Miscellany

A new semiconducting material, a compound of aluminum and antimony, has been developed at the Battelle Memorial Institute in Columbus, Ohio. This potential competitor of germanium and silicon has already been used to make rectifiers with good high-temperature characteristics, and possibly may also be used in making transistors. The cost of both aluminum and antimony is less than fifty cents per pound, compared with almost $350 per pound for germanium, and, although raw material cost is only a part of the expense involved in manufacturing a transistor or rectifier, the tremendous price difference makes the aluminum-antimony compound a promising material for further study.

At the same time, Hans Brauchli, a Swiss chemist at The Johns Hopkins University, has announced the possibility of obtaining germanium from vegetation growing in regions whose water supply is rich in germanium. The demand for germanium is much greater than its present supply, a situation Dr. Brauchli thinks can be remedied by harvesting germanium-rich crops and burning them, with the resulting ash having a germanium concentration of as high as five percent in some cases. A yield of one-tenth of one percent of germanium would make the crop as valuable as hay, he maintains, and higher yields would even be more profitable.

The completion of a fund of $130,000 for the purchase of new scientific and laboratory equipment for Marston Science Hall, William Jewell College, Liberty, Missouri has been announced. The project was made possible by grants from the Kresge Foundation of Detroit, Mrs. E. S. Pillsbury of St. Louis, and the Missouri Baptist General Association.

The University of Connecticut has announced the addition of an ADL Collins helium liquifier to the research facilities of the University's department of physics. The new instrument, to be put to use in exploring the properties of helium at extremely low temperatures, is in the charge of Charles A. Reynolds of the physics department.

A two Mev Van de Graaff generator at the University of Chicago is being used to produce a proton beam with a diameter of only two microns for radiobiology research, according to a report by Dr. William Bloom at the American Association of Anatomists' recent meeting in Columbus. This beam can be directed at individual chromosomes for genetic studies, and motion pictures of the effects of the irradiation of chromosomes on cell division have been made which should shed some light on the complex problems of radiation damage to living tissue.

A new cosmic-ray laboratory at the California Institute of Technology has been completed which houses a large counter-controlled cloud chamber and associated magnet for use in investigating penetrating showers. Such showers consist of very-high-energy particles in whose interactions with matter such phenomena as V-particles occur. The Caltech team, under C. D. Anderson, hopes to gain further information on V-particles and tau, kappa, and chi mesons with this new equipment.

Low-frequency radio propagation is being investigated by the Central Radio Propagation Laboratory of the Bureau of Standards in the 50–1100 kc region in an effort to learn more about ionospheric phenomena. Previous work was concentrated on frequencies above one megacycle. The new equipment, which includes a transmitter capable of delivering over two hundred kilowatts of pulsed power to its antenna, incorporates many of the features of its high-frequency predecessors.

Clementine, the fast reactor at the Los Alamos Scientific Laboratory, is in the process of being dismantled. The only known reactor utilizing plutonium as fuel and mercury as coolant with fast neutrons maintaining the reaction, Clementine has been in almost continuous use since her completion in 1947. Christened by certain Los Alamos Argonauts, her name was derived from a song and from the wartime designation of plutonium as "49". She was taken out of operation for lack of further usefulness rather than because of any immersion in foaming brine following a traumatic experience with a splinter. It is expected that a study of her remains will provide valuable information on precisely what happens to the components of a reactor after several years of use. Clementine will be replaced by a different type of research reactor more suited to the Laboratory's present requirements.

Injuries to AEC employees and those of its contractors occurred during 1952 at a rate of 2.51 per million employee-hours, one-third below the 1951 figure and well under the 9.06 injuries per million empolyee-hours reported by the National Safety Council for U. S. industry as a whole. Fatalities numbered 11, as compared with 24 in 1951, and none was due to radiation.

Journal Notes

The asteroid Icarus, discovered in 1949, may add to our knowledge of the validity of the general theory of relativity by providing a further check on its precessional formula for planetary orbits. In an article in the March 1, 1953 *Physical Review* J. J. Gilvarry points out that the orbit of Icarus is the closest to the sun of any known body, with a predicted perihelion precession of 10.05 seconds of arc per century. The decades of observation required to determine the actual precession may be desirable since so far the single source of experimental confirmation of this relativistic effect has been the planet Mercury.

The age of the earth and the time at which the formation of the elements occurred have been estimated by a Canadian group reporting in the March *Canadian Journal of Physics* to be 3.5 and 5.5 billion years respectively. The estimates were based on the isotopic constitution of lead ores that had been dated by analyses of their radiogenic lead content, that is, the lead resulting from the decay of thorium and uranium.

