BACTERIOLOGY

Chairman: WALTER A. ZYGMUNT, Meade-Johnson Research Laboratory
GORDON MALLETT, Eli Lilly and Company, was elected chairman for 1961

ABSTRACTS

Action of Cetyltrimethylammonium Bromide on the Bacterial Cell. WALTER NAKATSUKASA and W. A. KONETZKA, Indiana University.—This investigation was undertaken to study the effects of the cationic surface active agent, cetyltrimethylammonium bromide (CTAB), on bacterial cells in an effort to determine the relationships between disruption of the permeability properties of the cell and the disinfecting action of the compound. The release of 260 mμ-absorbing substances from the cell was dependent on a number of factors, the most significant of which appeared to be the concentration of CTAB and the physiological age of the cells. When the amount of release induced by CTAB was compared to the total content of 260 mμ-absorbing substances (as determined by boiling the cells), there was a correlation between the proportion of the total content released and the effect on viability. These studies indicated that the lethal effect of CTAB was associated with the quantity of essential materials lost from the cell rather than with the disruption of the permeability properties *per se*.

The Influence of Serum on the Cytopathic Effect of Measles Virus. ROBERTO A. MOURA[1] and LILA FERGUSON, Chas. Pfizer & Co., Inc.—When measles virus is grown in tissue culture of various species, its characteristic cytopathic effects are the formation of multinucleated giant cells and the appearance of intracytoplasmic inclusion bodies. It has been found that the species of serum used in the cell culture medium plays a role in the development of these cell alterations. When sheep serum was compared with calf serum as a protein source, it was observed that in the presence of the former, measles cytopathology was remarkably enhanced. Using Edmonston strain of measles virus, a single passage of the HeLa cell line in sheep serum results in greatly increased giant cell formation. On prolonged passage of the virus in cells fed on sheep serum, the cytopathic effect is greatly enhanced over that of sister cells maintained in calf or other sera.

Growth Behavior of Primary Mammalian Cells in Suspension Culture. S. J. CIECIURA, M. E. JEWELL, B. R. HADAR and J. Y. WHITE, Chas. Pfizer & Co.—The ability of a wide variety of *continuous* mammalian cell strains to proliferate in agitated fluid suspensions has been repeatedly demonstrated utilizing a variety of equipment, nutritional media, and environmental conditions. However, the successful cultivation of primary cells under similar conditions is not reported in the literature. Primary dog, monkey, and bovine embryo kidney, and human amnion cells inoculated

---

1. From the Instituto Adolfo Lutz, Sao Paulo, Brazil, presently in a fellowship at the Chas. Pfizer & Co., Inc.

into 1, 2, 4, 10, 20, and 200 liter vessels proliferate but to only a limited extent. Growth kinetic studies reveal that whereas the total cell population remained fairly constant throughout the course of incubation, cell viability decreased rapidly. Aliquots of these cells incubated as stationary cultures indicate that the number of cells attaching to the glass surface and capable of producing a confluent monolayer is directly proportional to the per cent viability. In contrast, the per cent viability of first passage cells in suspension culture remains high for a short period then decreases slowly. However, the rate of decrease is much slower than that observed with primary cells. Attempts to improve primary cell growth by modifying the serum concentration, initial cell density, and the method of culture "feeding" will be discussed.

A Programmable Multiple Syringe Driver for Use in Metabolic Studies with Filamentous Fungi. M. B. JENKINS and H. R. GARNER, Purdue University.—The Novick and Szilard chemostat is useful for the study of a variety of metabolic problems in bacteria. For some problems involving *Neurospora crassa* it became desirable to attempt to achieve control of concentration of additions to the growth medium similar to that achieved by the chemostat for bacteria. Use is made of the fact that growth rate in *Neurospora* under controlled conditions is quite constant and reproducible. During the period of 50 to 70 hours in which a cube root plot gives a straight line, growth of the mold corresponds in physiological state to that described as logarithmic growth in bacteria. In this period additions at the proper rate can achieve any of the following: (1) maintain a constant level of a metabolized substrate such as a tracer labeled compound, (2) maintain a constant level of a metabolized inhibitor of growth, (3) add a specific required nutrilite as fast as required for growth by a mutant strain, avoiding a higher concentration which may be metabolized by adaptive processes, (4) maintain a constant concentration of an inducer for adaptive enzyme studies. The device constructed achieves these by adding solution to growth flasks as many individual "shots" of a solution of the desired compound from syringes fitted with long hypodermic needles, according to a "program" presented to a photocell relay as holes punched in a long paper tape. The relay activates a motor driving an assembly of twelve syringes, permitting several variables in the same experiment.

Application of Petuely's Medium to the Selection and Differentiation of *Lactobacillus bifidus*. H. L. MURRAY and P. S. PRICKETT, Mead Johnson Research Laboratory.—A phase of our work on enteric bacteria included studies on the selectivity and differentiation of Petuely's medium for *L. bifidus*. In these studies stool samples of both infants and adults as well as pure cultures of enteric organisms were plated on Petuely's agar and incubated under four conditions (aerobic, 10% CO_2, 100% CO_2 and 100% N_2). This medium under anaerobiosis enabled the *L. Bifidus* present in the stool samples to develop without overgrowth by the remainder of the flora. The same selectivity was evident in bifidus-seeded stools of adults that were shown to be initially bifidus-free by this medium. Pure cultures of enteric bacteria either failed to grow or were readily differentiated from *L. bifidus* by their colonial morphology. The common enteric fungus, *Candida albicans*, was readily differentiated from *L. bifidus* by the for-

mer's mycelial production under anaerobic conditions on Petuely's medium. Our results show that this relatively simple medium is a valuable diagnostic tool in studies on the enteric microbial flora.