

dred thousand volt kevatron, a less powerful but more easily varied and controlled producer of ion beams. It will be used in studying the nuclear transformation of deuterium, lithium, beryllium, and boron.

W. F. Libby's carbon-14 dating techniques are also being developed at the Institute for Nuclear Studies. His results have proved of considerable interest to archaeologists and anthropologists and have already succeeded in establishing, among other things, the date of the first known human inhabitants of this continent as being in the neighborhood of ten thousand years ago. In a somewhat related vein, H. A. Urey has developed a method for detecting the temperatures of ancient climates by analyzing oxygen isotopes obtained from sea shells.

The Institute of Radiobiology and Biophysics was organized in 1945 to provide a continuity of the work on the biological effects of radiation carried out during the last war and to help provide a fundamental basis for the interpretation of the vast amounts of data accumulated since that time. The studies range from the effects of radiation on the living cell to new uses of radiation, both clinically and as a research tool. Considerable emphasis is given the study of ways of preventing and treating physiological effects of excess radiation. At the same time, the methods of the physical sciences have been applied to problems as diverse as measuring nerve impulses and the study of the mechanism of photosynthesis in green plants.

The Institute for the Study of Metals, under the direction of Cyril S. Smith, is concerned generally with studies in the physics and chemistry of the solid state in an effort to develop a "fundamental and systematic theoretical basis" for metallurgy and related fields. A number of research projects are currently in progress to examine the structure and behavior of metals when subjected to high pressures or to extremely low or extremely high temperatures. The Institute's research facilities include an extensive metallographic laboratory, a shop where special alloys are processed, an x-ray laboratory for studying the atomic structures of metals, a well-equipped cryogenic laboratory for low temperature work, an analytical and spectroscopic laboratory, and a high pressure laboratory where pressures up to 300,000 pounds per square inch can be produced. The low temperature laboratory has equipment for liquefying fifty quarts of hydrogen per hour at temperatures of 423 degrees below zero (Fahrenheit) or ten quarts of helium per hour at 460 degrees below zero.

HOUSTON'S MAGNETIC OBSERVATORY

The recent establishment of a magnetic observatory at the University of Houston brings the total number of such stations in the United States to three. Knowledge concerning the behavior of the earth's magnetic field over specific areas is of considerable importance to oil and mining industry geophysicists who use magnetic methods in their work, and the same information is essential to the communication services and to those who must maintain accurate navigation maps for sea

and air travel. The earth's magnetic field varies each day, with frequent strong variations (magnetic storms) which apparently are caused by sun spot activities.

The two previous magnetic observatories, one located at Cheltenham near Washington, D. C. and the other at Tucson, Arizona, were too far away to give reliable information for most of the Texas area. Discussions between representatives of the Coast and Geodetic Survey Division of Geomagnetism and Seismology and the Ruska Instrument Corporation of Houston led to a proposal for a magnetic observatory in Houston. The University of Houston agreed to furnish the site and buildings and to operate the station under the auspices of the Coast and Geodetic Survey, while the Ruska Corporation built and donated the necessary instruments. The observatory staff is headed by R. W. Long of the University of Houston.

GRANTS AND AWARDS

AEC FELLOWSHIPS

Selection of fellows to be sponsored by the Atomic Energy Commission for the 1951-52 academic year has been completed, and the individuals concerned were notified of their selection early in April. The fellowship awards, which are not to be announced in detail until all clearance procedures are final, are for research in the predoctoral physical and biological sciences and in the postdoctoral physical, biological, and medical sciences. Fellows may carry out their research and study in the university of their choice, provided the university accepts them for graduate study. A total of 287 fellows were chosen, of whom 156 will do predoctoral work and 30 will do postdoctoral work in the physical sciences. Thirty-one alternates in the physical sciences were also named in case budgetary provision could be made for their appointment or in case some of the appointees withdrew.

The fellows were chosen by a nine-man board of national scientific leaders under the chairmanship of George B. Pegram, vice president emeritus of Columbia University. Other members are George H. Boyd, dean of the University of Georgia graduate school; Robert G. Brode, professor of physics at the University of California; Detlev W. Bronk, president of Johns Hopkins University; Leland J. Haworth, director of Brookhaven National Laboratory; Warren C. Johnson, chairman of the department of chemistry, University of Chicago; Homer W. Smith, chairman of the department of physiology, New York University School of Medicine; Elvin C. Stakman, chief of plant pathology and botany, University of Minnesota; and Douglas Whitaker, dean of graduate studies at Stanford University.

