ACCELERATORS

VAN DE GRAAFF GENERATOR AT DUKE

A new annex to the recently completed physics laboratory at Duke University in Durham, N. C. is currently being constructed to house a four million volt nuclear accelerator of the Van de Graaff type which is being provided to implement a program of nuclear research to be carried out at Duke under contract with the Atomic Energy Commission. The generator cost (approximately $500,000) will be borne by the AEC, while the University will finance the new building; both will participate in the cost of the research project, which is expected to extend over a period of years. The Duke project will be administered by Walter M. Nielsen, chairman of the physics department, and Henry Newson will serve as project leader. Other Duke physicists participating in the program will be Lothar W. Nordheim, Eugene Greuling, and Harold W. Lewis. Delivery of the accelerator, which is now under construction, is expected before the end of the year.

CHICAGO'S SYNCHROCYCLOTRON

After more than three and one-half years spent on design and construction of the University of Chicago's 170-inch synchrocyclotron, the big accelerator has been put through initial performance tests with satisfactory results. The instrument is designed to accelerate protons to 450 Mev (which will make it the most powerful accelerator of positive ions in the western world) while deuterons and alpha-particles will be accelerated at energies of the order of 260 Mev and 520 Mev, respectively. In the preliminary tests, carried out in February, the design energy for deuterons was approximated when the particles were accelerated to 250 Mev. Herbert L. Anderson, professor of physics in the University's Institute for Nuclear Studies, and John Marshall, assistant professor, directed the machine's design and construction. The two and one-half million dollar accelerator was financed largely by the Office of Naval Research, with the remaining funds coming from the University of Chicago Cancer Research Foundation.

PRISMS, LENSES, MIRRORS

FOR VATICAN OBSERVATORY SPECTROGRAPH

The Bausch and Lomb Optical Company has reported completion of a special project of nearly two years' duration for the astrophysics laboratory of the Vatican's Observatory. The task involved production of four identical six-inch prisms, special lenses, and first-surface mirrors for a spectrograph to be used in determining the composition of stars of both low and high magnitudes. Made from a flint-type glass, specially selected and highly annealed, the 61-degree prisms are reportedly accurate in performance to five-millionths of an inch. Interferometer tests were used to determine the extent of each polishing operation, which was done by hand and limited to 10 minutes so that heat generated by polishing would not damage the prisms. After each operation the prisms were allowed to cool for an hour. The prism spectrograph will be used with a telescope to record the component colors of starlight, from which further information can be gained concerning the physical and chemical make-up of the stars. The work was undertaken at the request of Rev. Alois Gatterer, Rev. Joseph Junkes, and Rev. Walter J. Miller, director, assistant director, and papal astronomer, respectively, of the Vatican Observatory.

BERYLLIUM POISONING

DISCUSSED AT ATLANTIC CITY MEETING

Characteristics of the disease berylliosis, one of the more unpleasant problems facing industrial and laboratory health experts, were reviewed at length on April 24th in a paper by J. H. Sterner, medical director of the Eastman Kodak Company, and Merril Eisenbud, director of the AEC's New York Operations' health and safety division, during a joint meeting of the American Industrial Hygiene Association and the American Conference of Governmental Industrial Hygienists at Atlantic City. The disease, which appears in both an acute and chronic form, has many confusing aspects, especially in the case of the chronic disease, which only partially conforms to the conventional patterns of other chronic occupational diseases. While emphasizing the extreme toxicity of the various compounds of beryllium, any of which in overdose can cause the acute disease, Sterner and Eisenbud suggest that chronic berylliosis occurs only among individuals whose exposure has included beryllium oxide, and then only relatively seldom and under quite peculiar conditions. Chronic beryllium poisoning has occurred following very minimal exposure, they point out, and from examining the records of the disease within a beryllium-producing plant in which seventeen hundred workers were employed at one time or another, they continue, it was found that only six cases of chronic berylliosis were known. Of the six, none had been employed for a longer period than four months. The incidence of the acute disease among the same group was high, indicating relatively serious exposure conditions, but many workers in the group were exposed over periods of years without developing the disease, either in its chronic or acute forms.

A hypothesis offered by Sterner and Eisenbud which might provide a better means for understanding the disease was that its essential mechanism might be considered to be a modified immunological reaction whereby beryllium combines with protein in the body to form an antigen, which in turn stimulates a beryllium-specific antibody. The peculiar incidence of the chronic beryllium disease, they conclude, finds a parallel only in other well-recognized acquired sensitization or allergic diseases.

HONORS AND AWARDS

GUGGENHEIM AWARDS FOR 1951

Of the 154 fellowships awarded last April 15th by the John Simon Guggenheim Memorial Foundation of New York, four were received by physicists, five by mathematicians, nine by chemists, and ten by researchers in the field of biochemistry. Arthur S. Wightman of the Princeton physics department was awarded a fellowship for work in the quantum theory of wave fields; John R. Platt of the University of Chicago will do research on the electronic spectra of conjugated organic molecules; Su-Shu Huang, University of Chicago astrophysicist, will work on the theory of the broadening of spectral lines; and M. Avramy Melvin, a physicist from Eastsound, Washington, will carry out a project on the theory of generalized symmetry. Charles V. Robinson, senior biophysicist at the New England Center Hospital in Boston, received one of the biochemistry awards for research on the physiology of unicellular organisms using radioactive tracer techniques.

