telescope at the Observatory's Agassiz Station, and work on a twenty-five-foot parabolic reflector antenna and on housing for the necessary electronic and control gear is already in progress. Radiation from the hydrogen clouds (at a wavelength of 21 cm) was first discovered in 1951 by one of this year's Nobel prize winners, Edward M. Purcell of the Harvard physics department, and by Dr. Ewen, now a research associate at the Observatory. A short time later confirmation was provided from Holland, where J. H. Oort and C. A. Muller detected the same radiation during observations made at the Kootwijk Radio Observatory. The Dutch scientists are reported to have in operation apparatus with which they have begun to trace the spiral structures in the remote parts of our galaxy. Similar research is also being carried out at the Radio Physics Laboratory in Sydney, Australia.

The rarified hydrogen clouds, which emit no light and can therefore not be seen through optical telescopes, emit energy, quantum by quantum, whenever the single electrons of their constituent atoms reverse their spin. Such a phenomenon occurs only about once every four hundred years in an individual atom, but because of the great numbers of atoms involved the radiation is continuous and can be received as a radio signal with the appropriate equipment.

The Harvard radio telescope, a comparison radiometer that can be tuned to any frequency between 300 and 1650 megacycles, will be mounted parallel to the Earth's polar axis, thus permitting it to be focused on one spot in the sky for relatively long periods simply by moving it in one direction to compensate for the Earth's rotation. Although small compared with the British radio telescope being constructed at the Jodrell Bank Experimental Station near Manchester (see *Physics Today*, June 1952, p. 26), it is reported that the Harvard instrument will be sensitive enough to pick up radiations of less than 10^{-15} watt in power. The new program has been aided by a $32,000 grant from the National Science Foundation and by an anonymous gift from a friend of the Observatory.

Nobel Prize in Physics

1952 Award Shared by Bloch and Purcell

Two nuclear physicists who in 1945 discovered independently the phenomenon that is referred to either as "nuclear induction" or "nuclear magnetic resonance absorption" have been named to share this year's Nobel Prize in physics. Felix Bloch, professor of physics at Stanford University, and Edward M. Purcell, associate professor of physics at Harvard, were selected by the Swedish Academy of Science on November 6th to receive the award in recognition of their contributions to an improved understanding of the structure and forces of atomic nuclei.

The research method developed by Bloch and Purcell is essentially one of observing, in solids, liquids, or gases, the effects accompanying the reorientation of the nuclear magnetic moment of a substance to which is applied a strong and steady magnetic field at right angles to a simultaneously applied alternating electromagnetic field. The effects, either those of the absorption or of the dispersion of electromagnetic waves, can be detected in the radio wave region with the help of appropriate electronic circuits. Information obtained from a knowledge, for different substances, of the critical frequencies at which peaks appear in the radio-frequency signal has led to the precision measurement of the gyromagnetic ratios, the spins, the signs of the magnetic moments, and the magnitudes of the moments of a variety of nuclei.

Dr. Bloch was born in Switzerland, studied at the Federal Institute of Technology in Zurich, received his doctorate in physics at the University of Leipzig, and carried on research at several other European laboratories before coming to the United States in 1934, when he was invited to join the Stanford faculty. During World War II he worked on the Manhattan Project until 1944, at which time he joined the radar project at Harvard's Radio Research Laboratory.

Dr. Purcell, a native of Illinois, graduated from Purdue University in 1933 and received his PhD at Harvard in 1938. During the war he was on leave of absence from the Harvard faculty and served as a staff member of the Massachusetts Institute of Technology Radiation Laboratory to work on the MIT radar program.

The co-winners of this year's Nobel Prize in physics will share a cash award of 171,134 Swedish crowns, which amounts to approximately $16,518 for each scientist. Formal presentation of the awards will be made on December 10th at Stockholm.

Franklin Institute Awards

Thirteen Scientists Honored

Wolfgang Pauli, professor of theoretical physics at the Physikal Institut of Eidgenossische Technische Hochschule in Zurich, Switzerland, has been awarded this year's Franklin Medal for his formulation of the exclusion principle as related to atomic structure. Awarded annually by the Franklin Institute to the scientist whom the Institute considers to have done most to advance the knowledge of physical science or its application, the medal was accepted by M. J. Rohrbach, Swiss Consul in Philadelphia, on behalf of Dr. Pauli, who was unable to attend the October 15th presentation ceremonies.

