the whole undertaking are adapted to the participation of persons all over the world who have high-frequency receiving sets, no technical training being required. Long-delay echoes are a most surprising and baffling phenomenon. J. Hals was listening in Norway, one day in 1927, to telegraphic signals from station PCJJ in Holland on a frequency of about 9,600 kc/s. Some of the signals were followed, after about 3 seconds, by a faint echo or reproduction. Echo signals occurring one seventh of a second after an emitted signal had been well known, being due to the reception of waves that had traveled all the way around the earth. But the discovery of echoes after a materially greater interval than a seventh of a second immediately raised the puzzling question of where such an echo could come from.

The phenomenon has been verified in a few scattered observations by Dutch, British and French engineers. Echoes have been heard from 1 to 30 seconds after the emitted signal. Not enough is known, however, to determine what causes the echo signals nor how they are propagated. Two theories have been proposed. One, by Dr. C. Størmer, of Norway, is based on the assumption that there are streams of electrons in space some hundreds of thousands of miles out from the earth's equator, converging in a vast toroid upon the magnetic poles of the earth, and accounting for the aurora borealis or northern lights. Dr. Stormer supposes that the signals are reflected from these electron streams in space. According to the other theory, advanced by Dr. B. Van der Pol and Professor E. V. Appleton, these echoes are due to a slowing up and reflection of the waves by a peculiar distribution of ionization in the very high levels of the ionosphere (that portion of the atmosphere 65 miles and more above the surface of the earth which is responsible for all long-distance radio transmission).

The British Broadcasting Corporation through its magazine, *World-Radio,* and with the aid of Professor Appleton, has inaugurated a worldwide endeavor to learn more about these long-delay echoes. Special emissions are provided from two high-power, high-frequency stations to facilitate observations by anyone who cares to listen with a high-frequency receiving set. Listeners in all parts of the world have been enrolled in the endeavor, over 10,000 of them in Great Britain. It seems likely that information of unique value to science will result, and an orderly explanation of the curious phenomenon developed, when definite data are secured on the frequencies and the times of day and season at which these echoes occur, their intensities, the area over which a given echo is heard, their relation to magnetic storms, sunspots, etc.

Dr. J. H. Dellinger, chief of the radio section of the National Bureau of Standards, would be very glad to have any successful reception of long-delay echoes in the United States reported to him, and will relay the information to the British authorities who are coordinating the investigation for the world as a whole. Observers should give the identifying letter of the signal observed, the time to the nearest second at which the direct signal was heard, the time to the nearest second at which the echo was heard, an estimate of the relative intensities of direct signal and echo, a description of the sharpness or apparent shape of the echo, and any pertinent information on interference, fading of signals, or other conditions of the observations.

Dr. Dellinger would be interested also in receiving reports on reception of long-delay echoes on any other stations, especially high-frequency stations in the United States. It may, on the other hand, be difficult to be certain of any echoes observed because of the lack of silent periods as in the special signals from the two European stations.

LOCAL HEALTH SERVICE IN RURAL AREAS

IMPROVED rural health standards, which are summarized in the Boston *Evening Transcript,* will be sought by the public health service in using a $1,000,000 grant allotted from the Federal Emergency Relief funds. Surgeon-General Cumming has issued regulations governing participation of the public health service in the establishment or maintenance of permanent local health services in rural areas.

The service will give financial aid through state health departments toward maintaining existing county or district health units when local funds available are insufficient. Also it will undertake establishment of new full-time rural health units, where needed, when local funds available are insufficient to meet the entire cost. It will not contribute to any project in which less than fifty per cent. of the cost is borne by state or local authorities, and where state or local authorities can meet more than fifty per cent. of the total cost of a project they will be expected to do so. The Federal service will not contribute to any project in which less than twenty-five per cent. of the total cost is borne by local authorities.

Under the regulations, the allocations for rural health maintenance will be made only where the county or district unit is under direction of a whole-time medical health officer whose training meets the requirements recommended by the joint committee on qualifications of county health officers and adopted by the conference of state and territorial health officers. The personnel of the unit must consist of not less than a

whole-time medical health officer, one public health nurse and a clerk.

