Miscellany

Public Use of MTR Facilities

The Atomic Energy Commission has announced that the facilities of the Materials Testing Reactor in Idaho are now available to the public on a limited basis. According to the contractor, Phillips Petroleum Company, the peak thermal neutron flux of this reactor, which is now two years old, is 5×10^{14} neutrons per cm^2 per second; this figure is ten times that of Canada's NRX reactor and one hundred times that of the Argonne and Brookhaven reactors. Thermal neutron fluxes available for irradiations range from 2×10^{9} to the maximum figure, and brief irradiation at even the highest levels can be carried out by means of shuttle tubes operated by air or water pressure. Fast neutron fluxes of about 10^{14} are also present in certain locations in the reactor.

High-intensity gamma radiation of the order of 10^{6}–10^{7} roentgens per hour is also obtainable at the MTR reactor station. Discharged fuel units, highly radioactive, must be stored for several weeks before shipment to the processing plant, and by stacking these units appropriately "an intense field of essentially pure gamma radiation has been made available".

Charges for public irradiations will be based on depreciation and overhead as well as on direct operating expenses, according to the AEC. Applications must be filed with the Isotopes Division, U. S. Atomic Energy Commission, Oak Ridge, Tennessee, which issues authorizations to persons or firms "equipped to handle radioactivity in a safe manner". Information concerning the services available at the MTR, scheduling, and price lists can be obtained directly from the contractor, Phillips Petroleum Company, Idaho Falls, Idaho.

Reorganized

The research department of the Naval Research Laboratory in Washington, D. C., has undergone its first major reorganization since the end of World War II as a result of recommendations based on a six-month study of the Laboratory's scientific organization and program-planning. As before, the research department is headed by a director of research, E. O. Hulburt. Under the new plan, he has three associates, one each in the fields of electronics, materials, and nucleonics, who are R. M. Page, O. T. Marzke, and E. H. Krause, respectively. There are now 13, instead of 12, scientific divisions, which conduct research, development, and evaluation work in the physical sciences. The names of these divisions suggest the scope of the Laboratory's scientific program, which includes long-term as well as short-range planning objectives: Applications Research; Atmosphere and Astrophysics; Chemistry; Electronics; Mechanics; Metallurgy; Nucleonics; Optics; Radar; Radiation; Radio; Solid State; and Sound. New superintendents and their divisions are: R. C. Guthrie, Radar; J. P. Hagen, Atmosphere and Astrophysics; W. S. Pellini, Metallurgy; A. H. Schooley, Electronics; and C. V. Strain, Nucleonics.

The new NRL divisions were created by combining or regrouping existing branches in the research department, so that no expansion in scientific personnel is contemplated at this time, according to Captain W. H. Beltz, director of NRL. The mission of the Laboratory remains the same as it was when it was established in 1923, following the recommendations of the Naval Consulting Board, which was headed by Thomas A. Edison. It was created, in the words of the Board, "to increase the safety, reliability, and efficiency of the Fleet by the application of scientific research and laboratory experimentation to Naval problems". Originally a part of the Office of the Secretary of the Navy, NRL was administered in succeeding years by various Navy offices and bureaus. In 1946, it was made a field of activity of the Office of Research and Inventions, now the Office of Naval Research. The character of its organization (namely, a research laboratory under Navy management, staffed by civilian scientists) has not changed in its 31 years of existence.

The Baltimore headquarters organization of the Air Research and Development Command has also seen some major internal changes in recent months. The new headquarters organization is described as being "somewhat similar to that of an industrial organization rather than the traditional military organization, although titles and certain terms have been retained to keep within the framework of the Air Force". There has also been a gradual shifting to the Baltimore headquarters of early planning on weapon systems, much of which was formerly accomplished by subordinate ARDC centers. The ARDC Office of Scientific Research, which is responsible for maintaining a contract program with research laboratories in universities and elsewhere, will continue unchanged in its mission and method of operation. It will, however, have an increased responsibility for furnishing technical and scientific advice to other branches of the ARDC headquarters staff.

Research Notes

The strong focusing principle, which makes use of fields that cause an ion beam to alternately converge and diverge in producing a collimated stream of particles, was originally devised in connection with high-energy proton accelerators. In the *Journal of Applied Physics* for April A. M. Clogston and H. Heffner take up in detail the analogous problem of focusing electron beams, and consider axially symmetric and

quadrupolar periodic electric and magnetic fields. They find that "periodic focusing may be useful for one or more of at least three reasons: (1) the reduction of magnet weight effected by periodic magnetic focusing when permanent magnets are employed, (2) the possibility of making the focusing electrodes an integral part of the rf structure in certain traveling wave tubes, and (3) the production of an electron beam with a periodically varying boundary, charge density, or velocity." To aid in the design of actual instruments making use of periodic fields appropriate equations and graphs are given.

