advancement of science in its purest form. Lavoisier, Dalton, Davy, Berzelius, Bunsen, Van't Hoff, Arrhenius, Victor Meyer, Crookes, Remsen, Venable—their names are many and they have labored for the truth in science and for the truth alone.

To cite a conspicuous example, because of his notable genius and because of the fact that, being associated with the university at which I was at that time a student, it was my privilege and pleasure to have known him—I will refer to Josiah Willard Gibbs. Gibbs contributed more than any other scientist to the elucidation of some of the most complex problems in theoretical chemistry. He was a pure scientist if there ever was one. He was absolutely impractical and the application of his science to a practical problem of production would have been for him an utter impossibility. To him the pursuit of knowledge was an abstraction, something to be followed for the sake of the knowledge alone, without any ulterior view to its ultimate application. His studies were so abstruse and apparently intangible that he was understood by but few, if any, of his contemporaries and by only a small proportion of his more advanced students. But the value of his contributions to the realm of chemistry is well-nigh incalculable and his name is achieving the eminence to which it is entitled.

But although Gibbs and the many others who have added much to pure science through the medium of chemistry are dead—the progress in these directions will continue and new hands will bear the torches into the dark places.

It is in the realization of such dreams as the construction of this splendid laboratory which we are today dedicating that assures the fulfilment of the promise of the future, and, in closing, I will quote to you a remark once made to me by Willard Gibbs, which emphasizes an idea that may well serve as a guiding principle in scientific inquiry:

> Nature is like a sphynx of whom we are forever asking questions. The answer she gives does not depend so much on the questions we ask as it does on the way we ask our questions.

B. B. BOLTWOOD

YALE UNIVERSITY

OPENING OF THE ASTRONOMIC HALL OF THE AMERICAN MUSEUM

ON March 24, 1926, a reception was held at the American Museum of Natural History in celebration of the opening of the preliminary astronomical hall. Included in the exhibits are oil paintings of the three solar eclipses seen in the United States in 1918, 1923 and 1925.

These eclipse paintings were begun through the engagement of Mr. Howard Russell Butler, N.A., by Mr. Edward Dean Adams, to paint the solar eclipse of June 8, 1918, at the station of the U. S. Naval Observatory at Baker, Oregon, and the gift of this painting to the American Museum. A physicist by early training and an artist by life training, Mr. Butler is probably the best qualified man in this country, if not in the world, to undertake the painting of this astronomical phenomenon which lasts at most only a very few minutes.

The paintings are arranged in the form of a triptych, and one sees the paintings as he would view the eclipses, each through a separate window. The lights are hidden so that the pictures appear to be large photographic transparencies in their true color.

The picture on the left of the triptych is of the total eclipse of the sun, which occurred on June 8, 1918, as seen by Mr. Butler at Baker, Oregon. The eclipse reached totality at 4:03 P. M. at an altitude of about 45°, and since it was in the afternoon the long axis of the corona was inclined to the right. The time was near the period of maximum sun-spots, and as was to be expected there was a diminished corona not exceeding three fourths the diameter of the sun, but with more polar streamers than were expected. The prominences, especially those on the lower right, reached exceptionally large proportions, the "Heliosaurus" measuring 47,000 miles in height. The "Eagle" at the top was another large and striking prominence. The eclipse was seen through a thin film of clouds, so thin that it did not appreciably lessen its brilliancy, but added to the picturesque effect. (Gift of Mr. Edward Dean Adams to the American Museum of Natural History.)

The vertical picture in the center of the triptych is of the total eclipse of the sun, which occurred on September 10, 1923, as seen near Lompoc, California. This eclipse reached totality at 12:59 P. M. and since it was almost a noon-day eclipse, the long axis of the corona was practically horizontal. The time was nearer the period of minimum sun-spots, and as was to be expected the corona was more extended. It was seen in a gap between two clouds. Mr. Butler, having practically finished his notes during the period of totality, was surprised by the first Baily's bead of the third contact, that is, the first appearance of a speck of the photosphere, evidently between two volcanic peaks on the rough surface of the moon. This appeared like an orange ball of great brilliancy resting on the upper limb of the moon. For a few seconds the corona remained, and Venus, slightly more than one degree above the moon, continued to shine brilliantly. He concluded to make this combined effect, commonly known as the diamond-ring effect, his pic-

ture. (Gift of the Morris K. Jessup Fund to the American Museum of Natural History.)

