NORTH AMERICA

APPOINTMENTS

National Academy Elections

THE following have been elected members of the US National Academy of Sciences:

George E. Backus, University of California at San Diego; *Paul B. Beeson*, Oxford University; *Harry Beevers*, Purdue University; *Elkan Rogers Blout*, Harvard University; *Keith A. Brueckner*, University of California Institute for Radiation Physics and Aerodynamics; *Robert K. Cannan*, National Academy of Sciences; *Samuel C. Collins*, Massachusetts Institute of Technology; *Jerome W. Conn*, University of Michigan Hospital; *Allan V. Cox*, Stanford University; *Richard R. Doell*, US Geological Survey; *Sidney D. Drell*, Stanford Linear Accelerator Center; *Gerald M. Edelman*, The Rockefeller University; *Herman N. Eisen*, Washington University; *Thomas Eisner*, Cornell University; *Herman Feshbach*, Massachusetts Institute of Technology; *Arthur D. Hasler*, University of Wisconsin; *George H. Hepting*, Southeast Forest Experiment, Asheville, North Carolina; *Norman H. Horowitz*, California Institute of Technology; *Harold L. Johnson*, University of Arizona; *Stephen C. Kleene*, University of Wisconsin; *William A. Klemperer*, Harvard University; *Walter Kohn*, University of California at San Diego; *Tjalling C. Koopmans*, Yale University; *Martin G. Larrabee*, The Johns Hopkins University; *Thomas Lauritsen*, California Institute of Technology; *Benjamin Lax*, Massachusetts Institute of Technology; *Joseph C. R. Licklider*, Massachusetts Institute of Technology; *Floyd G. Lounsbury*, Yale University; *Robert H. MacArthur*, Princeton University; *Boris Magasanik*, Massachusetts Institute of Technology; *Jerrold Meinwald*, Cornell University; *Alton Meister*, Cornell University; *Arthur W. Melton*, University of Michigan; *Elliott W. Montroll*, University of Rochester; *Louis Nirenberg*, New York University; *Egon Orowan*, Massachusetts Institute of Technology; *John Rodgers*, Yale University; *Marshall N. Rosenbluth*, Institute for Advanced Study; *Jack Schultz*, Division of Biology, Institute for Cancer Research, Philadelphia, Pennsylvania; *Harrison Shull*, Indiana University; *Seymour J. Singer*, University of California at San Diego; *Earl Reece Stadtman*, National Heart Institute; *Andrew Streitwieser, jun.*, University of California at Berkeley; *J. T. Tate*, Harvard University; *Warren Weaver*, Sloan Foundation; *Edward O. Wilson*, Harvard Center for Environmental and Behavioral Biology; *Bernhard Witkop*, National Institute of Arthritis and Metabolic Diseases; *Dean E. Wooldridge*, Thompson Ramo Wooldridge, Inc.; *Jeffries Wyman*, European Molecular Biology Organization; *Norton D. Zinder*, The Rockefeller University.

The foreign associates elected are: *N. N. Bogolyubov*, Soviet Academy of Sciences; *Francis H. C. Crick*, Cambridge, England; *Nikolay P. Dubinin*, Soviet Academy of Sciences; *Alexander N. Frumkin*, Soviet Academy of Sciences; *Ernst Hadorn*, University of Zurich; *Fred Hoyle*, Cambridge, England; *Francois Jacob*, Pasteur Institute; *Takesi Nagata*, University of Tokyo; *Artturi I. Virtanen*, Biochemical Research Institute, Helsinki; *Jan Waldenstrom*, University of Lund.

PHYSICS

Uses for Old Accelerators

Low energy particle accelerators are cheap and comparatively easy to use, and a panel of the United States National Research Council has now argued for the extension of their use from conventional nuclear structure work to fundamental research in nuclear astrophysics, atomic physics and solid state physics The panel, under Professor William A. Fowler of the California Institute of Technology, believes that great discoveries can be made with small means; the report spells out how the capability of low energy accelerators can be enhanced by recently developed techniques such as beam-foil spectroscopy and solid state channelling. It is estimated that there are at least 230 low energy accelerators in university, government and industrial laboratories in the United States, and that about a thousand scientists are engaged in working on them.

Beam-foil spectroscopy is a relatively new technique for studying the structures of multiply ionized particles and measuring the mean life-times of excited electronic levels in atoms and ions. Particles are accelerated, magnetically analysed and admitted to an evacuated target chamber, in which they interact with a thin foil and emerge radiating light which can be analysed spectroscopically. The cost of setting up a complete laboratory, including the accelerator, is $75,000. Life-times of the order of 10^{-10} to 10^{-7} seconds are measured simply by recording the variation of light intensity with distance. This kind of information is of immediate importance to astrophysics for the analysis of stellar compositions and the interstellar medium, for stellar abundances depend crucially on mean life-times, while studies of the solar corona involve high stages of ionization.

The panel has also urged that the way in which accelerated particles in the keV to MeV range lose energy as they travel through amorphous solids or single crystals provides a means of following basic atomic collision processes and also yields the information necessary for technological applications such as ion implantation. The panel also commends the exploitation of "channelling", which occurs when a beam of accelerated particles enters a crystal almost parallel to a major lattice plane and is guided by Coulomb repulsion forces along a channel between planes so that relatively little energy is lost. This technique may help in the study of lattice and surface disorders and the location of foreign atoms in a crystal.