dish which is protected by wind and temperature variation can be maintained at a given accuracy at a fraction of the cost of a freestanding instrument.

The NEROC backers cite a large number of theoretical and practical experiments on the interference from the ribs of a radome and also on the method of erecting a 156-meter-high structure to enclose a 135-meter dish.

When Sir Bernard Lovell, director of the Jodrell Bank Observatory, visited NEROC in May, the staff argued the merits of a radome so forcefully that Sir Bernard, who has over $11 million allocated toward a 120-meter dish at his observatory, promptly dispatched a five-man team to Cambridge, Massachusetts, to look at the details.

Then there is the element of competition among the six designs. The NEROC telescope can be regarded as a direct competitor with the ARA west-midwest proposal. The proposals for the Very Large Array of the NRAO (to be placed in the southwest) and the array of 40-meter dishes in Owens Valley are also in competition.

However, the midwestern backers of the radar dish to study upper atmosphere and ionosphere problems have sought to avoid direct competition with the other proposals. The midwest astronomers sent their proposals to the atmospheric sciences section of NSF's division of environmental sciences, while the other proposals went to the astronomy division of mathematical and physical sciences at NSF.

To evaluate the six proposals, NSF supplemented its standing advisory apparatus by establishing, in June, a special panel under the chairmanship of Robert H. Dicke, a Princeton University physicist heavily involved in both theoretical and experimental astronomy.

The other members of the panel are: Bart J. Bok of the University of Arizona, William W. Morgan of the Yerkes Observatory, Eugene N. Parker of the University of Chicago, Sterling Colgate of the New Mexico Institute of Mining and Technology, Rudolph Kompfner of Bell Telephone Laboratories in Holmdel, N.J., Merle A. Tuve of the Carnegie Institution of Washington, and Gart Westerhout of the University of Maryland.

Three of the panel members are identified with optical astronomy: Bok, Morgan, and Parker. To represent the theoretical problems of plasma physics

NEWS IN BRIEF

● **"BRAIN DRAIN"**: The number of scientists, engineers, and physicians immigrating to the United States increased 77 percent between 1956 and 1966, according to a report by the House Research and Technical Programs Subcommittee. Representative Henry S. Reuss (D–Wis.), chairman of the subcommittee, stated, "According to this study, a growing scientific brain drain from the developing countries may be working at cross purposes with our foreign aid program." The report notes that immigrant scientific manpower in 1966 provided nearly 10 percent of the additions to the U.S. supply of engineers, and 26 percent of the new physicians. Between 1956 and 1966, the developing countries' share of scientific immigrants rose from 33 to 46 percent of the total. These countries were the source of 4390 scientific immigrants in 1966. During the same year about 6000 students from developing countries were graduated from U.S. colleges and universities, giving the countries a net gain in scientific manpower of three in ten new graduates. Of the 1966 scientific immigrants, 60 percent were from the 13 nations receiving the bulk of U.S. aid: Brazil, Chile, Nationalist China, Colombia, the Dominican Republic, India, Iran, Israel, Korea, Pakistan, the Philippines, Turkey, and Vietnam. The report also indicates that foreign-born scientists and engineers are more likely to be engaged in research and development work than their American counterparts. The study, *The Brain Drain into the United States of Scientists, Engineers, and Physicians,* can be obtained without charge from the Research and Technical Programs Subcommittee, House of Representatives, Washington, D.C.

● **NEW ACADEMIC PROGRAMS**: The University of California, Berkeley, has established a Department of Demography, chaired by Judith Blake Davis who previously headed the Group in Demography. At the University of Illinois in Urbana, the National Laboratory on Early Childhood Education has been started. The laboratory will attempt to coordinate the work of six educational research and development centers, located at the University of Arizona, Tucson; University of Chicago; Cornell University, Ithaca, N.Y.; George Peabody College, Nashville, Tenn.; New York University, New York City; and Syracuse University. The laboratory and centers are all funded by the U.S. Office of Education. J. McVicker Hunt will head the coordination activities at the new laboratory in Urbana.

● **DEFOLIANTS**: Defense Department procurement of defoliant chemicals for use in Vietnam is proceeding at a steady pace. The Pentagon recently announced contracts of $57.7 million to eight companies for the chemical agents. Actual yearly expenditures rose from $12.5 million in fiscal year 1966 to $45.2 million in fiscal 1967. Estimated expenditure for fiscal 1968 is $43.3 million. The companies supplying the defoliants are Dow Chemical, Diamond Alkali, Uniroyal Chemical, Thompson Chemical, Hercules, Monsanto, Ansul, and Thompson Hayward.

● **R&D RESOURCES**: U.S. research and development expenditures are projected at $25 billion in 1968, up by $1 billion from 1967, according to an NSF report. The report notes the continuing upward swing of R&D expenditures compared with $22.2 billion in 1966 and $20.5 billion in 1965. However, the average annual growth rate of 6.9 percent for the 1965–68 projection is down from the 9.5 percent increase amassed over the preceding 7 years. The greatest period of growth for R&D expenditures was between 1958–65, when they rose 15.8 percent. According to the report, "Outlays for research account for 35 percent of the R&D total; expenditures for development amount to 64 percent." Expenditures for R&D rose more rapidly than the gross national product and R&D manpower also grew faster than the civilian U.S. labor force during the period studied. Between 1953–65, expenditures rose at an annual rate of 12.1 percent compared with 5.1 percent for the gross national product. R&D manpower advanced from 237,000 full-time equivalent employes in 1954 to 504,000 in 1965, an annual average increase of 7.1 percent compared with 1.5 percent for the national labor force. The report, *National Patterns of R&D Resources, 1953–68—Funds and Manpower in the United States,* is available from the Government Printing Office, Washington, D.C., for 30 cents.