

tions. For the 1970 PhD recipients who had not received a job offer by last summer, 60% of the 210 had accepted temporary positions.

The tight job market is also forcing the BS recipient to compete with PhD's for employment, resulting in the highest unemployment rate for the BS group as compared to the MS and PhD groups. In July 1970, 170 BS recipients did not have a job offer; by November, 23% of that group were still not em-

Table 1. Graduate Enrollments

	Total	First Year
1963-64	13 046	4061
1964-65	13 629	4167
1965-66	14 876	4358
1966-67	15 504	4162
1967-68	15 305	4010
1968-69	15 475	3669
1969-70	14 372	3918
1970-71	14 300	3494

Table 2. First-year Graduate Students

	1964-65	1966-67	1968-69	1969-70	1970-71
PhD-granting institutions (175)	3354	3409	2998	3202	2658
MS-granting institutions (130)	813	753	671	716	836

ployed. Of the 65% who are working, some listed their occupation as bartender, television repairman, construction worker and postal employee.

As a new part of the employment survey, AIP received questionnaires from 800 placement service registrants. Of the 202 PhD's who earned their degree before 1967, 167 were employed. Of those persons 32% used only a small fraction of their physics training and 29 of the 72 persons employed by a university were holding temporary positions. —TJ

Seven nations out of 12 now support CERN 300 GeV

A decision on whether or not to construct a 300-GeV accelerator at CERN was expected to occur at a CERN Council meeting on 19 February. After the UK decision to participate after all in the project, many had thought that the plan would receive a clear go-ahead at the Council meeting in December.

Seven nations (Austria, Belgium, France, Federal Republic of Germany, Italy, Switzerland and UK), representing 87% of CERN's financial support, have now announced their decision to participate. Of the remaining five countries (Denmark, Greece, Netherlands, Norway and Sweden), none had said "No" at this writing.

The total cost of the eight-year program for the 300-GeV synchrotron is set at 1150 million Swiss francs. The leading contributors would be Germany (268 million), UK (248 million), France (229 million) and Italy (148 million).

The plan is to use the existing 25-GeV synchrotron as injector. It would divide its time among feeding the big synchrotron, filling the Intersecting

Storage Rings and providing 25-GeV beams for experiments. In the "missing-magnet" design, a 2.2-km-diameter ring would be filled initially with only half the iron-core magnets; this arrangement would yield 200 GeV in the sixth year of the program. Within the budget further magnets could be added to raise the energy to 300 GeV. The tunnel diameter limits the ultimate energy with conventional magnets to 400 GeV.

Meanwhile if superconducting magnets continue to appear promising, they could be installed in the gaps to boost energy to 700 GeV and even eventually to 1000 GeV.

NSF astronomy reorganized into five separate programs

The NSF Astronomy Section has recently been reorganized, abolishing the optical and radio-astronomy programs, and forming five separate programs, which include both theoretical and laboratory studies, as well as observations in all spectral regions. Robert Fleischer continues as head of the section.

The solar-system astronomy program covers objects within the solar system, including work on the sun itself, planets, comets, asteroids, celestial mechanics and the interplanetary medium. Its program director is Harold H. Lane.

The stars and stellar-evolution program covers basic stellar astronomy, including pulsating stars, variable stars, stars of various spectral classes, and so on, insofar as they can be studied to reach conclusions about a particular star or type of star. Investigations of stellar modeling of both interiors and atmospheres also fall in the program, whose acting director is Fleischer.

The stellar-systems and motions program covers interactions of stars and of their characteristics, as evidenced by either dynamic coupling or by their motions. It deals with all group characteristics of stars that are smaller than a galactic scale. Lane heads this program, too.

The galactic and extragalactic astronomy program is directed by James Wright. The galactic astronomy portion covers spiral structure and the interstellar medium of our own galaxy. In the extragalactic portion are investigations of objects outside our galaxy, such as other galaxies, quasistellar objects, remote radio sources and cosmology.

The astronomical instrumentation and development program considers proposals for developing new types of observational and data-recording instrumentation. The program is intended to coordinate, both within and outside NSF, all instrument development appropriate to astronomy. Basic operation of some observatories covering several of the subject-matter programs also falls into this program, whose acting director is Fleischer.

The section will also continue to be responsible for scientific coordination of the national astronomical observatories supported by NSF, with that responsibility falling to Gerald F. Anderson.

Plan for economical Venus exploration proposed

A comparatively low-cost approach to the unmanned exploration of Venus has been proposed by the Space Science Board of the National Academy of Sciences. This Venus study, which was based in part upon a 1968 report of the board, is entitled *Venus: Strategy for Exploration*, and is the work of a 21-man panel. Co-chairmen of the panel were Richard M. Goody of Harvard University and Donald M. Hunten of the Kitt Peak National Observatory.