The state health officers will submit to the Public Health Service a statement of the situation in each county or district recommended for assistance and will attach a proposed budget showing the distribution of funds from all sources and indicating the items required from the Public Health Service for the period ending June 30, 1935. The surgeon-general will then review these with discretion to approve or disapprove of any project submitted for consideration.

Quarterly reports will be required from state health officers to the Public Health Service for each project, showing the activities carried on by the unit and presenting a statement of expenditures incurred by the several participating agencies for the quarter.

Notices went out to state health officials on October 19, announcing that the allocation of funds could be made as soon as desired by counties needing assistance. There are now 550 full-time county units. The number in 1933 was 616 units. The first to be organized was in Yakima County, Washington, in 1911. The state health officials at that time asked the Public Health Service to aid in setting up an agency to combat typhoid fever. The unit has continued active since.

It is estimated that less than twenty-five per cent. of the rural population of the country has the benefit of full-time service at the present time.

EDWARD W. BROWNING'S BEQUESTS FOR PUBLIC WELFARE

BY the will of the late Edward W. Browning, of New York City, the income from his residuary estate, said to be over $5,000, will be divided into six equal portions and such portion be devoted each year as a prize for the results achieved during such year in the six classes or purposes outlined in the will which are to be known as the Browning Prizes. The classes are as follows: "The prevention of cruelty to children or animals, or the promotion of peace and international harmony.

"The spreading of the Gospel under Protestant auspices, either by distinguished example, effective teaching or exceptional service.

"The uplifting of the moral condition of the world, either by some direct and positive service or example to that end, or by the introduction or furtherance of methods most successful in decreasing vice, gambling, intemperance; or dishonesty and corruption in government and politics.

"The production of the most serviceable invention or useful discovery; or architectural improvement in fireproofing and sanitation or otherwise; or the most important work of art in painting, sculpture or literature.

"The most widely beneficial discovery or new method in medicine, surgery or in the prevention of disease.

"The increased production or improvement of fish, birds or animals; the conservation of forests; the irrigation of arid lands; the increase or improvement of crops, flowers or plants." The value of Mr. Browning's estate is said to be $7,000,000. The testament, dated in December, 1912, named as trustees of the prize funds Dr. Elmer Ellsworth Brown, formerly chancellor of New York University; Dr. Nicholas Murray Butler, president of Columbia University; Dr. John H. Finley, Robert T. Morris, M.D.; Dr. Henry S. Pritchett; The Rev. Henry A. Stimson, and the late Clarence H. Kelsey.

DEDICATION OF THE NEW ZOOLOGICAL LABORATORY AT BELTSVILLE, MD.

MORE than a hundred guests attended the dedication services on October 20 of the new Zoological Laboratory building which has now been completed at the Beltsville Research Center, Maryland. Dr. Maurice C. Hall, chief of the Zoological Division of the Bureau of Animal Industry, presided and several guests spoke briefly. Among the speakers were: Dr. Cooper Curtice, who was the first chief of the division and is now retired; Dr. Charles Wardell Stiles, who also served as chief of the division; and Dr. Albert Hassall, who until his recent retirement was assistant chief. These men discussed the early work of the bureau in research and procedures for the eradication and control of animal parasites, and stressed the possibilities which the new building and equipment provide for additional investigations.

Other speakers were Dr. Henry B. Ward, permanent secretary of the American Association for the Advancement of Science: Dr. W. E. Cotton, superintendent of the Bureau of Animal Industry Experiment Station at Bethesda, Md.; Dr. Lawrence A. Avery, superintendent of the new laboratory; and Earl C. Butterfield, the newly appointed superintendent of the Beltsville Research Center. Other guests represented the Johns Hopkins University, the Helminthological Society of Washington, the Smithsonian Institution and various branches of the Department of Agriculture.

The building cost $50,000 and contains thirty-one rooms. It will be used for experimental work in the control and eradication of parasites. Several other buildings accommodate small animals such as dogs, cats, guinea pigs, rabbits, chickens, pigs and others. The special equipment includes a variety of apparatus, a post-mortem room, refrigerator room, incinerator and library. The lots and pens outside these buildings are separated by double fences and ditches