host material. Elimination of contaminating host material from virus vaccines may be very important in reducing "side effects," such as allergic encephalitis, from vaccines which can be obtained only from tissues of whole animals. Chemical inactivations of viruses may also be carried out in systems relatively free of contaminants which would normally react with the inactivating agents and, thus, alter their effects on the viruses themselves. Differences in elution characteristics of the viruses presently investigated strongly suggest that surface properties of animal viruses can be investigated by means of chromatographic methods. In this connection, preliminary experiments (*12*) have shown that formaldehyde-treated polio 2 can be separated from untreated virus.

In general, we feel that procedures such as those described offer the definite hope that studies of animal viruses will no longer be hampered by the past difficulties involved in preparation of purified agents.

Summary

Techniques of column chromatography with cellulose ion exchangers have been successfully applied to mammalian viruses and rickettsiae. Recovery of virus is excellent, and appreciable purification in terms of phosphorus and protein removal has been demonstrated.

Elution characteristics of poliovirus (types 1, 2, and 3), and Coxsackie A9 virus are similar, whereas those of ECHO-13 and Colorado tick fever differ from them as well as from each other.

Elution diagrams of preparations of ECHO-13 and polio 2 viruses grown on P^{32}-labeled tissue cultures show a high degree of correlation between the distribution of titratable virus and the distribution of radioactivity.

A single adsorption and elution of Q fever or epidemic typhus fever rickettsiae results in a striking degree of purification, as demonstrated by electron micrographs.

The chromatographic behavior of the animal viruses and rickettsiae appears to depend more upon the chemical nature of the surfaces of these infectious agents than upon their size.

The chromatographic procedure described may prove useful in the preparation of purified, P^{32}-labeled, fully infectious animal viruses for further fundamental research. It may also prove useful for the removal of unwanted host materials in the preparation of vaccines.

References and Notes

1. E. A. Peterson and H. A. Sober, *J. Am. Chem. Soc.* **78**, 751 (1956).
2. H. A. Sober *et al.*, *ibid.* **78**, 756 (1956).
3. B. Commoner *et al.*, *Nature* **178**, 767 (1956).
4. A. Taussig and E. H. Creaser, *Biochem. et Biophys. Acta* **24**, 448 (1957).
5. E. H. Creaser and A. Taussig, *Virology* **4**, 200 (1957).
6. L. Berman and C. S. Stulberg, *Proc. Soc. Exptl. Biol. Med.* **92**, 730 (1956).
7. W. F. Scherer, *Am. J. Pathol.* **29**, 113 (1953).
8. H. Eagle, *J. Exptl. Med.* **102**, 595 (1955).
9. M. R. Bovarnick and J. C. Miller, *J. Biol. Chem.* **184**, 661 (1950).
10. L. J. Reed and H. Muench, *Am. J. Hyg.* **27**, 493 (1938).
11. O. H. Lowry *et al.*, *J. Biol. Chem.* **193**, 265 (1951).
12. B. H. Hoyer *et al.*, unpublished.

Charles Franklin Brooks, Meteorologist

Charles Franklin Brooks, professor of meteorology, emeritus, at Harvard University, died suddenly at his home on 8 January 1958, in his 67th year. Although he had retired last year from the directorship of Harvard's Blue Hill Meteorological Observatory, he had remained active in meteorological affairs; on the morning of his death he had made numerous samplings and measurements of the fresh snowfall.

Dr. Brooks's career spanned all the tremendous development in meteorology which has been concentrated in the present century. He was born in St. Paul, Minnesota. The severe summer thunderstorms which occur in that part of the country impressed him during his youth and served to spark his interest in the weather. He applied climatology early in life when he computed his rates for a contract in snow shoveling by the season versus rates per storm.

His university education was pursued at Harvard, where he received the A.B. in 1911, the A.M. in 1912, and the Ph.D. in 1914. His Ph.D. in meteorology was the second to be awarded in this country.

He went to Washington, D.C., to work on the *Atlas of American Agriculture*. Then he became instructor in geography at Yale University (1915–18). Later he served as instructor in meteorology for the U.S. Army Signal Service at College Station, Texas. Following this work he returned to Washington to edit the Weather Bureau's *Monthly Weather Review* (1918–21). For the next decade he taught meteorology and climatology in the Graduate School of Geography at Clark University.

The American Meteorological Society was founded in 1919 largely through the personal energy and enthusiasm of Dr. Brooks. He was elected secretary at the first meeting and served in that office until 1954. He was editor of the society's *Bulletin* during the first 19 years, and more recently he became known as "Mr. American Meteorological Society."

In 1931 he took the post of professor of meteorology at Harvard and director of the Blue Hill Meteorological Observatory. Under his directorship the observatory once more gained international recognition, as the staff and number of projects increased.

