News of Science

Properties of Viruses

The October 1955 issue of the *Proceedings of the National Academy of Sciences* (U.S.) contains two interesting articles on the properties of viruses. A paper by Fraenkel-Conrat and Robley Williams deals with the reconstitution of active tobacco mosaic virus from its inactive protein and nucleic acid components. The virus protein was separated from the ribosenucleic acid either by dialysis at *p*H 10 or by treatment with the detergent dodecyl sulfate. Neither the protein nor the nucleic acid fraction was infectious for the tobacco plant, and neither fraction contained particles that resembled the virus in electron micrographs.

A solution containing 1 percent protein, 0.1 percent nucleic acid, and 3*M* buffer at *p*H 6 was kept in the cold for 24 hours. After this treatment, the mixture contained large numbers of particles that were indistinguishable from tobacco mosaic virus in the electron microscope and that were infectious for the tobacco plant. Brief treatment of the reconstituted virus with hot detergent permitted the demonstration in the electron microscope that the reconstituted virus particles contained a core of nucleic acid inside a cylinder of protein, just as in preparations of natural virus. Tobacco mosaic nucleic acid could not be replaced by other kinds of nucleic acid.

A paper by Stent and Jerne deals with the distribution of parental phosphorus atoms among bacteriophage progeny. When coliphage T4 is randomly labeled with phosphorus-32, there is a loss of infectivity as a result of radioactive decay. On the average, this "suicide" results from the disintegration of 10 atoms of phosphorus-32 per phage particle. When labeled phage particles are used to infect bacteria, some 40 to 50 percent of the label is transferred to the progeny.

Despite this efficient transfer, it was not possible to detect phosphorus-32 suicide among the progeny by loss of viability. This suggests that most of the parental phosphorus-32 is transferred to such a small minority of the progeny population that their suicide is not easily measurable. However, the inactivation of a fraction of a labeled phage population may be detected by another more sensitive technique. The phosphorus-32 suicide of a phage particle results in loss of ability to transfer phosphorus-32 to progeny phage because, under conditions of single infection, it has no progeny.

A preparation of hot phage T4 containing 260 atoms of phosphorus-32 per particle was used for infection. The first generation progeny contained 43 percent of the parental phosphorus-32. The ability of this first generation progeny to transfer phosphorus-32 to second generation progeny was determined at intervals. The rate of decrease of phosphorus-32 transferability indicated that each of the suiciding particles contained between 2 and 6 percent of the phosphorus of its parent.

This suggests that the 50 percent of the phosphorus of each parent appearing in the progeny is distributed over at least 8 phage particles. One may conclude that parental phage nucleic acid is not transferred in one piece to a single progeny particle or randomly distributed over all progeny particles. Instead, it appears to be distributed in relatively large fragments to a small fraction of the progeny phage particles. These two papers have important implications with regard to the function of nucleic acids.
—M.H.A.

Soviet Medicine

Major and Mrs. Paul W. Schafer of Washington, D.C., a doctor-nurse team, recently completed a month-long visit to the U.S.S.R. as guests of the Soviet Ministry of Health. Their invitation was arranged by B. V. Petrovsky, surgical clinic chief of the Second Moscow Hospital. Petrovsky met Schafer, chief of the Thoracic and Cardiovascular Service at Walter Reed Army Hospital, during the 1954 World Congress of Cardiology in Washington. The Schafers, the first Americans to be afforded the opportunity of such a tour in more than a decade, traveled thousands of miles in the U.S.S.R., where they visited 40 hospitals, clinics, research institutes, and sanitoria and talked with more than 200 Soviet physicians. Their itinerary included Leningrad, Moscow, and the North Shore of the Black Sea.

They found the Soviet medical and health system to be a highly centralized state organization that provides free care; doctors and nurses are paid by the state. Students get free medical education and then are assigned to work areas by the state. Some 20,000 physicians were graduated from the 75 Soviet medical schools last spring and 27,000 students matriculated this fall, 60 percent being women.

The Schafers do not feel that Soviet physicians are as adequately trained as Americans, and they also feel that physicians often are charged with responsibilities that could have been satisfactorily handled by nurses and technicians. The Soviets agreed that they had not placed sufficient emphasis on training programs for nurses and technicians and that they had thus been forced to produce larger numbers of doctors to implement their plan for medical care.

Generally, hospitals were found to be well run, clean, and efficient organizations in which patients appeared to be getting good medical care, although everywhere there was an apparent extravagance in the use of physicians. In Sochi each of the many sanatoria visited was found to have its own polyclinic with a staff of from 20 to 40 physicians caring solely for the medical needs of the institution's 200 to 300 patients, none of whom was acutely ill.

A similar situation was seen in general hospitals. For example, in 1954 the Bodkin Hospital in Moscow, which has 2400 beds, cared for 40,000 patients and performed 10,000 operations. There are approximately 500 doctors on the staff of this hospital—100 residents and 365 doctors in "postgraduate courses for rising qualifications." In addition, there is a teaching staff of 100.

Surgery is practiced extensively in the Soviet Union, despite the retarded development of anesthesiology. Using local anesthetic techniques, Soviet physicians perform essentially the same operations as are done in this country and appear to be having good results. All types of heart, lung, and esophageal operations are carried out under local anesthesia. Large volumes of ¼-percent procaine solution are administered after substantial premedication with pantopon or morphine.

Medical care closely follows the American pattern. Antibiotics are generally available but are used less frequently and in smaller dosages than in this country. Aside from an extensive BCG program, the medical management of tu-