ESSAY CONTEST ANNOUNCED

The Gravity Research Foundation, New Boston, New Hampshire, will award eight cash prizes on November 23, 1951, for short essays on the application of gravity to practical uses. A first award of \$1000, a second, third, and fourth award of \$400, \$200, and \$150 re-

spectively, and four \$100 awards will be given for the best essays of 1500 words or less on any of the following subjects: (a) the possibilities of discovering some partial insulator, reflector or absorber of gravity; (b) the possibilities of discovering some alloy, the atoms of which can be agitated or rearranged by gravity tension to throw off heat; and (c) the possibilities of discovering some alloy the temperature of which can be affected by gravity waves. Essays will be accepted from anyone who has received neither a first nor second award in a previous year. Manuscripts must be typewritten on paper 11 x 8½ inches, with two carbon copies, and should reach the office of the president, George M. Rideout, at the above address, before October 15, 1951.

NEW QUARTERLY

PACIFIC JOURNAL OF MATHEMATICS

Publication has been announced of the *Pacific Journal of Mathematics*, under the sponsorship of the following West Coast universities: the University of British Co-

lumbia; the California Institute of Technology; the University of California at Berkeley, Davis, Los Angeles, and Santa Barbara; Oregon State College; the University of Oregon; the University of Southern California; Stanford University; Washington State College; and the University of Washington. The Institute for Numerical Analysis of the National Bureau of Standards is providing clerical assistance and space for the *Journal*, and the American Mathematical Society has agreed to furnish financial aid to the publication during its initial period. Editors are E. F. Beckenbach (UCLA), Herbert Busemann (USC), and R. M. Robinson (UC, Berkeley).

The *Journal* will be devoted to the publication of basic research articles in the various branches of mathematics and is to appear quarterly in March, June, September, and December. A minimum of six hundred pages per yearly volume is planned. Further information may be obtained by writing to the *Pacific Journal of Mathematics*, University of California Press, Berkeley 4, California.



Arnold Sommerfeld.
Photo courtesy of
Paul E. Klopsteg.

Arnold Sommerfeld

Arnold Sommerfeld, the doyen among the physicists in Germany, died in München on April 26, 1951, at the age of eighty-two. He had been knocked down by a car and suffered arm and leg fractures about four weeks earlier. Although he seemed to get over this accident well at first, clotting in the brain set in after about a fortnight and ended fatally.

Sommerfeld held the chair of Theoretical Physics at the University in München from 1905 to 1946 after having previously been Professor of Engineering Mechanics at the Technische Hochschule, Aachen. Besides being a master in the mathematical handling of physi-

cal problems he was an inspiring teacher with a keen eye for detecting outstanding students even in the junior stages of their career. Thus he soon created a school for theoretical physics which became leading in Germany and to which graduates of other universities came from all parts of the world. This began at a time when problems of the propagation of radio waves stood in the fore. But soon his and his pupils' energies were turned to Quantum Theory and the theory of the atom, and a continuous stream of important contributions came from him and his pupils. It is fair to say that the development of atomic physics was immensely speeded up by the research originated by Sommerfeld. His book *Atombau und Spectrallinien* appeared in five editions between 1919 and 1931, each edition thoroughly rewritten according to the progress of this rapidly and radically changing subject. One of Sommerfeld's later important contributions was the theory of the electronic state of metals.

Sommerfeld made two extensive lecturing tours to the United States, in 1922 and 1928, which contributed much to the dissemination of atomic theory in this country. At least ten of Sommerfeld's full-time pupils hold chairs of physics at American universities and many more of the now senior generation of physicists in this country received stimulation and encouragement from him. His six-volume course of theoretical physics, of which two volumes exist to date in an American translation, is a work summing up his teaching of classical physics. Written with remarkable freshness in the last years as a bequest to the young generation it perpetuates much of the fascination of Sommerfeld's lectures and insures that the name of Sommerfeld the teacher will remain as familiar as that of Sommerfeld the scientist.