Among chemists to receive the Guggenheim awards are W. F. Libby of the University of Chicago's Institute for Nuclear Research and Frederick A. Matsen, associate pro-

fessor of chemistry and physics, University of Texas. Dr. Libby will continue his research into methods of historical dating by the radiocarbon content of plant and animal remains; Dr. Matsen will do research on the electronic spectra of aromatic molecules.

Mathematicians receiving the fellowships are Nathan Jacobson of Yale, who will work in abstract algebra; Ralph H. Fox of Princeton and Max Shiffman of Stanford, who will carry out projects in topology; Leonard J. Savage of the University of Chicago, who will do research in mathematical statistics; and Irving E. Segal, also of Chicago, who will consider mathematical aspects of quantum mechanics.

IVES AWARDED RUMFORD PREMIUM

The Rumford Premium of the American Academy of Arts and Sciences has been awarded this year to Herbert E. Ives, former president of the Optical Society of America and a vice-president of the American Association for the Advancement of Science. The Rumford award, which was established by the Academy in honor of Benjamin Thompson (Count Rumford), is presented every second year in recognition of important contributions to the knowledge of heat and light. Dr. Ives, a member of the Bell Telephone Laboratories staff for almost thirty years, was honored for his outstanding research in the physics of light measurement.

SIGMA DELTA EPSILON

Sigma Delta Epsilon, graduate women's scientific society, is offering two research awards to members in good standing which will be announced at the Philadelphia meeting of the American Association for the Advancement of Science next December. An award of $500 will be given for the best paper describing work in the mathematical, physical, or biological sciences presented at any regular session of any scientific society from October 1, 1950 to September 30, 1951, or to the best article describing original research accepted for publication in a scientific journal during the same period. A $200 award will go to the best paper, which need not be published or presented at a scientific society meeting, describing original research carried out in the home. Three copies of the papers, and a letter from the chapter secretary testifying to the author's membership in the Society, should be submitted to the National President, 1106 N. St. Joseph St., South Bend 17, Indiana, not later than October 1, 1951.

STALIN PRIZES AWARDED

Among Soviet physicists who received this year's Stalin prizes, awarded March 15th, is Dmitri V. Skobeltzyn, winner of a 200,000-ruble first prize for cosmic ray studies which were described by the *Literary Gazette* as bringing "close to a successful solution" the question of the nature of the forces behind the structure of the atomic nucleus. Leonid M. Brekhovskikh, Lazar D. Rosenberg, and two other scientists were the recipients of another 200,000-ruble prize for "scientific research in the field of acoustics". A 100,000-ruble second prize went to Yakov P. Terletzky, nuclear physicist of Moscow University, for his work on the theory of "induction expediters" (described by *Pravda* as being similar to betatrons) and on the origin of cosmic rays. Other important awards went to Boris G. Lazarev for a "new method of enrichment of helium with light isotopes", and to Anatoly Dorodnitzyn and a group of other workers "of a scientific research institute" for research in the field of aerodynamics, the nature of which was not disclosed. The awards, eighty-two of which were in science and fifty-nine in industry, carried a total cash benefit of over 11,000,000 rubles.

AEC NEWS

INDUSTRIAL USE OF FISSION PRODUCTS

Large quantities of the highly radioactive mixture of elements resulting from uranium fission are now stored in underground tanks at the Hanford plutonium production works in the Pacific Northwest, according to the Atomic Energy Commission, and in an effort to develop ways of estimating the potential uses to which such fission products might ultimately be put, the AEC has asked the Stanford Research Institute to make a thorough study of the problem. The immediate objectives of the study are to acquaint industrial concerns with the characteristics of fission products and to obtain the cooperation of industry in developing estimates of their possible utilization. While it is not expected that large, readily available markets for fission products will be found, it is nevertheless the aim of the Institute's study to uncover potential large-scale uses that may be developed with minimum cost and difficulty.

Isotopes making up the fission products are generally radioactive and fall within an atomic weight range of 72 to 162. They include both beta and gamma emitters, and isotopes with half-lives ranging all the way from a few seconds to one million years are represented in the slush from the Hanford piles. A descriptive booklet prepared by the Stanford Research Institute under contract with the AEC's Division of Reactor Development (*Industrial Utilization of Fission Products—A Prospectus for Management*) suggests some conceivable ways of using the fission products. After pointing out five of the principal capabilities of these materials that might be of interest to industry (the ability to kill organisms, induce chemical reactions, ionize gases, activate phosphors, and produce rays which can penetrate solids), the prospectus lists some of the uses these properties suggest, including the sterilization of foods and drugs in containers without heat, production of new or cheaper chemicals, production of improved static eliminators and fluorescent lights, production of new types of luminescent paints and tiles, tracing of pipeline flows, and radiography. Some of these uses are speculative, and others have already been technologically developed through the use of other forms of radioactivity.

The Institute will distribute the prospectus as part of its current study of the possible market for fission products. The booklet will go to a representative sample of U. S. industry. Dr. J. E. Hobson, director, has announced that the Institute will also have a limited supply of copies available for other interested concerns. They may be obtained by writing to Project 361, Department of Business and Industrial Economics, Stanford Research Institute, Stanford, California.

NEW LABORATORY AT BOULDER

The Santa Fe Operations Office of the U. S. Atomic Energy Commission has announced plans to build a specialized research laboratory on a section of the National Bureau of Standards grounds at Boulder, Colorado. The new laboratory will be operated by the Bureau of Standards and will be staffed by about fifty persons including scientists and specialized technicians. The Commission has further announced that plans are under way for the transfer of the Santa Fe Operations Office headquarters from Los Alamos