Negentropy is a recent concept in information theory which corresponds to "information" in a physical system. When information is obtained from a system, the negentropy of the system decreases by an amount equal to or greater than the information, leading to the principle that "The sum of negentropy plus information must always decrease". In a paper appearing in the May *Journal of Applied Physics* **L.** Brillouin of IBM discusses this principle in relation to telecommunications (i.e. "live" information) and writing and reading (i.e. "dead" information). Live information carries the energy required for its detection along with it, and much of it is bound to be lost by dissipation, sound absorption, etc. Dead information presents more of a problem; a book may easily be read by 10^5 people, increasing the information by that factor and apparently contradicting the above principle since, after all, the work involved is the same to the author and publisher whether the book is read or not. Brillouin surmounts the problem by stating that "an additional source of energy is absolutely necessary for the reading, and this source of energy provides the negentropy which is changed into new information".

The study of color centers in alkali halide crystals has proved to be an especially fertile way of approaching the problem of crystalline imperfections. The structure of such crystals is quite simple and perfect ones can be obtained readily; further, "they appear to exhibit in striking form a large number of physical and chemical properties of the type that are strongly influenced by the principal crystalline imperfections, namely, excitons, electrons and holes, vacant lattice sites, impurity atoms, and dislocations. To date no other type of crystal has permitted so clear a vista to the imperfection-determined properties." This quotation is from "Color Centers in Alkali Halide Crystals. II", an 88-page review article by Frederick Seitz appearing in the January *Reviews of Modern Physics,* in which a comprehensive survey of recent work in this field is given. An earlier article with the same title, published eight years ago, is now obsolete, and the present paper is designed to rectify the situation.

For centuries people have been trying all sorts of schemes for utilizing the sun's energy for their own particular purposes. Aside from frying eggs on sidewalks to demonstrate how hot it has been, the most popular approaches have been by means of photoelectric devices and by solar furnaces. The latter usually consist of parabolic mirrors that concentrate the sun's light on a very small area, and produce the highest temperatures yet obtained in a convenient manner. Sometimes, however, a uniform intensity of radiation is required over a larger area; this was the case at MIT recently. In the May *Review of Scientific Instruments* Robert Gardon describes a solar furnace built at MIT using 400 small plane mirrors that produced 5 cal/cm^2 sec over a 5 cm square area, a radiant intensity 200 times greater than that of direct sunlight. The use of plane mirrors made possible the larger uniformly illuminated area, and the apparatus was simple and inexpensive to construct.

The new 60-inch cyclotron at the University of Washington is described in the May *Review of Scientific Instruments,* and, besides a discussion of the characteristics of the machine, "an account is given of the major troubles encountered and the steps taken to achieve satisfactory operation". Three years were required between the start of construction and the attainment of an internal beam, and the total cost, including buildings and salaries, was about $900 000. The present external beam of the machine is 125–200 μa of either deuterons or molecular hydrogen ions at 21 Mev.

Publications

Former NBS Director Lyman J. Briggs, who retired in 1945 after having spent almost half a century in public service, celebrated his eightieth birthday on May 7th. In honor of the occasion, *The Scientific Monthly* has devoted most of its May issue to a group of articles dealing with Dr. Briggs' career and with certain major scientific developments to which he has contributed. Articles included are by Wallace R. Brode, Vannevar Bush, E. C. Crittenden, N. Ernest Dorsey, Hugh L. Dryden, Gilbert Grosvenor, Paul R. Heyl, and L. A. Richards. Dr. Brode's introductory tribute to Dr. Briggs, together with the remarks by Dr. Bush, constitutes a concise and illuminating review of the early history of the atomic energy program, beginning with the formation in 1939 of the Advisory Committee on Uranium under the leadership of Dr. Briggs, and culminating three years later in the establishment of the Manhattan District project. Dr. Briggs was presented with a recording microbarograph at a meeting of the staff of the Bureau of Standards, at which he discussed his early work with Rowland at Johns Hopkins University and the Department of Agriculture, as well as his work at NBS.

A new series of *Zeitschrift für Physikalische Chemie* (originally established in 1887) is now being published in Germany by Akademische Verlagsgesellschaft, Frankfurt, by arrangement with the original owners and in cooperation with the former editors. It is pointed out that the contents of the Frankfurt edition, of which the first issue was published in May, are "not identical with those of a periodical released under the same title in Leipzig, Soviet Zone of Germany". Two vol-