mobilization, assistance for other nations in building up their military strength, and the maintenance of a vigorous civilian economy for an increasing population. The importance of scientists in all phases of the program is constantly increasing, and if the need should arise for additional projects requiring further major expenditures of scientific effort, as might almost certainly be expected, the existing shortage seems guaranteed to become critical.

It might be remembered that an originally compelling reason for the establishment of the National Science Foundation was to provide a single coordinating agency concerned with all aspects of science and with its conservation as a precious national resource. In establishing the agency, the National Science Foundation Act of 1950 called upon NSF to develop a national policy for the promotion of basic research and education in the sciences and to carry on various programs of scientific support, evaluation, and cooperation. Unhappily, the Foundation has had to function during its first two years of existence with only a fraction of the relatively modest budget allowed under the Act. This has led to serious curtailment of some parts of the NSF program at a time when all signs indicate that the most strenuous effort will be needed to avert a nation-wide shortage of scientists that could prove crippling to the plans of government and industry alike. It is possible that with the election out of the way the next Congress will be able to approach science, as an important element in the national welfare, with such enlightened bipartisanship that the National Science Foundation may receive financial encouragement to carry out its programs on the scale originally planned.

Industrial Physics

Columbia Reports Team Research Study

As part of the Columbia University School of Engineering studies of research administration, a project has been under way for the past year and one-half to examine the use of scientific research teams in industrial research operations. One portion of the survey, which has to do with data on personnel employed and needed by industrial research laboratories, has recently been released. A questionnaire distributed to the approximately 3300 industrial research laboratories listed by the National Research Council resulted in 1436 codable answers covering a total of 44,639 professional research workers in physics, chemistry, biology, engineering, and other categories. Of these, 1988 are listed as physicists.

One of the more striking aspects of the survey is that at the time the questionnaires were returned (early this year) an increase of about twenty-five percent in the total number of physicists thus employed was indicated by the responding laboratories as required in industrial research by January 1953. It is pointed out in the survey, however, that the reported estimates of personnel requirements by 1953 do not necessarily represent statistical estimates for all industrial laboratories.

AIP Placement Service

At Cambridge APS Meeting Next Month

For the past several years the American Institute of Physics has conducted a placement register for the benefit of physicists seeking employment and for that of employers seeking physicists to fill jobs. Although the placement service register operates continuously at the Institute offices, its most prominent role has been played at the large Winter Meetings of the American Physical Society and, on several occasions, at the APS Spring Meetings in Washington, D. C. This service is considered an essential part of the Institute's efforts on behalf of the physics profession, and it is an encouraging fact that since its establishment large numbers of physicists have been aided in contacting the personnel representatives of university, industrial, institutional, and government laboratories, and that many mutually satisfying placements have resulted.

This winter's "New York" meeting of the Physical Society, which is *not* going to be held in New York but rather at Harvard University in Cambridge, Massachusetts on January 22–24, 1953, will also include a placement service register. Organizations wishing to post notices of available positions may send descriptions of the openings on 8½ x 11-inch paper in multiple copies (fifteen are required) to the Institute office, or post them upon arrival at the meeting. Pre-registration for applicants seeking new positions is essential, and application forms and further information can be obtained by writing to the Institute.

In order to insure their inclusion at the Cambridge placement register, registrants' completed qualification forms and employers' descriptions of open positions must be received by the Institute office no later than *January 12, 1953.* Registrants and employers should report to the placement desk upon arrival at the meeting to receive code numbers and further instructions. Personal contact, through the arrangement of interviews, is the primary objective of the placement register, and it is therefore to the advantage of both employers and registrants to be present. The qualifications of those seeking positions will, however, be available for inspection whether or not registrants are present, and employers who are unable to attend the meeting may send descriptions of vacancies for posting.

All correspondence relating to the foregoing should be addressed to Mrs. Marjorie Robinson, Placement Service Register, The American Institute of Physics, 57 East 55th Street, New York 22, N. Y.

Radio Astronomy

Harvard Observatory Program Announced

A research program aimed at attempting to determine the structure of our galaxy through a study of the great clouds of hydrogen which float in the Milky Way is soon to be initiated by the Harvard Observatory under the direction of Bart J. Bok and Harold I. Ewen. Plans have been announced for construction of a radio

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