

A Radio Message

From Iowa to Virginia, Via the Moon

In present long-range radio communications, the ionosphere, an electrically charged layer of the upper atmosphere, is used as a reflector for radio waves. The occurrence of occasional ionospheric storms sometimes interrupts long-range communications, however, and it has been suggested that the effects of these radio storms might be circumvented if a dependable system employing ultra-high frequency radio waves reflected from the surface of the moon could be developed for emergency use. Last winter some encouraging results in this direction were obtained during a cooperative experiment conducted by the National Bureau of Standards and the Collins Radio Company. Ultra-high frequency signals were transmitted after reflection from the moon. A twenty-kilowatt transmitter located in Cedar Rapids, Iowa was used to send in Morse Code the historic message "What hath God Wrought!" at an operating frequency of 418 megacycles to a receiver at the NBS field station in Sterling, Virginia.

To verify that the signal was in fact reflected by the moon, the Bureau of Standards reported, the actual transmission delay was compared with the theoretical value determined from the relative positions of transmitter, moon, and receiver and the known speed of radio waves. The 2.5-second time interval that was measured proved to be in approximate agreement with the theoretical value. Those participating in the experiment were P. G. Sulzer, G. F. Montgomery, and Ross Bateman of the NBS central radio propagation laboratory and I. H. Gerks of the Collins Radio Company.

Research Corporation, 1951

Grants in Aid to Science and Education

Grants in aid totalling \$875,000 were made by Research Corporation in its 1951 fiscal year according to the foundation's president, Joseph W. Barker. The sum was distributed in the form of 288 grants to educational and scientific institutions in forty-one states, the District of Columbia, Hawaii, Canada, Formosa, India, Lebanon, and the Philippine Republic. In the annual report covering the foundation's 39th year of operation, Dr. Barker notes that Research Corporation's fields of disbursement are being strongly influenced by the indirect effects of government sponsored research on the smaller educational institutions. The huge research programs sponsored by defense and other agencies in the larger American universities and technical institutions, on top of these schools' usual educational programs, create a need for additional scientists who frequently are recruited from the smaller institutions.

In the face of this competition, the smaller colleges find it harder and harder to keep together the staffs needed for science teaching and independent research projects, according to Dr. Barker. To support research in such colleges, Research Corporation last year distributed through its Cottrell grants program over

\$350,000 to the smaller colleges of liberal arts and sciences. The principal aim of this program is the support of work by younger researchers and teachers who are training a new generation of scientists. An additional \$225,000 was given to universities and scientific institutions through the foundation's general grants program which fosters pioneering research, mainly in the physical sciences.

Since its founding in 1912 by Frederick Gardner Cottrell, the foundation has distributed grants amounting to nearly \$7,000,000—primarily in the fields of physics, chemistry, engineering, mathematics, and nutrition. Further information may be obtained from C. H. Schauer, Director of Grants, Research Corporation, 405 Lexington Avenue, New York 17, N. Y.

Oceanography

Research Awards Offered by Texas A & M

The Texas A & M Research Foundation Fellowship in Physical Oceanography, available to an outstanding graduate in physics for the 1952-53 academic year, has been announced by the college. The fellowship carries a stipend of \$1500. Texas A & M is also offering assistantships in physical oceanography, as well as in the fields of biological, geological, chemical, and meteorological oceanography, providing \$900 to \$1500 each. Fellows and assistants in physical oceanography take standard curricula leading to the MS or the PhD degree, together with additional graduate work in physics and in the basic sciences or in engineering. In the assistantships, duties with the department of oceanography will consist of aiding in the program of oceanographic research sponsored by various government agencies and by industry. Further information may be obtained by writing to the Head of the Department of Oceanography, Agricultural and Mechanical College of Texas, College Station, Texas.

RCA Fellowship at NYU

New Award in Electrical Engineering

A predoctoral fellowship in electrical engineering to be known as the David Sarnoff Fellowship at New York University has been established by the Radio Corporation of America. The fellowship provides an annual grant of \$2700 and will be administered jointly by NYU and the RCA Education Committee. Other RCA resident fellowships are available for outstanding graduate students in electrical engineering at Princeton, Caltech, and the University of Illinois; in physics at Columbia University; and in engineering physics at Cornell University.

