SCIENTIFIC EVENTS

JOHN FILLMORE HAYFORD

AT the annual meeting of the American Geophysical Union, May 1, 1925, the following resolutions were passed:

WHEREAS, we, the members of the American Geophysical Union, have learned with sincere regret of the death on March 10, 1925, of our associate, Dr. John Fillmore Hayford, director of the College of Engineering of Northwestern University; therefore, be it

Resolved, That we express our deep sorrow in the loss of this member whose active work in the American Geophysical Union began with its organization in 1919. He held the office of chairman of the section of geodesy from July 1, 1922, to June 30, 1924, and, not being eligible for immediate reelection, that of vice-chairman from July 1, 1924, until the time of his death.

Dr. Hayford enjoyed world-wide renown in the realm of geophysical science. For a number of years he was in general charge of the geodetic field and office work of the U. S. Coast and Geodetic Survey, during which time he unified the triangulation systems of the entire country by basing them upon a single point and on one spheroid of reference. He derived, from triangulation and astronomical data in the United States, a new spheroid which was adopted in 1924 by the section of geodesy of the International Geodetic and Geophysical Union as being the most reliable in existence and the one recommended for use in all mapping and charting purposes by those countries which have not already adopted a spheroid for such work.

Dr. Hayford, while in charge of the geodetic work of the U. S. Coast and Geodetic Survey, was instrumental in initiating the revision of field and office methods and practices in conducting geodetic work, leading to greater efficiency and economy. He made the first comprehensive quantitative investigation of the theory of isostasy and thereby proved its validity. In recognition of this he was awarded, early in 1924, the Victoria Medal by the Royal Geographical Society of London.

During the war Dr. Hayford was a member of the Advisory Committee on Aeronautics and, at the time of his death, was a research fellow of the Carnegie Institution of Washington, carrying on investigations concerning the levels of water in the Great Lakes.

The long list of scientific reports and papers by Dr. Hayford forms his fitting and lasting memorial.

Resolved, That the members of the American Geophysical Union regret the death of Dr. Hayford as a personal loss as well as a loss to the science of this country and the world and that they express to his family their deepest sympathy.

Resolved, At the annual meeting of the American Geophysical Union, held on May 1, 1925, that a copy of these resolutions be sent to Dr. Hayford's family and that they be spread on the minutes of the union.

THE STRUCTURE OF LIGHT[1]

THE first Fison Memorial Lecture was delivered by Sir Joseph Thomson in the Medical School, Guy's Hospital, London, on Thursday, May 7, the chair being taken by Lord Balfour. Sir Joseph selected as his subject "The Structure of Light," in the course of which he stated that the optical properties of light appear to be explicable only upon a wave theory, whereas the electrical properties are more easily explained on a corpuscular theory. Newton himself really combined the two theories, as the assumption of waves generated by the corpuscles was an essential part of his explanation of simultaneous reflection and refraction. The followers of Newton were "more corpuscular" than Newton himself, and a purely corpuscular theory of light was generally adopted until the work of Young and Fresnel once more focussed attention upon the wave theory. By the end of the nineteenth century, Maxwell's electromagnetic theory, and the pioneer experiments of Hertz and Lodge on electromagnetic waves, had made the wave theory of light probably the most complete and satisfactory in physical science. Then the study of gaseous ionization, the photoelectric effect, X-rays and black body radiation began to throw doubts upon the sufficiency of the ordinary wave theory.

As an alternative, Sir Joseph Thomson put forward a new theory designed to explain both electrical and optical properties of light (see *Phil. Mag.*, vol. 48 (1924), p. 737). Imagine an electron and a positive nucleus joined by a tube of force. If the electron jumps from one stable state to another of smaller energy, we may suppose that the tube of force is thrown into a loop, which becomes detached as a closed "ring of force." Such a ring would travel out like a vortex ring in a direction perpendicular to its own plane. It would also carry with it a definite "quantum" of energy. Immediately before and after the formation of the ring ordinary electromagnetic waves would also be started, but the ring would carry nearly all the energy liberated by the movement of the electron. Absorption of energy by an atom could take place by a converse process, and would normally occur only when the energy in the ring was sufficient to move an electron from one stable state to another, *i.e.*, when the energy was great enough to produce partial or complete ionization of the atom. The circumference of a ring of force would be equal to the wave-length of the light, and so a ring of visible light would be too large to be absorbed easily by an atom except by a process involving resonance, whereas an X-ray ring would be comparable in size to an atom. This would account for the observed differences between X-ray and optical absorption. The waves which

[1] From *Nature*.