

steady-state power levels between 250 and 1500 kW are three at Gulf General Atomic (in San Diego), which manufactures the reactors, one at the University of California in Berkeley, one at the University of Texas in Austin, and one at the University of Wisconsin.

Over the last eleven years Columbia has received \$670 000 from AEC and NSF to build the reactor and associated equipment, according to William W. Havens Jr, who is director of the division of nuclear science and engineering in Columbia's School of Engineering and Applied Science.

In its decision the licensing board declined to decide the issue of whether the reactor operation will be harmful to the health and safety of the public. It did say that there is reasonable assurance that operation in both steady-state and pulsed modes can be conducted without endangering the public. It cited the absence of substantive criteria from the AEC concerning accidents for

research reactors and of "convincing objective standards of the regulatory staff." It said that it should not decide whether a reactor accident could endanger the public just on the basis of a single proceeding and its own personal views.

The board specifically urged that the AEC regulatory staff ought to sponsor a new experiment to resolve a conflict in Gulf General Atomic data on what fraction of fission products would be released under postulated accident conditions. Figures from two experiments, one conducted in 1960 and one in 1966, differed by a factor of 3000.

Any party to the proceeding could appeal the decision until 10 May.

Members of the Atomic Safety and Licensing Board are Valentine B. Deale, chairman, a Washington lawyer, Hood Worthington, a nuclear scientist of Wilmington, Del., and Eugene Greuling, physics professor at Duke University. —GBL

## San Francisco museum stresses involvement

A novel experiment in science education for the general public is underway in San Francisco. It is a museum of science and technology called the "Exploratorium," which first opened its

doors to the public in Sept. 1969. The director of the Exploratorium, Frank Oppenheimer, is a particle physicist currently on leave from the University of Colorado.

Instead of static exhibits or push-button experiments, the new museum demonstrates basic principles with dynamic experiments that are designed to challenge the perceptions and affect the senses of the operator as well as his intellect. Interaction between the museum guest and the experiments is the rule at the Exploratorium. Professional artists have contributed to many of the exhibits.

Experiments and demonstrations at the Exploratorium include a photo-activated harp, lasers, a synthetic-odor display, a SLAC spark chamber for cosmic-ray demonstrations, stroboscopes, optical-illusion displays and many others. There is a holography exhibit and several displays of optical art, as well as a computer-poetry display and models of spacecraft. The visitor can operate a large gyroscope or manipulate a bar magnet to affect a cathode-ray-tube image.

Admission is free at the Exploratorium; there are no guards; high-school students also serve in the museum program as part-time "explainers." The museum has received a National Science Foundation grant to enable secondary-school students to participate in the construction of experiments.

According to Oppenheimer, there is a great need for museums of this type. The Exploratorium is an attempt to integrate the museum into the educational structure, not as a replacement for the classroom experience but as a

teaching environment to supplement it.

The museum is housed in the Palace of Arts and Sciences, which was constructed for the 1915 Panama-Pacific International Exposition. The building was extensively renovated in 1964-67. A board of directors, including physicists Edward U. Condon, Edwin McMillan and Wolfgang Panofsky as well as many other notables, sponsors the museum. The Exploratorium is entirely supported by foundation grants and gifts from private individuals. GLM

## James Fletcher becomes new director of NASA

The new director of NASA is James C. Fletcher, formerly president of the University of Utah. He succeeds Thomas O. Paine, who resigned in September.

After earning his PhD in physics from the California Institute of Technology in 1948 Fletcher joined Hughes Aircraft Company. In 1954 he became associate director and then director of electronics in the guided-missile research division of Ramo-Wooldridge Corp. Four years later Fletcher and an associate organized the Space Electronics Corp, which later merged with the spacecraft division of Aerojet General Corp to form the Space General Corp; Fletcher became its first president. Later he became chairman of the board of Space General and Systems Vice President of Aerojet General. In 1964 he resigned to become president of the University of Utah.

Fletcher has been a member of the President's Science Advisory Committee.

## NSF budget

*continued from page 61*

graduate-student traineeships, where NSF proposes no new starts (as it did last year). The predoctoral fellowship program is being somewhat reduced in terms of numbers of fellowships available. Humphreys said, "We believe that the increase in funding for research, both in the Foundation and nationally, will provide for manpower needs in the immediate future without the special incentives obtained from these traineeships and fellowship programs." —GBL

## Model-cities program for engineers and scientists

A pilot program to place 400-600 unemployed engineers and scientists in staff positions in state, county and local government has been approved to be instituted by the US Department of Housing and Urban Development and the Department of Labor (see *physics today*, February, page 61). It is ex-



Stereo sound at the Exploratorium allows visitor to vary the arrival time of a tap on a vacuum-cleaner hose.

pected that the program will be administered by the National League of Cities and the US Conference of Mayors. The program will concentrate on unemployed technical personnel in those regions of the country that have been hardest hit by aerospace cutbacks. These regions include Seattle, Wash., Los Angeles and Southern California, Wichita, Kan., Fort Worth, Tex., Cape Kennedy, Fla., Columbus, Ohio, Huntsville, Ala., Long Island, N. Y. and Boston, Mass.

