

of the 60-inch machine, and its range includes lower energies than those of the older instrument. The new cyclotron is expected to be used primarily for scattering experiments in nuclear structure studies.

Another low-energy cyclotron, a four-sector, spiral-ridge machine capable of accelerating protons to energies of 30 to 35 Mev, was scheduled to reach completion last month, according to an announcement released by the University of Colorado in January. A grant of \$293 000 was recently awarded by the Atomic Energy Commission for completing the construction of the \$1.3 million accelerator and to support research in nuclear physics on the Boulder campus.

The new Colorado cyclotron will serve as the main research tool of the University's Nuclear Physics Laboratory and it is heralded as the only such instrument located on a university campus between the Mississippi River and the Pacific Coast. The cyclotron will be operated under the direction of David A. Lind, professor of physics at the University.

Two tandem Van de Graaff machines rated at 15 Mev, the most powerful yet designed, are being constructed by the High Voltage Engineering Corporation. One of the machines will be installed at Stanford University's new Russell Varian Laboratory of Physics; the other will be erected near Rutgers University's new physics building in Piscataway Township, N. J. A third machine is on order for the Atomic Energy Commission.

The Stanford machine will cost \$1.3 million, granted by the National Science Foundation, and will require more than two and one half years for delivery, installation, and testing. It will be operated under the direction of Walter E. Meyerhof of the Stanford Physics faculty and will be used in precise energy studies of nuclear forces and structure. The new machine will for some experiments be coupled with an existing 3-Mev Van de Graaff at Stanford to produce 36-Mev neutrons, 18-Mev protons and deuterons, and alpha particles in a range up to and exceeding 15 Mev. Acceleration of heavy nuclei to energies above 50 Mev is also expected.

The Rutgers accelerator will be operated in collaboration with Bell Telephone Laboratories. The \$1.2 million for the machine itself will be provided out of bequests to the University. Funds for the building in which it will be housed (\$700 000) have been requested from the state of New Jersey, and additional funds for auxiliary equipment are being sought from the federal government. Bell Laboratories will make annual payments to allow its scientists one third of the accelerator's use for a period of ten years. The cooperative arrangement allows the University to install a larger and more versatile machine than it could otherwise obtain. Both the new physics building and the Van de Graaff are expected to be ready for use by the fall of 1963.

Rensselaer Polytechnic Institute, in ceremonies held in late October, formally dedicated its new high-

intensity linear accelerator, together with two recently completed laboratories of the RPI Science Center. The new linac, which has a beam current of nearly one ampere, was designed to accelerate electrons to an energy of about 35 Mev.

In the course of dedicating the new Rowland and Jonnson Laboratories, plaques were unveiled honoring Henry A. Rowland and Mr. and Mrs. Erik Jonnson of Dallas, Texas. Rowland, who is remembered for many brilliant accomplishments in physics (including the development of the diffraction grating machine that gave rise to a new era of spectroscopy in the 19th century), graduated from Rensselaer in 1870. He later became the first president of the American Physical Society. Mr. Jonnson, after whom the second laboratory is named, is an RPI alumnus and benefactor who is an organizer of Texas Instruments, Inc., of Dallas.

At the convocation preceding the dedication, addresses were presented by Frederick Seitz, head of the Department of Physics at the University of Illinois, and by Edwin M. McMillan, director of the University of California's Lawrence Radiation Laboratory. Seitz and McMillan each received the honorary degree of Doctor of Science, accompanied by citations presented by Rensselaer's president, Richard G. Folsom.

