

for Union College and Rensselaer are being accepted from Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, and the District of Columbia. The Union summer program also includes teachers from North Carolina.

NBS Boulder Laboratory

For Radio Wave Propagation Research

Construction has begun on a major laboratory of the National Bureau of Standards at Boulder, Colorado. The new building will house the Bureau's Central Radio Propagation Laboratory on a 210-acre site directly south of the city, near the campus of the University of Colorado. Complete and modern facilities are to be provided for research on the propagation of radio waves and on the expanded utilization of the radio spectrum now being used for FM, television, facsimile, and radar.

The NBS Central Radio Propagation Laboratory is engaged in a broad program of basic and applied research in radio physics and associated geophysical phenomena of the upper atmosphere and the troposphere. The program has four aspects: ionospheric research, systems research, measurement standards, and regular propagation services. Investigations are under way dealing with the properties of matter at radio and microwave frequencies and with the development of techniques for the precise measurement of electrical quantities in these regions. One aspect of the basic standards and measurement program is concerned with obtaining atomic standards of time and frequency. NBS also participates in an advisory capacity on radio subjects for other agencies of the Government such as the Defense and State Departments and the Federal Communications Commission.

More than fifty members of the NBS tropospheric research group are now housed in temporary quarters at Boulder pending completion of the new building. Another group of twenty, engaged in studies of long-range propagation techniques, is located in Colorado Springs. By mid-1954, a staff of about five hundred—including scientific and clerical personnel—will be employed at the new Boulder Laboratory.

Miscellany

The Copley Medal of the British Royal Society for the Advancement of Science has been awarded to P. A. M. Dirac, Lucasian professor of mathematics at Cambridge University, for his contributions to the present understanding of quantum theory, elementary particles, and electromagnetic fields. Included among the other awards presented during the Royal Society's 290th anniversary meeting last month were the Hughes Medal, which was given to Philip I. Dee of Glasgow University for his work leading to the wartime development of microwave radar, the Sylvester Medal, which went to Cambridge mathematician Abram S. Besicovitch, and the Rumford Medal, which was won this year by Fritz

Zernike of Holland, professor of theoretical physics at the University of Groningen and the discoverer of the principle of phase contrast, for his development of a new and valuable technique in microscopy.

An exact replica of Sir Isaac Newton's original reflecting telescope, the ten-inch high first ancestor of the 200-inch Hale telescope on Palomar Mountain, has been presented to the Mount Wilson and Palomar Observatories by the Royal Greenwich Observatory. Newton built his first telescope when he was twenty-six years old, replacing the lenses used in previous refracting telescopes with a two-inch concave mirror to eliminate the chromatic aberration caused by lens systems. The original telescope was presented by Newton to the Royal Society in London in 1672. Sir Harold Spencer Jones, British Astronomer Royal, arranged for presentation of the replica to the observatories in California after a visit last summer. It will eventually be exhibited in the museum of Palomar Observatory.

The University of Buffalo has recently received support from the Office of Naval Research for the continuation and expansion of the research program on the physics of carbons and graphite, which has been under way for some time in the department of physics. The project is under the direction of S. Mrozowski, professor of physics; John G. Castle, Jr., is in charge of the low-temperature phase of the project.

The University of Tennessee physics department will carry on a two-year project, directed by R. R. Newton, associate professor of physics, to investigate the causes of inaccuracy in fin-stabilized rockets. The program will be conducted under a contract with the Redstone Arsenal, Huntsville, Alabama.

A nomogram relating the mean life for gamma-ray transitions to the energy and spin change has been constructed from the formula of V. F. Weisskopf (*Phys. Rev.* 83: 1073; 1951). Prepared by R. Montalbetti of the University of Saskatchewan physics department, the nomogram appears in the November 1952 issue of the *Canadian Journal of Physics* (30: 660), published by the National Research Council, Ottawa.

Education

The University of Illinois College of Engineering has announced that its departments of electrical engineering and physics, in cooperation with several leading companies in the electronics industry, will conduct a Summer School on Semiconductors and Transistor Electronics at Urbana, Illinois, from June 22 through July 17, 1953. Courses will be offered in three areas: a general survey of semiconductors, physics of transistors, and transistor circuits. Lecturers will include outstanding scientists from industrial laboratories as well as regular University of Illinois staff members. The school will be part of the Summer Session of the University, so that graduate-level academic credit can be given if desired. Inquiries should be addressed to the Department of Electrical Engineering, University of Illinois, Urbana, Illinois.

