

Laver and the late R. Valentine were presented by Fenner. The influenza hemagglutinin protein purified by electrophoresis (cellulose acetate) could be identified as a structure with a sedimentation coefficient of 7.5S and measuring $40 \times 140 \text{ \AA}$. The neuraminidase protein (8.5S) was structurally more complex and consisted of a 40- $\text{\AA}$ (diameter) knob, a tailpiece measuring 100 $\text{\AA}$ in length and a crosspiece between these structures ($50 \times 85 \text{ \AA}$). These highly purified proteins retained their antigenic specificity. While the number of nonstructural proteins that are coded for by the influenza genome is not known, preliminary data from work carried out with *ts* mutants was given (Fenner) which suggested that a minimum of 5 nonstructural antigens can be detected (3 hours) in virus-infected (WSN) cells by appropriate immunofluorescent techniques. Discussion of the proteins of influenza virus ended with a brief summation (Kilbourne) of experimental evidence supporting the concept that viral neuraminidase is instrumental in the release of mature virions from the host cell.

The final session of this conference was spent on a consideration of the epidemiological aspects of influenza outbreaks and methods for their control. Davenport gave the epidemiologists' viewpoint regarding the antigenic variation of the influenza group and its significance in the appearance of new serotypes. Pereira reported that surveillance of various domestic birds and animals revealed a high incidence of influenza infections and the viral isolates exhibited a wide range of antigenic variation. Influenza is believed to be equally rampant among wild animals that are presently being tested. It was suggested that such epizootics may constitute reservoirs of influenza strains that can undergo abrupt antigenic changes (mutation and selection) culminating in pandemic infections of non-immune human populations. This is certainly not an unreasonable hypothesis. The apparent difficulty in constructing any laboratory model capable of predicting future antigenic changes in myxovirus populations was emphasized. It was also pointed out that there is as yet, regrettably, no adequate experimental model for assessing selective values of competing old and new strains.

Methods suggested for the possible control of influenza virus centered primarily on the use of vaccines. Kilbourne advocated the use of antigenic

hybrids prepared in the laboratory for vaccination programs and the development of a repository of such strains was considered. As a case in point, it was indicated that it was recently possible to obtain a recombinant of the new Hong Kong strain with high growth capacity in eggs by cross reactivation with egg-adapted influenza virus (PR8). The chief advantage of this approach is that it circumvents the problem of securing high-titered stocks of nonattenuated field strains for use in vaccine production.

Techniques for improving the antigenicity of influenza virus or its components were also mentioned. Among them was the use of methylated bovine serum albumin (Braun) which has already been shown by Plescia and Braun to neutralize influenza virus infectivity and to be highly successful in stimulating antibody production with a number of relatively poor nonviral immunogens. Baron presented rather convincing evidence that protective levels of interferon can be induced in animals treated with double-stranded polyinosinic:polycytidylic acid complexes (PI:C) before or after challenge with such viruses as herpes simplex [*Science* **162**, 811 (1968)]. PI:C was also effective in affording protection against respiratory infection in mice exposed to A_2 influenza virus. Some toxic effects that appear to accompany PI:C treatment in certain animals may, however, preclude the immediate practical application of this approach for preventing human infections in other than topical therapy. The session concluded with a discussion of future needs in influenza virus research.

Undoubtedly much of the success of the conference can be ascribed to the choice of the convener, Werner Braun, whose strong background in the genetics of microorganisms and unbiased interest, as an "outsider," in the biology of influenza virus infections were responsible for the valuable contributions that he made in the discussion of various topics. The meeting ended on the note that serious gaps still exist in our knowledge of the genetics of the influenza virus. Hopefully, these gaps may be bridged by new approaches, particularly by a more intense utilization of recent physico-chemical and genetic methods discussed at this conference.

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Calendar of Events

Courses

Fundamentals of Dynamic Measurements as Applied to the Ocean, San Diego, Calif., 11-14 March. Is designed for practicing engineers, scientists and technicians who use sophisticated electronic instrumentation in ocean research. The course will enable the participant to gain a firmer knowledge of the instruments necessary to perform measurements of time-varying phenomena as they apply to the ocean sciences. Will include units on recorders, signal generators, transducers, analog and digital conversion, waveforms, filters, amplifiers, voltage regulators, and the ocean research applications of these units. (Third Ocean Sciences Short Course, Instrument Society of America, Education and Research Services, 530 William Penn Place, Pittsburgh, Pa. 15219)

Infrared Spectroscopy, Cambridge, Mass., 17-27 June. This course is intended for chemists, biologists, and medical research workers who wish intensive training in the methods of infrared spectroscopy and interpretation of infrared spectra. The course covers infrared instrumentation and techniques (1 week) and applications to problems of chemistry and biology (1 week). Tuition \$500 for both weeks, \$275 for either week alone. Tuition scholarships for academic personnel. (Dr. Richard C. Lord, Director, Spectroscopy Laboratory, Massachusetts Institute of Technology, Cambridge 02139)

Desalination: Methods and Applications, Berkeley, Calif., 24-28 March. The course is planned as an introduction to desalination and a survey in depth of the state of the art, covering the development, theory, application, and economics of the principal methods of desalination, including separation by phase change, reverse osmosis, and electrodialysis. The registration fee is \$275. (Continuing Education in Engineering, University of California Extension, Berkeley 94720)

Water Pollution Control, Bronx, N.Y., 2-6 June. Two one-week courses, supported jointly by Manhattan College and the Federal Water Pollution Control Administration, will be offered for advanced study in "Stream and Estuarine Analysis" and "Biological Waste Treatment." The fee for each course is \$175. Stipends and travel allowances are available for United States citizens associated with universities and state regulatory agencies (Donald J. O'Connor, Civil Engineering Department, Manhattan College, Bronx, N.Y. 10471)

Contemporary Optics, Rochester, N.Y., 28 July-8 August. Both the fundamentals of optics and their application to problems and developments in contemporary optical research and engineering will be discussed. In order to have a cohesive course that will provide a broad coverage of optics, the subject matter has been divided into four sections: quantum optics, Fourier optics, geometrical optics, and optical physics. Tuition is \$500 for applications received by 15 June and \$525 thereafter. (Contemporary Optics, Institute of Optics, College of Engineering and Applied Science, University of Rochester, Rochester, N.Y. 14627)