Neutrino Counter

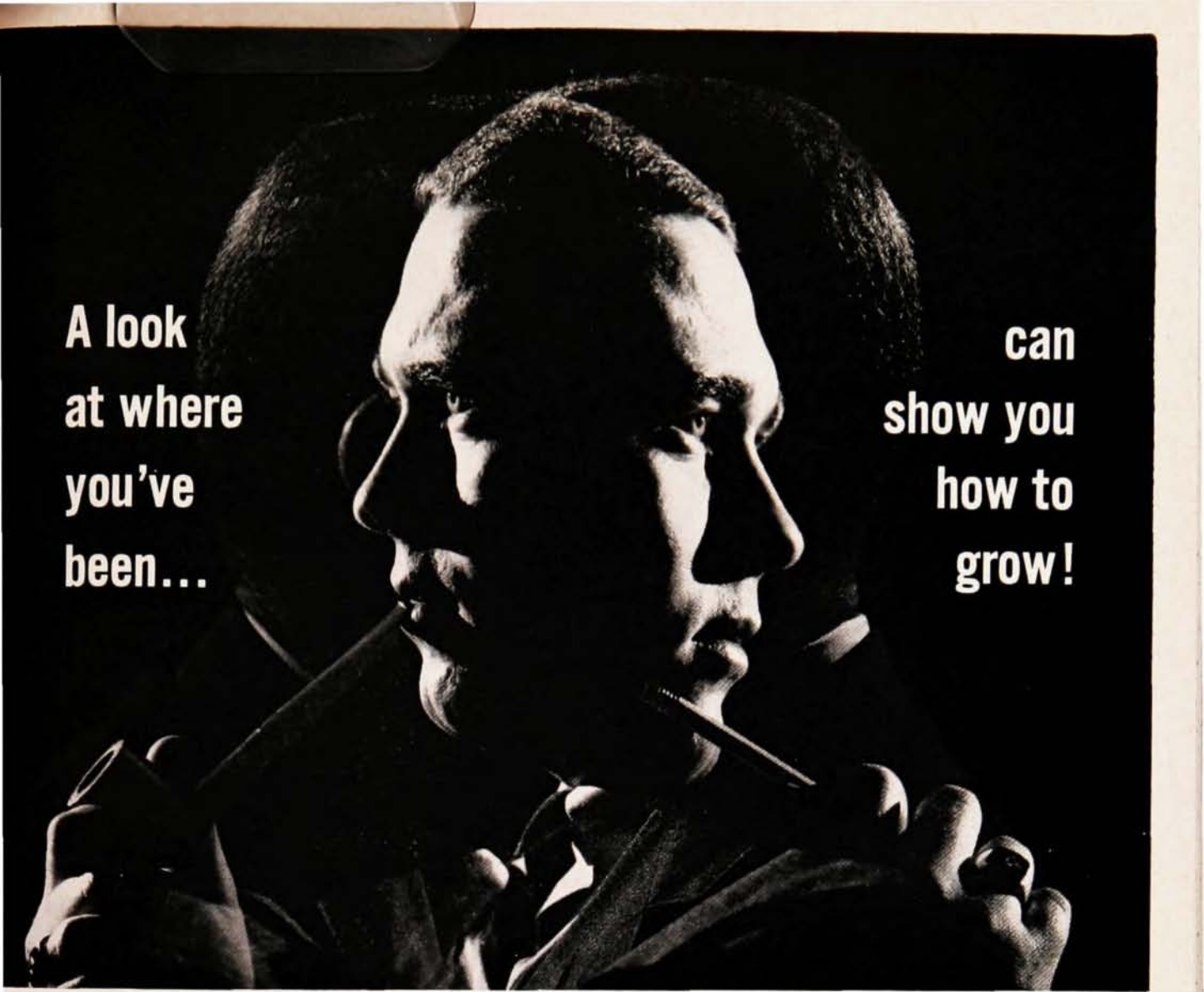
A grant of \$77 000 has been awarded by the Atomic Energy Commission in support of a new neutrino-detection project to be carried out under the direction of Frederick Reines, head of the Department of Physics at Case Institute of Technology. The project will involve the construction of a large liquid counter of the Čerenkov type which is to be installed in a deep underground location to minimize the effects of cosmic radiation. The detector, with its associated array of photomultiplier tubes, is expected to observe the passage of only one neutrino every few days, while the cosmic-ray count is expected to be about 500 per hour, even under a thick shield of earth.