In 1940 the Weather Bureau Solar Radiation Field Testing Unit was moved from Washington, D.C., to Blue Hill at Dr. Brooks's suggestion, because the new location provided better exposure and proximity to other laboratories experimenting with the uses of solar energy. The Weather Bureau still maintains a solar observing unit at the Blue Hill Observatory.

In 1932 Dr. Brooks was instrumental in reestablishing a weather observatory at the top of Mount Washington. He became its president and engaged actively in this work until his death. Without his efforts, the Mount Washington Observatory almost certainly would have failed during times of crisis.

From the first few years of the Mount Washington observations he was able to illustrate their value to the Weather Bureau as aids in forecasting storms and cold waves. This, subsequently, led to the Bureau's support of the observational program. Liquid water content and icing rate of clouds were first routinely observed on the mountain. This work, always heartily endorsed by Dr. Brooks, led to many experiments in cloud physics and to the collecting of valuable data for the aircraft and tower industry, the latter having developed with the need for tall television and microwave towers.

Dr. Brooks's chief scientific studies have been on weather and climate. In his studies of the relations between ocean weather and synoptic meteorology, the difficulties and inaccuracies of meteorological measurements at sea became apparent. Studies of instrumentation and recommendations concerning the methods of observation followed.

At Blue Hill he prepared, jointly with A. J. Connor, basic climatic maps of North America which are still considered the best available for the area.

In the 1930's he set up a network of special weather stations over New England for the study of eclipse meteorology. His findings show the detailed changes in the weather which occur during an eclipse.

Under his direction the American chronometric radiosonde was developed at Blue Hill and, for a time, used routinely by the U.S. Weather Bureau and other countries. He studied the deficiencies of precipitation gages, designed and put into use new windshields which provide better "catch" during windy storms of rain or snow. His interpretation of clouds in terms of stability and general pattern of the atmosphere is well known among meteorologists. During World War II he taught new Weather Bureau and Civil Aeronautics Authority observers methods of cloud observation.

His knowledge of clouds, instruments, and methods of observation led the International Meteorological Organization, which later became the World Meteorological Organization, to utilize his experience in these matters in the late 1940's and early 1950's. He served this organization as a member of the committee which prepared the *International Cloud Atlas*. In 1953 he participated in the meetings of the Commission on Instruments and Methods of Observation of the World Meteorological Organization.

Although he was above all an observer, he heartily endorsed theoretical work in cloud physics and weather radar at Blue Hill.

In New England, Dr. Brooks has probably done more for the U.S. Weather Bureau than any other single person. He helped obtain a district forecast office in Boston, when previously the forecasts emanated from Washington. He was a strong advocate of hurricane research which could be applied to New England as well as to other areas, and he was constantly in touch with his senators and congressmen, emphasizing the needs of the Bureau. For nine years he and other staff members of the observatory studied snowstorms affecting the Boston area. This work helped to improve the forecasting of snowstorms for this area.

He was a fellow of the Royal Meteorological Society of Great Britain, a member of many scientific organizations in the United States, and, at one time, president of the Association of American Geographers. He served with the U.S. Quartermaster Corps, the Office of Scientific Research and Development, and the National Research Council.

His book, *Why the Weather*, published in 1921 and revised and enlarged in 1935, has served to inspire many to become meteorologists.

After the founding of the Lowell Broadcasting Council and of its radio station, WGBH–FM, whose transmitter is located on Blue Hill, he gave weekly talks on current events, both local and international, in the ever-expanding field of meteorology.

The most important phase of his career revolved around his unique personality. He worked and played at meteorology almost continuously, yet during all of this activity, Dr. Brooks showed a warm sympathy for all men, and he gave his time and energy unstintingly, day or night, to all who sought his advice—regardless of their academic degrees or lack of them.

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Blue Hill Meteorological Observatory, Harvard University

News of Science

President's Message on Space Agency

President Eisenhower has proposed the creation of a National Aeronautics and Space Agency. He described the new agency on 3 April in a special message to Congress.

". . . An imaginative and well-conceived space program must be given high priority and a sound organization provided to carry it out. Such a program and the organization which I recommend should contribute to (1) the expansion of human knowledge of outer space and the use of space technology for scientific inquiry; (2) the improvement of the usefulness and efficiency of aircraft; (3) the development of vehicles capable of carrying instruments, equipment, and living organisms into space; (4) the preservation of the role of the United States as a leader in aeronautical and space science and technology; (5) the making available of discoveries of military value to agencies directly concerned with national security; (6) the promotion of cooperation with other nations in space science and technology, and (7) assuring the most effective utilization of the scientific and engineering resources of the United States and the avoidance of duplication of facilities and equipment."

Civilian control. "I recommend that aeronautical and space science activities sponsored by the United States be conducted under the direction of a civilian agency, except for those projects primarily associated with military requirements. I have reached this conclusion because space exploration holds promise of