Rowland Angell, who will preside; Russell Henry Chittenden, Frederic Collin Walcott and Phoebus Aaron Levene.

SIR JOSEPH PETAVEL, engineer and physicist, director of the National Physical Laboratory at Teddington, England, died on March 31, at the age of sixty-two years.

SIR ARCHIBALD GARROD, formerly regius professor of medicine at the University of Oxford, died on March 29, at the age of seventy-eight years. Sir Archibald was known for his work on chemical problems connected with metabolic changes in disease. He was elected a fellow of the Royal Society in 1910.

PERCY FRY KENDALL, professor emeritus of geology at the University of Leeds, has died at the age of seventy-nine years.

THE death is announced of Professor Emeritus Fredericq, of Liége. He was eighty-five years of age and had been professor of physiology in the University of Liége since 1879.

DR. LUDWIG DÖDERLEIN, the German zoologist, has died at the age of eighty-one years. He was for many years keeper of the Strasburg Zoological Museum and since 1921 had been honorary professor of zoology at the University of Munich.

SCIENTIFIC EVENTS

EXHIBITION OF VERY LOW TEMPERATURES AT SOUTH KENSINGTON

LORD RAYLEIGH presided on March 4 when Sir William Bragg, president of the Royal Society, opened the Exhibition of Very Low Temperatures, their Attainment and Uses, at the Science Museum, South Kensington. The London *Times* states that one of those present was Lady Ramsay, widow of Sir William Ramsay, one of the discoverers of the gas argon and a pioneer in this branch of science. The chairman, in introducing Sir William Bragg, spoke of his position as director of the Royal Institution, the historic home of low temperature research, where Faraday carried out his experiments. He said:

> The museum used to be a place where nothing changed. It should be something living, and should show not only the past, but also the way in which modern thought was tending and technique improving. This was especially important in such a time of change and development as the present. There was nothing to equal visual demonstration to show the progress of the application of knowledge; and Count Rumford's original idea in founding the British Institution was to make it a science museum, with a display of models working. The idea broke down then because the social conditions of the time were against it.
>
> The present exhibition was devoted to one of the strangest developments of human thought and experiment. He recalled his own original astonishment at the idea of an absolute zero of temperature, and the state of a body when all its heat had been extracted. The same attraction lay in the search for the absolute zero as in trying to reach the top of Mount Everest.
>
> Even to the non-scientist it was strange to think of air running about like water, of rubber as brittle as porcelain, or of a hammer made out of quicksilver.

Sir William concluded by referring to the long list of famous workers in this development of modern science, and to the great industrial importance of liquid oxygen and of other gases, such as argon.

The exhibition consists of two parts. Up the center of the hall are arranged the historical exhibits, beginning with the original apparatus used in 1823 by Faraday in his experiments for the liquefaction of gases. Other original apparatus shown includes that used by Joule and Kelvin in 1853 for cooling certain gases by allowing them to expand through a porous plug, and that employed in 1860 by Thomas Andrews to investigate the "critical state" of various substances.

The contemporary development of low temperature research, and of its applications, is shown in a series of exhibits arranged round the walls of the room. Separate sections are devoted to temperature reduction, temperature and pressure measurement, liquefaction and solidification, storage and transport and practical applications.

Among the exhibits are a model of a plant for the manufacture of solid carbon dioxide—a process upon which, among many more important things, the supply of cheap ice-cream depends; a selection of insulating materials, arranged to show the various thicknesses required to obtain an equal degree of insulation, and a container for transporting liquid oxygen. Of practical applications of the results of low temperature processes conspicuous examples are mine rescue appliances, airmen's breathing apparatus for use at high altitudes and the refrigeration of food-stuffs.

A series of pictures at one end of the hall show the various uses of oxygen, and one of them, the cutting of metal, is demonstrated by an actual plant, of which the flame cuts steel as quickly as a tailor can cut cloth.

Many of the exhibits are of that kind which the visitor may work for himself by pressing a button. A pamphlet describing the exhibition (which will remain

open until the end of May) has been written by T. C. Crawhall.

ASTRONOMICAL APPOINTMENTS AT THE UNIVERSITY OF CHICAGO

APPOINTMENT of four new faculty members of its department of astronomy, three of them distinguished young foreign astronomers, has been made by the University of Chicago. The appointments will make the department one of the most cosmopolitan groups in the university, as well as one of the outstanding departments.