Job commitments from municipalities participating in Model Cities programs will be obtained and unemployed scientists and engineers who have registered with the National Registry for Engineers and Scientists will be recruited for these jobs. A one-month orientation program for the selected candidates will be conducted by two universities. This program will be followed by on-the-job training. Current plans call for selection of candidates by about 1 July. If the pilot program operates successfully, it may be expanded to find positions for 2000 technical people in model-cities programs.

Unemployed physicists interested in the pilot program should register with the National Registry for Engineers and Scientists, 800 Capitol Mall, Sacramento, Calif. 95814. They should also contact Raymond W. Sears, Placement Consultant, American Institute of Physics, 335 East 45th Street, New York, N. Y. 10017. National Registry forms can be obtained from the AIP placement office as well as from the National Registry headquarters.

## James Wakelin joins Department of Commerce

James H. Wakelin Jr has been named Assistant Secretary of Commerce for Science and Technology. Wakelin succeeds Myron Tribus, who resigned in November to take a position in private business.

Since 1964 Wakelin had been chairman of the scientific advisory board of Teledyne Ryan Aeronautical Company in Washington, D.C. and became its chief scientist in 1966.

Wakelin's association with the government has included serving as assistant secretary of the Navy for Research and Development under President Eisenhower, and as chairman of the President's Task Force on Oceanography in 1969. He received a PhD in physics from Yale University in 1940.

## Peace Corps calls for science and math teachers

The Peace Corps is calling for volunteers with physics, chemistry, math or general-science backgrounds to teach and train teachers in Sierra Leone, Uganda, Gambia, Korea, Malaysia, Jamaica, Micronesia and the eastern Caribbean. Some programs include families and begin this spring and summer. For further information write or call collect to Frank O'Sullivan, 408 Atlantic Ave., Rm. 211, Boston, Mass. 02210; telephone (617) 223 7366.

due) is serving a one-year term as chairman. Other new members are Charles Baltay (Columbia); George Masek (University of California, San Diego); Lee Pondrom (University of Wisconsin), and Horace Taft (Yale). "The British Teacher Program" places young British university graduates in temporary teaching positions in American institutions. Information is available from the Woodrow Wilson National Fellowship Foundation, Box 642, Princeton, N.J. 08540.

D. Reidel in Dordrecht, Holland is publishing two new journals. *Boundary-Layer Meteorology* will cover the lowest 1000 meters of the atmosphere. R. E. Munn (Department of Transport, Toronto, Canada) is editor. *Cosmic Electrodynamics*, edited by C. P. Sonnett (NASA Ames Research Center) will publish papers in geophysical and astrophysical plasmas.

International Planning Management Corp has been organized to seek solutions to problems in international development, transportation, urban planning and related interdisciplinary fields. George C. Sponsler is president of the firm, which is located in Bethesda, Md.

NSF is supporting a joint Soviet-American program to study auroral substorms. The principal American investigator is Charles R. Watson of the Geophysical Institute at the University of Alaska.

NSF has awarded a total of \$723 000 under its Pre-Service Teacher Education Program to the American Geological Institute, to Knox College, and to the University of Washington. The Program aims to "improve the preparation and training of prospective elementary and high-school science and mathematics teachers."

NSF has awarded \$900 000 to the Physics Department of Yeshiva University's Belfer Graduate School of Science. The three-year grant is the largest ever made under NSF's Departmental Science Development Program.

*Transport Theory and Statistical Physics* will be published by Marcel Dekker, New York. The new journal, edited by Paul F. Zweifel (Virginia Polytechnic Institute) will be devoted to irreversible statistical mechanics.

*The Index to the Literature of Magnetism*, Volume 9, Part 2, is now available from the AIP. This index, which was published by the Bell Telephone Laboratories for internal use and made available by the AIP on behalf of the conference on Magnetism and Magnetic Materials, costs \$3.00 per copy. Copies of some earlier volumes can be obtained by sending \$3.00 per copy to the Back Numbers Section of the AIP, at 335 East 45th St., New York, N.Y. 10017

## inbrief

The American Geophysical Union (AGU) was elected to the status of an AIP affiliated society on 20 March by the AIP Governing Board. The AGU has about 10 000 members and publishes the *Journal of Geophysical Research*, *Radio Science*, *Reviews of Geophysics*, *Transactions of the American Geophysical Union* and *Water Resources Research*. Homer E. Newell of NASA is currently president of the AGU; A. F. Spilhaus Jr is the executive director.

Alfred J. Eggers, Jr. formerly the Assistant Administrator for Policy with NASA, has been appointed to the position of Assistant Director for Research Applications, of the National Science Foundation. Eggers will head the new program called "Research Applied to National Needs," which is designed to support research applied to important environmental and societal problems. Joel Snow and Leon M. Schwartz have been appointed to assist Eggers.

The APS has announced the appointment of George T. Carroll to the newly created position of Assistant Treasurer. Carroll, who was previously with Columbia University, was educated at Columbia and Yale Universities.

The electrical-engineering department of Texas Tech University has received a \$476 000 grant from NSF for a three-year period. The funds will be used to upgrade and expand the department. The program is directed by R. H. Seacat.

Construction of the Richard S. Perkin Laboratory for Astrophysics of Harvard College Observatory has begun in Cambridge and is scheduled for completion in 1972. \$1.5 million was left to the observatory in Perkin's will, and \$1 million came from NSF.

A chairman and four new members have been named to the 13-man executive committee of the National Accelerator Laboratory's Users' Organization. Earle C. Fowler (Pur-