The picture on the right of the triptych is of the total eclipse of the sun, which occurred on January 24, 1925, as seen at Middletown, Connecticut. The eclipse reached totality at 9:10 A. M., and consequently the long axis of the corona is inclined to the left. The time was near the period of maximum sunspots, and not only was the outline of the corona surprising to astronomers, but some of the streamers were much longer than was expected. The prominences, while many (19 were recorded by the camera), were so small that they could not be seen by the naked eye. (Gift of the Morris K. Jessup Fund to the American Museum of Natural History.)

Besides the paintings of the eclipses, two other pictures by Mr. Howard Russell Butler were exhibited. Mr. Butler has painted a lunar landscape with the cooperation of Professor Henry Norris Russell, director of the Halsted Observatory at Princeton. It shows the earth in the sky as seen from the moon, the observer being located in one of the rugged lunar craters near a spine thrust up from the crater floor, similar to that which was formed during the great eruption of Mt. Pelée on Martinique in 1902. The earth is represented as in the month of June with the Atlantic toward the observer. It is passing through the constellation Scorpio, Antares appearing near the point of the spine. Mars is seen near the top of the canvas. (Gift of the Morris K. Jessup Fund to the American Museum of Natural History.) Mr. Butler's second picture represents the great aurora of August 12, 1919, as seen from Ogunquit, Maine.

In an outer alcove of the hall are a large number of photographic transparencies representing solar eclipses and other astronomical phenomena. These preliminary exhibits represent the first example of American Museum methods of education applied to astronomy and just outside of the hall are exhibited for the first time plans for the proposed hall of astronomy.

CLYDE FISHER
AMERICAN MUSEUM OF NATURAL HISTORY,
NEW YORK CITY

FILIBERT ROTH

FILIBERT ROTH, professor emeritus and founder of the forestry department at the University of Michigan, has passed away. Professor Roth's life was that of a pioneer worker. In his life he combined Europe's best scientific ideals in forestry with an American frontiersman's conviction in the momentousness of his subject. He was representative of the early educator in his field.

Professor Roth was born in Wurtemburg, Germany, April 20, 1858, and came to the United States in 1871. His first years in this country in Wisconsin and later on western plains formed a rich background for his later efforts. It was his early impressions of the Lake States' white pine areas in Wisconsin which served as a foundation for his masterly knowledge of American forest conditions.

Graduating from the University of Michigan in 1890, almost immediately Professor Roth worked as special timber expert with the Bureau of Forestry. There he first became identified prominently with all forest developments in this country, and his work with his colleague, Dr. B. E. Fernow, forms an essential chapter in the history of the development of American forest policies. Associated as they were, the two minds formed an alliance in presenting forestry to a new country. It was generally assumed that at the source of every creek there was enough pine to last for all time; they were heralded as the "denudiatics." But so many of their early predictions have now become demonstrated realities that their teachings are known and accepted to-day as general truths by all.

Professor Roth rapidly achieved distinction in the bureau. His publication, "Timber," in 1895 was early recognized as a first step toward the dissemination of scientific knowledge concerning wood in America: bulletin 10 has, perhaps, been used more than any other one publication which deals with timber.

His acquaintance with the forests of the Lake States led to a study and report on "Forest Conditions of Wisconsin," 1898. This was the first publication written on the forests of that region.

Still associated with Dr. Fernow, he taught forestry at Cornell University from 1898 to 1901. Later he served as an administrator of the national forest reserves, Department of the Interior. He remained here until the urgent call for the establishment of forestry at the University of Michigan was heeded. In 1903 he organized the first courses in forestry to be given in the middle west.

With little financial assistance, he labored successfully with the newly founded and meagerly equipped department. With characteristic enthusiasm, he told his early classes of the one hundred per cent. increase in the university's equipment—"We now have two pairs of calipers." During Professor Roth's administration, the professional facilities and material equipment of the department assumed worthy proportions. No other man was better qualified than "Daddy" to establish forestry in the Lake States.

As an exceptional teacher, Professor Roth was also a worker among his boys. The last time he taught dendrology, he made a tree book for himself and con-