Dr. Gerard P. Kuiper, of Leyden, Holland, has been appointed assistant professor of practical astronomy, effective on September 1. He has carried on research at the Bosscha Observatory in Java, at the Lick Observatory of the University of California and at Harvard University. Last year, at the Lick Observatory, he found that the bright new star, or nova, which was being observed by astronomers all over the world, is in reality a double star. He has also greatly increased the known number of "white dwarfs," those peculiar stars which are so dense that a cubic inch of material from them would weigh tons.

Dr. Bengt Stromgren, now privatdozent and lecturer on astrophysics at the University of Copenhagen, has been appointed assistant professor of theoretical astrophysics, effective on October 1. He became active in astronomical research at the age of thirteen and, although he is still under thirty, is already one of the world authorities in astrophysics and co-author of two important text-books.

Dr. S. Chandrasekhar, a native of Madras, India, has been appointed research associate, effective on January 1. Especially well known in the field of mathematical astronomy, Dr. Chandrasekhar is a former student of Sir Arthur Eddington. He received the Ph.D. at Trinity College, Cambridge, and has recently been engaged in research at Harvard University.

Dr. Philip C. Keenan, of the Perkins Observatory of the Ohio State and the Ohio Wesleyan universities, has been appointed instructor in astronomy. He received the Ph.D. at the University of Chicago. Drs. Kuiper, Chandrasekhar and Keenan will do most of their work at the Yerkes Observatory of the University of Chicago, at Williams Bay, Wisconsin. Dr. Stromgren will work chiefly at Chicago. Professor William D. MacMillan, member of the Chicago faculty for twenty-eight years and widely known for his theoretical studies in astrophysics, reaches the retirement age this year.

The present personnel of the department of astronomy, in addition to American-born members, includes Dr. Otto Struve, chairman of the department and director of Yerkes Observatory, whose father, grandfather and great-grandfather served as directors of various European observatories; Professor George A. Van Biesbroeck, a native of Belgium; and Dr. Hans Rosenberg, a German.

In addition to its work at the Yerkes Observatory, the department of astronomy will direct research at the McDonald Observatory, now in construction in the Davis Mountains of Texas. The McDonald Observatory is a cooperative enterprise of the University of Texas and the University of Chicago.

SYMPOSIUM ON HEAVY WATER AT THE KANSAS CITY MEETING OF THE AMERICAN CHEMICAL SOCIETY

PROFESSOR HAROLD C. UREY, of Columbia University, will be the chairman of a heavy water symposium which will be held in connection with the ninety-first meeting of the American Chemical Society in Kansas City, Mo., from April 13 to 17.

The symposium will survey the results achieved by workers in nine American universities and in the laboratories of the United States Government. Biology, physics, medicine, physical and inorganic chemistry, and organic chemistry are the principal spheres of investigation. Hundreds of isolated experiments to find uses for deuterium are reported from practically every civilized country. It has become a valuable tool in research. Its price is now so low that it is available to all.

Among the speakers will be Dr. F. G. Brickwedde, of the National Bureau of Standards, codiscoverer of heavy water. He will discuss the effects of mass on physicochemical and physical properties as determined by measurements at very low temperatures.

Professor W. D. Harkins, of the University of Chicago, will show the importance of deuterium as a reagent in the determination of the structure and properties of the nucleus.

Deuterium in biology will be discussed by Professors C. A. Smucker and H. V. Moyer, of the Ohio State University, who will report their experiments on the growth of bacteria in heavy water. Dean Frank C. Whitmore, of the Pennsylvania State College, and Professors J. O. Halford and L. C. Anderson, of the University of Michigan, will speak of developments in organic chemistry, where the use of deuterium has helped to elucidate many problems.

Professor H. S. Taylor, of Princeton University, will give the results of recent investigations in which deuterium and hydrogen have been used to study the properties of surfaces and reactions at surfaces.

Professor S. C. Lind and Dr. C. H. Shifflett, of the University of Minnesota, will illustrate the differences between the rates of reaction of hydrogen and deuterium with oxygen when the products of the decomposition of radioactive substances are used to