GE Fellowships

Education Program Expanded

Following a two-year survey made by the General Electric Company in review of its educational assistance program, GE has announced its decision to in-

crease the number of awards provided annually under the program from 138 to approximately 285. The expanded program comprises assistance to students in both undergraduate and postgraduate studies and research, grants to colleges either through direct payments or help in purchasing equipment for laboratory and instructional purposes, and summer courses for science and mathematics teachers. Fifteen postgraduate fellowships have been raised in value from a former maximum of \$1500 to a new range of \$1400 to \$2100 plus an added stipend of \$1200 per student to the colleges where the recipients study.

An additional twenty new postgraduate fellowships are now being offered by GE for work in chemistry, physics, and metallurgy. Of these, twelve will be granted in chemistry, four in physics, and four in metallurgy. Physics awards will be given for study at the California Institute of Technology, Cornell University, Harvard University, and the University of Illinois. Another new part of the education program is designed to assist thirty outstanding college students throughout the country during their senior year. These scholarships, amounting to \$500 each, will be awarded primarily to engineering students. The company's established program of making available a fund of \$150,000 for aid to colleges and universities in purchasing needed laboratory equipment will be continued. During the last ten years, according to GE, assistance has been provided to more than 130 colleges and universities in enlarging and modernizing laboratory facilities for instructional and research purposes.

Visibility Laboratory

At Scripps Institute of Oceanography

Specialists in optics, electronics, and other related sciences will be brought together in a cooperative research program to be carried out in a newly created "Visibility Laboratory" which will be located at the University of California's Scripps Institute of Oceanography, La Jolla, California. The new laboratory, sponsored jointly by the U. S. Navy and the Air Force, will be concerned with visibility problems in modern warfare and with techniques for providing new factors of safety in aviation and ship operation. Siebert Q. Duntley, professor of physics at the Massachusetts Institute of Technology, has been granted leave of absence from MIT to become director of the laboratory.

New Edison Laboratory

Ground Broken Near West Orange

Construction has begun on a new one-story laboratory for Thomas A. Edison, Inc. at West Orange, New Jersey. The site is near the original brick structures built by Edison in 1887, which are generally recognized as the first industrial research laboratory, now headquarters for the Thomas Alva Edison Foundation. The half-million dollar laboratory will be devoted to basic and applied research and to technical work directly

supporting the operations of the Company's seven manufacturing divisions. Construction is expected to be completed early next year.

Geophysical Research

New Institution Created in Denmark

Establishment of the Geophysical Research Institution as an independent scientific center at the University of Copenhagen has recently been announced. The new institution is under the direction of Niels Arley and has a governing board consisting of H. M. Hanson, rector of the University of Copenhagen, Niels Bohr, director of the Institute for Theoretical Physics, and Dr. Arley. Current plans call for a research program which will include deep-sea expeditions to measure the oceans' geomagnetic field and to study magnetic characteristics of bottom samples. The Institution also plans to carry out a systematic geophysical survey of Greenland.

New Publications

Annual Reviews of Nuclear Science

Annual Reviews, Inc., a nonprofit corporation which since 1931 has published annual critical reviews designed to cover systematically the current literature in certain major fields of science, has announced the completion of an agreement with the National Research Council of the National Academy of Sciences covering the publication of the *Annual Review of Nuclear Science*. Volume 1, prepared under the editorial supervision of the NRC's Committee on Nuclear Science and containing twenty-six review papers, was issued last month. Future volumes will appear under the editorship of James G. Beckerley, director of classification for the Atomic Energy Commission, who will be aided by three associate editors: Martin D. Kamen (Washington University), Donald F. Mastick (AEC), and Leonard I. Schiff (Stanford University). The Review also has an editorial committee consisting initially of Dr. Schiff, C. D. Coryell (Massachusetts Institute of Technology), L. F. Curtiss (National Bureau of Standards), E. Segré (University of Illinois), and R. E. Zirkle (University of Chicago).

Rational Mechanics and Analysis

The *Journal of Rational Mechanics and Analysis*, published for the first time this year, aims especially "to close the rift between 'pure' and 'applied' mathematics and to foster the discipline of mechanics as a deductive, mathematical science in the classical tradition." The *Journal*, under the editorship of T. Y. Thomas and C. Truesdell (with the assistance of D. Gilbarg, V. Hlavatý, and E. Hopf), is published by the Graduate Institute for Applied Mechanics of Indiana University, Bloomington, Indiana, and will contain articles in English, French, German, and Italian. The editorial board has twenty-six members, of whom the fol-