Faint flashes of light in the night sky have been observed by two English physicists at the Atomic Energy Research Establishment, Harwell, to be correlated with cosmic radiation. A photomultiplier tube mounted at the focus of a parabolic mirror and a horizontal array of Geiger counters were used for this experiment, according to a letter to the editor in the February 21st issue of *Nature*, and a large fraction of the observed light pulses, selected to be at least three times as large as the night-sky noise level, coincided with discharges in the Geiger counters. Further experiments are planned to examine the nature of the phenomenon.

Trace element determination by neutron radioactivation analysis is the subject of an article in the February 1953 issue of the *Bulletin of the American Society for Testing Materials*. The technique involves the identification of radioisotopes produced by neutron irradiation, and is capable of an accuracy of ten percent or better in the measurement of micro quantities of trace elements in bulk materials. Such diverse materials as drugs, alloys, and petroleum products can be analyzed in this way through services offered by Oak Ridge National Laboratory.

Electrets, dielectrics which maintain external electric fields without decaying, are prepared by heating a slab of the dielectric and then cooling it in the presence of a high potential, with carnauba wax being used almost exclusively for this purpose. In the February issue of the *Journal of Applied Physics* research performed at the Bureau of Standards on plastic electrets of Plexiglas, Lucite, and Nylon is reported which indicates their applicability, charge densities as high as 5.5×10^{-8} coulomb/cm^2 having been obtained.

The elementary reciprocity law of photography, which says that the negative density after development is directly proportional to the product of the time of exposure and the intensity of the light reaching the film, does not hold for extreme values of exposure time and intensity. The origin of the failure lies in the mechanism of latent image formation in the film and is accounted for by existing theories of the photolytic process. Until recently the shortest exposure times used had been about 10^{-6} sec. Dr. Brian O'Brien, a specialist in ultra-high-speed photography at the University of Rochester, has made exposures as short as 10^{-7} sec with cameras operating faster than one million frames per second and finds a new reciprocity failure in this region that is theoretically unexplained at present.

The fertility of male mice is far more sensitive to fast neutron irradiation than had previously been realized, according to a report in *Nature* by a group at England's Atomic Energy Research Establishment. Female mice were less affected, in contrast to their greater susceptibility to x- and gamma-radiation. The dosage needed to sterilize male mice permanently produced relatively little other physiological damage.

Ultrasound in biology and medicine is the subject of four papers in the January 1953 *Journal of the Acoustical Society of America*. The various biophysical reactions of living tissue to intense ultrasonic radiation (several watts/cm^2 at frequencies of about a megacycle) are discussed in detail, with the conclusion that local heating is responsible for most of the observed effects of ultrasound. Unlike other forms of diathermy, however, ultrasonic energy selectively heats interfaces between tissues of different acoustic impedance, at bone surfaces for example, and so presents unique problems for practical therapy. These papers, with two others to appear subsequently, were first presented at a symposium held at the University of Illinois in May 1952.

Summer Courses

A number of courses to be given during the summer of 1953 has been announced by MIT, several of them being of interest to physicists. A course on Digital Computers and their Applications will be presented under the direction of Charles W. Adams, and such authorities as M. V. Wilkes and Stanley Gill of Cambridge and Jay W. Forrester of MIT will serve as guest lecturers. Transistors and their Applications is the title of another course to be given, laboratory work as well as lectures being included in the program. Two one-week courses in Infrared Spectroscopy, one emphasizing the technique and the other its applications, will be conducted by Richard C. Lord, director of MIT's Spectroscopy Laboratory, and Foil A. Miller of the Mellon Institute. Courses on Thermodynamics, Mathematical Problems of Communication Theory, Optical Methods in Instrumental Analysis, and Operations Research are also scheduled. Information on these and other courses may be obtained from Professor Ernest H. Huntress, Room 3–107, Massachusetts Institute of Technology, Cambridge 39, Massachusetts.

Boston College has announced a special two-week intensive course in modern industrial spectrography from July 20th to 31st. The course is particularly designed for chemists and physicists from industries in the process of installing spectrographic equipment. Information on the course may be obtained from Professor James J. Devlin, S.J., Physics Department, Boston College, Chestnut Hill 67, Boston, Massachusetts.

Scholarships

An alumnus of the University of Virginia has provided for two post-doctoral and four pre-doctoral fellowships in the department of physics. The stipends for the academic year are $5000 for each post-doctoral fellowship and $2500 and tuition for each pre-doctoral fellowship.