Tape recordings of three lectures presented during the major symposium of the 20th Anniversary Meeting of the American Institute of Physics in October 1951 (The Atom, by E. U. Condon; Physics as a Science and an Art, by K. K. Darrow; and The Nucleus, by E. Fermi) are available on loan to members of the American Association of Physics Teachers who wish to use them for presentation to classes, seminars, or science clubs, according to a recent AAPT announcement. Prospective borrowers may refer to the published papers in the November 1951, and the January and March 1952 issues of *Physics Today*. Each recording is complete on one reel and must be played on a double-track tape machine at $3\frac{3}{4}$ inches per second. Requests for the recordings should be addressed to Thomas H. Osgood, Editor, American Journal of Physics, Michigan State College, East Lansing, Michigan.

Bryn Mawr College has announced a \$3200 postdoctoral fellowship in physics or chemistry for 1953-54, to be known as the Helen Schaeffer Huff Memorial Research Fellowship. Candidates for the fellowship must be women who hold a doctor's degree or who have otherwise demonstrated their ability for research. Among equally good candidates, preference will be given to a student whose research field lies along the borderline between chemistry and physics. Applications should be made to the Dean of the Graduate School, Bryn Mawr College, Bryn Mawr, Pennsylvania, before March 15, 1953.

The American Society for Metals is sponsoring the second annual program of science achievement awards of more than one hundred prizes for pre-college students (\$5000 in cash and U. S. Defense Bonds) and twenty awards for teachers (\$1000 in cash prizes). Students in grades seven through twelve are eligible to take part in the program, which is being conducted by the National Science Teachers Association, 1201 Sixteenth Street, N.W., Washington 6, D. C. Rules for the program can be obtained by writing to Future Scientists of America, in care of the Association at the above address.

Industry

Transistor development at the David Sarnoff Research Center of the Radio Corporation of America has resulted in a demonstration model television receiver shown for the first time in November at the RCA laboratories in Princeton, New Jersey. The receiver, about one-quarter the size of a conventional table-model television set, was one of a number of devices demonstrated by RCA (including radios, record players, and public address systems) which were constructed with transistors replacing the usual vacuum tubes.

An industrial cooperation program at the California Institute of Technology, initiated more than two years ago to strengthen Caltech's associations with business concerns, has led to the formal organization of the Caltech Industrial Associates under the direction of Robert V. Bartz, former director of the Industrial

Liaison Office of the Massachusetts Institute of Technology. Each member of the group associated with Caltech, which now includes twenty-three companies representing the oil, aircraft, steel, chemicals, manufacturing, and other industries, supports the over-all research program of the Institute and in return is kept informed on key developments and trends in areas of existing or potential importance to its business.

American oilmen, at the request of the AEC, have developed a plan whereby the oil industry's annual billion dollar search for oil can become a search for uranium as well. A program, worked out by a joint committee of the Society of Exploration Physicists, the American Association of Petroleum Geologists, and the Society of Economic Paleontologists and Mineralogists, is being presented to oil companies throughout the nation that would provide for checking materials drilled from seismic test holes and from the first 500 feet of oil wells. The plan would also encourage the thousands of surface geologists employed in the oil industry to be on the lookout for radioactive deposits. The plan is being presented to the industry as a potentially profitable business proposition.

North American Philips Company, Mount Vernon, N. Y., has reported the development by its Research and Control Instruments Division of a new and precise method for the identification and quantitative analysis of minute amounts of elements present in very thin film deposits. Instrumentation consists of a standard x-ray spectrograph employing tungsten radiation, but using a special analyzing crystal with newly developed optics. The method is said to have the advantage over former techniques that it does not rupture or otherwise destroy the film.

Stanford Research Institute has put into operation a \$200,000 ion-scattering analyzer for studying the properties and surface behaviors of various materials. The apparatus is designed to identify and measure minute quantities of elements in surface substances by bombarding the sample under study with a low-energy beam of protons. Analysis of proton rebound velocities gives an accurate description of the surface character and proportional composition of the sample.

Arthur D. Little, Inc., Cambridge, Massachusetts, has established an international division in connection with its scientific and industrial consulting services abroad.

El-Tronics, Inc., designers and manufacturers of scientific instruments, has announced a large-scale expansion of its research and industrial facilities in Philadelphia.

High vacuum equipment used for work in electronics, plastics, and metallurgy will be designed and produced by a new organization, the High Vacuum Equipment Corporation of Hingham, Massachusetts, according to Joseph B. Merrill, president and general manager. William O. DiPietro is in charge of the concern's research and development activities.