Twelve other 1952 medals of the Institute were awarded for work in physics, mathematics, chemistry, metallurgy, and engineering. Physicists John Bardeen of the University of Illinois and Walter H. Brattain of the Bell Telephone Laboratories received Stuart Ballantine Medals "in recognition of their contributions to the theory of surface states in semiconductors and of their invention of the point contact transistor, a device foreshadowing a notable advance in the means of electromagnetic communication." The Elliott Cresson Medal, awarded for discovery or original research, was presented to Edward C. Molina, lecturer in mathematics

at Newark College of Engineering, "for his important contribution to the mathematical theory of probability and for his significant contributions to the improvement of telephonic communications both by the application of mathematical probability to the study of telephone traffic and by the invention of switching equipment." Cyril S. Smith, director of the Institute for the Study of Metals at the University of Chicago, received the Institute's Francis J. Clamer Medal "in recognition of his work leading to the discovery of the basic factors in the metallurgical behavior of elemental plutonium essential to the development of nuclear energy."

Commercial Atomic Power

Industry Takes a Long Hard Look

The suggestion that breeder piles might ultimately be owned and operated, under government licencing, by industrial companies to produce both plutonium for the government and electric power for consumers is reported to have greatly stimulated the interest of industry in the applications of atomic energy. Certainly the crowded corridors of the Waldorf-Astoria during the National Industrial Conference Board meetings in New York City last October suggested the opposite of apathy concerning "Atomic Energy in Industry", which was the conference theme. At least one spokesman for industry, however, has indicated that cost considerations will continue for some time to stand in the way of any large-scale commercial investments in the field.

Harry A. Winne, General Electric vice-president in charge of engineering, cautioned against too optimistic estimates of the early feasibility of an atomic-electric power industry in speaking before the American Institute of Electrical Engineers Machine Tool Conference on October 30th. The government is at present the only customer for plutonium, he pointed out, and plants operating breeder reactors could therefore live economically only so long as the government guarantees the market and price of plutonium. "This situation does not constitute a sound basis for an atomic-electric power industry," he continued. "Certainly, barring war, at some time in the future our atomic bomb stockpile should reach an adequately high peak, and the government would not then be justified in continuing to purchase the plutonium outright. Atomic-electric power will be really economically sound only when it can compete with conventional electric power without requiring a government-sponsored weapons market. It could not do that today—unless in some very peculiar and unusual circumstances—nor, in my opinion, for a good many years to come."

Referring to the atomic power feasibility studies being made by industry teams under contract with the AEC and to the work of the many other firms that are now contractors in the atomic energy program, Mr. Winne emphasized that industry nevertheless has a healthy interest in atomic energy that should be encouraged to grow. "Only thus," he said, "can we learn to build better and less costly atomic power plants which, I believe, in the long-term future, perhaps several decades from now, will make atomic energy a significant contributor to our industrial activity."

New Research Facilities

Walter Kidde Nuclear Laboratories

The first privately-financed research organization devoted primarily to the development of atomic power for industrial purposes, the Walter Kidde Nuclear Laboratories, has begun research operations at its recently constructed laboratory near Garden City, on Long Island. The new laboratory, housed in a brick structure of modern design, with laboratory area for work in physics, chemistry, metallurgy, radiochemistry, and materials testing, is expected to be in full operation by the latter part of 1953, by which time it is expected that a minimum staff of one hundred will be employed. The stated objectives of the organization are (1) the development of commercial atomic power, with particular emphasis on original research and development in the field of low-cost nuclear reactors, (2) cooperation on a contract basis with government agencies and their contractors in the development and design of atomic facilities, and (3) collaboration with private industrial organizations, laboratories, and others interested in the application of the nuclear sciences to specific problems.

Battelle Laboratories at Frankfurt, Geneva

Battelle Memorial Institute, Columbus, Ohio research foundation, has announced that it is establishing industrial research laboratories in Germany at Frankfurt/Main, and in Switzerland at Geneva, and that a program of fellowships has been set up for selected students in the universities of both countries. In addition, research centers and fellowship programs for other West European nations are contemplated for the future. Battelle-Frankfurt has been licensed by the Bonn government to operate as a nonprofit organization on a site presented for the purpose by the City of Frankfurt. The laboratory will cost an estimated $1,500,000 to build and equip. The Geneva laboratory, formerly used for medical research, is being remodeled and is scheduled for completion and occupancy early next year. The centers will be staffed by European scientists and technicians and are intended to provide research facilities to serve the industry of the two countries. Funds have been allotted by Battelle for approximately twenty fellowships in Swiss and German universities to be administered by the Swiss Federal Institute of Technology and by the German science foundation, Stifterverband für die Deutsche Wissenschaft.

Nuclear Physics Labs at NRL

Additional laboratory facilities for research in nuclear physics are being completed at the Naval Research Laboratory of the Office of Naval Research in Washington, D. C. Two new laboratory buildings, representing the first major expansion at NRL since the end of