly received from Janet Gunnison have been included in our series. The 10 strains are presumed to have been non-toxic on original isolation but possess other characters, including agglutinating antigens which are normal for the species. All strains have been studied with respect to the following: cell morphology, spore formation, motility, extensin physiological reactions and colony type.

To date, no significant difference has been observed with respect to the above mentioned characters, in the various strains except that in the serial passage culture spore formation is markedly retarded. This is not true of the original culture from which this strain was derived. Rough-smooth dissociation apparently has not occurred. An attempt to repeat the phemenon of loss of toxicity by serial passage in thioglycollate broth and other studies on this and additional strains are in progress.

Antibacterial substances from plants collected in Indiana. DOROTHY SANDERS, PAUL W. WEATHERWAX and L. S. MCCLUNG, Indiana University. Following the suggestion by Osborn and others that antibacterial substances may occur naturally in plants, a preliminary survey has been made of the occurrence of such substances in a series of plants collected in Indiana during the summer of 1944. In general the juice of the plants, or particular portions of them, obtained by a Carver hydraulic press, was tested for inhibitary activity against *Bacillus subtilis* and *Escherichia coli* using the Oxford cup technique. Representatives (1 to 50 species) of the following families have been included: Plantaginaceae, Ranunculaceae, Gramineae, Araceae, Solanaceae, Papayaceae, Phytolaccaceae, Polygonaceae, Lilicaceae, Compositae, Asclepiadaceae, Violaceae, Menispermaceae, Labiatae, Euphorbiaceae, Caprifoliaceae, Saxifragaceae, Oxalidaceae, Iridaceae, Onagraceae, Leguminosae, Umbelliferae, Anacardiaceae, Ulmaceae, Apocynaceae, Rosaceae, Solanaceae, Aceraceae, Celastraceae, Alismaceae, Anonaceae, Magnoliaceae, Nymphaeaceae, Juglandaceae, Tiliaceae, Vitaceae, Ericaceae, Polypodiaceae, Osmundaceae, Acanthaceae, Celastraceae, Convolvulaceae, Primulaceae, Urticaceae, Typhaceae, Scrophulariaceae, Balsaminaceae, Simarubiaceae, Lauraceae,

Bignoniaceae, Rubiaceae, and Martyniaceae. Although about 15 of approximately 150 specimens tested show some degree of inhibitory activity against one or both test organisms, no sample has been encountered which gave exceptionally high values. Perhaps the greatest activity was shown by extracts of the common ragweed, *Ambrosia elatior*, though this was not true of the giant ragweed, *Ambrosia trifida*. It should be mentioned that in many instances a very marked stimulation of growth of the test organisms was evident.