Studies preliminary to the new project have been underway for the past year. In March of 1961, Dr. Reines and his associates installed a smaller detector of the same type (which is still the world's largest) in a Morton Salt Company mine in Fairport Harbor, Ohio, where it was used in studies of the stability of the proton. That counter, with a tank the size of a small swimming pool, has a capacity of 1800 gallons of doubly distilled water. The proposed new detector is planned to be more than one hundred times as large.

The most recent grant brings the total support provided by the Atomic Energy Commission for Dr. Reines' low-level counting project to \$611 000.

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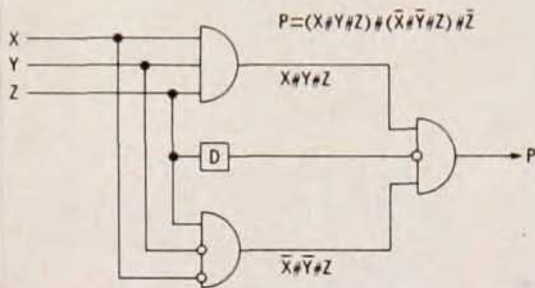
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DEFINITIONS: $X \oplus Y \oplus Z \equiv \text{Maj}(X,Y,Z)$; $f_{xy} \equiv f(X,X,Z)$; $f_{\bar{x}\bar{y}} \equiv f(X,\bar{X},Z)$

DERIVATION: Let $f(X,Y,Z)$ be even-parity function P .
Then $f_{xy} \equiv \bar{Z}$ and $f_{\bar{x}\bar{y}} \equiv Z$ so



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Electric Company, Ltd., were opened recently on a site located a few miles west of Ottawa. The firm's Research and Development Laboratories will be devoted primarily to the fields of communications and electronics, with emphasis given to the special needs of Canada's telephone industry. Northern Electric's main fields of interest include telephone and data transmission, microwave radio communication, switching, and audio and video broadcasting.

Radiation Centers

Brookhaven National Laboratory has announced the establishment of a Radiation Development Center designed to advance the Atomic Energy Commission's program for process radiation development. The Center will serve the Laboratory's various research programs, and will be available on a limited basis to visiting scientists interested in investigating such applications of radiation energy as the production of plastics and chemicals, the cold sterilization of drugs and medical supplies, and the preservation of perishable foods.

The Center will include a high-intensity radiation development laboratory equipped with an irradiation cell for experimental work with radiation sources and a work-preparation cell where various types of sources will be prepared for experimental use. A shielded area will be provided for radiation sources not being used. The total level of radiation to be employed in this facility is approximately two million curies. Most of the sources will be of either cobalt-60 or cesium-137, although spent reactor fuel elements will also be used.

The Brookhaven Radiation Development Center is expected to be ready for occupancy in mid-1962. To operate the Center, a Radiation Division has been established within Brookhaven's Nuclear Engineering Department. Bernard Manowitz, associate head of the Chemistry and Chemical Engineering Division, will be in charge of the new Division.

A complex of radioisotope facilities at Oak Ridge National Laboratory, including ORNL's Fission Products Development Laboratory and the new Radioisotope Development Laboratory, has been placed under a single organizational roof with the establishment of a new Isotopes Development Center to be operated as part of the Atomic Energy Commission's isotopes program. Arthur F. Rupp, a specialist in radiochemical processes who has been on the ORNL staff since 1945, has been named director of the Center.

A broadened program of basic and advanced radioisotope research is to be carried out, and the Center will be responsible for a continuing evaluation of radiation and radioisotope technology on a world-wide basis and for providing data to governmental, industrial, educational, and private research groups to stimulate the application of radioisotope techniques. Plans have also been announced for inviting scientists from the United States and abroad to spend terms of one or two years at the Center on a research-participation basis.