Radio Corporation of America has announced that eighteen university students from fourteen states have been awarded RCA scholarships for the current academic year under a plan to "encourage the training of scientific personnel for the growing requirements of the electronics industry".

Fellowships for graduate study in rocket and jet propulsion at Princeton University and the California Institute of Technology for 1953 will be financed with a fund of $36,000 set aside for the purpose by the

Daniel and Florence Guggenheim Foundation. Since 1948 thirty-seven fellows have been appointed under the program.

The Speer Carbon Company has established a fellowship in carbon research at the University of Buffalo for a candidate for the PhD degree in physics. The fellowship carries a stipend of $2400 plus tuition, with additional allowances for dependants. Applications for 1953–54 should be directed to the Chairman of the Department of Physics, University of Buffalo, Buffalo, N. Y.

Industry

An agreement has been concluded between the AEC and the Pioneer Service and Engineering Company of Chicago and the Foster Wheeler Corporation of New York for a study to determine the feasibility of the design, construction and operation of a nuclear reactor by these companies in the next few years. This study is to be financed by the companies, who will have access to the pertinent AEC files and facilities. Their report, due next year, will make recommendations on such a reactor project and the place of industry in carrying it out. This is the fifth such industrial study to be authorized by AEC, the others being conducted by the Dow Chemical Company and the Detroit Edison Company, the Commonwealth Edison Company and the Public Service Company of Northern Illinois, the Monsanto Chemical Company and the Union Electric Company, and the Pacific Gas and Electric Company and the Bechtel Corporation.

The formation of an independent industrial research laboratory, Cambridge Applied Research, Inc., has recently been announced. Specific information on the facilities and special fields of interest of Cambridge Applied Research may be obtained by writing them at 60 White Street, Belmont 79, Massachusetts.

Ronald W. Gurney, most recently Visiting Research Professor at the University of Maryland's Institute of Fluid Dynamics and Applied Mathematics, died of a cerebral hemorrhage on April 14th at his home in New York City. He was fifty-four years old. A native of England, he was educated at Cambridge and did his earliest research under Lord Rutherford. His first important work, done at Princeton in collaboration with E. U. Condon, was the theory of the radioactive decay of the nucleus, which was also developed independently by Gamow. The Gurney-Mott theory of the photographic process is another significant advance associated with his name. The author of four books, in addition to numerous papers and articles, he had just completed final work on the proofs of a new book, *Ionic Processes in Solution*, before his death. For several years he had suffered from severe hypertension, which ultimately compelled him last year to give up regular university work and to become a consultant to various laboratories on solid state physics.

We hear that..

Lester Banks, formerly with the U. S. Air Force, has joined the Radar Laboratory of Hughes Research and Development Laboratories, Culver City, California. **Austin Madeson,** formerly with the U. S. Navy Underwater Sound Laboratory, has joined the Hughes Field Engineering Department; **Duane Roller,** on leave of absence from Wabash College, is serving as assistant director of the Laboratories; and **Lester C. Van Atta,** formerly with the Radar Laboratory, has been made head of the newly created Microwave Laboratory.

George L. Bonvallet, associate physicist at Armour Research Foundation, was recently elected president of the Chicago Acoustic and Audio Group, an organization concerned with the scientific and engineering aspects of sound.

Detlev W. Bronk, president of The Johns Hopkins University and of the National Academy of Sciences, has been honored with election to the Academy of Sciences of the Institute of France for his work in the field of biophysics and his leadership in the development of many phases of science. Dr. Bronk is also a member of the Royal Society of England.

The Armour Research Foundation of Illinois Institute of Technology has announced the promotion of **James J. Brophy** to supervisor of the physics of solids section and the appointment of **Bernd Ross,** formerly director of research at Radiation Counter Laboratories, Inc., Chicago, as an associate physicist.

The Argonne National Laboratory has announced the following appointments to its Physics Division: **Harvey Casson, Charles M. Huddleston, Robert H. McDowell, William A. Reardon,** and **Joseph A. Thie,** newly appointed to the Reactor Engineering Division.

Allen S. Dunbar has joined the Dalmo Victor Company as assistant director of research following three years with the Stanford Research Institute as senior research engineer.

Eugene Feenberg, professor of physics at Washington University in St. Louis, will serve as a visiting professor this summer at Stanford University, where he will give a seminar on models for nuclear structure. The Stanford Department of Physics has also announced the promotion of **Edwin T. Jaynes** from instructor to acting assistant professor of physics and the appointment of **Jack J. Kraushaar** of Brookhaven National Laboratory as instructor of physics, both effective September 1.