The study proposes a series of Pioneer-IMP class probes weighing about 850 pounds. The basic "bus" of these "planetary explorers" could be modified to carry a variety of payloads, including orbiters, atmospheric probes and small landers.

Information about the atmospheric composition, cloud physics, radiative heat budget, surface composition, and seismology of the planet, as well as other parameters, could be gathered using a series of these probes. The cost of the Venus-probe program is estimated to be \$100 million for the first three probes and \$25 million for each succeeding mission. The first probe in the series could be launched in 1975.

Because of the low cost, reliability

requirements for the Venus probes could be somewhat less stringent than for previous planetary ventures. Because Venus exploration has demonstrated the inhospitability of that planet to terrestrial life, the panel has recommended a relaxation in sterilization requirements. Venera 7, the Soviet probe which was recently reported to have made the first successful soft landing on Venus, has confirmed the harshness of the Venusian environment. The surface temperature at the surface is, according to Tass, about 700 K and the atmospheric pressure at the surface is 90 atmospheres.

The report of the Venus panel is available from the Space Science Board, at 2101 Constitution Avenue, Washington, D.C. 20418.

NAL program for visiting high-energy theorists

A new theoretical program is being set up at the National Accelerator Laboratory beginning in the academic year 1971-72, when the machine is expected to produce its first beam. S. B. Treiman (Princeton) is organizing a group of high-energy theorists to spend varying periods of time, up to one year, at NAL. (This is in addition to the existing theory program.) Some are bringing their own financial support and others will receive assistance from NAL.

Treiman said that the emphasis will be on phenomenology and that for the first couple of years it is planned to continue having visiting theorists. He said NAL will welcome high-energy theorists who want to take their academic leave at NAL "rather than going to the fleshpots of Paris," but they will be expected to provide their own funds. NAL will act as host, providing office space.

Among those who expect to be at

NAL for some period of time during the first year are: Henry Abarbanel (Princeton), Stephen Adler (Institute for Advanced Study), James Bjorken (SLAC), Curtis Callan (Institute for Advanced Study), Roger Dashen (Institute for Advanced Study), Sidney Drell (SLAC), Frederick Gilman (SLAC), Benjamin W. Lee (State University of New York at Stony Brook), Yoichiro Nambu (University of Chicago), Jeremiah Sullivan (University of Illinois), Treiman and C. N. Yang (Stony Brook). —GBL

in brief

A protocol providing the basis for joint Soviet-American experiments at the Institute of High-Energy Physics in Serpukhov and the National Accelerator Laboratory, was signed by representatives of the Soviet and US atomic-energy commissions on 30 Nov.

Senior Fulbright-Hays awards for research and lecturing abroad during 1972-73 are available to US citizens with a doctorate or college teaching experience. Applications, which should be sent this Spring, are available from Senior Fulbright-Hays Program, 2101 Constitution Avenue, Washington, D.C. 20418.

The physics department of the College of William and Mary will use a three-year \$610 000 NSF Departmental Science Development grant for new equipment, visiting faculty, and other teaching and research needs. The department now has 25 faculty members and 56 graduate students.

Rutgers University has started an interdisciplinary PhD program in Geophysical Fluid Dynamics. Emphasis is on basic dynamic mechanisms

Wisconsin

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ished but he was fortunate to have already established a new research direction for himself at the Wisconsin electron storage ring 15 miles away in Stoughton. He does not plan to rebuild his old equipment.

Some of the low-temperature facilities, which were also heavily damaged, cannot be restored until the building construction is completed and funding is assured. —GBL

underlying motions in the atmosphere and oceans.

The Institute for Environmental Sciences has created a solar-radiation committee headed by Charles H. Duncan of the Goddard Space Flight Center. The committee will deal with such fields as radiometers, calibrations, simulation facilities, radiant-energy sources, optical, thermal and electronic design, instrumentation, and safety and maintenance. It is now planning to recommend a practice for solar simulation for thermal vacuum testing of space-flight materials and spacecraft.

The Institute of Physics and the Physical Society, 47 Belgrave Square, London. S.W. 1, is forming an Atomic Collisions in Solids Group, for those interested in the interaction of energetic particles with solids.

A new graduate program in petrology at the Stony Brook campus of the State University of New York emphasizes solid earth and moon studies. Stony Brook's Earth and Space Sciences Department also expects to add a new geophysics group.

the physics community

Project SEED: mathematics in the ghetto

An approach to teaching advanced mathematical concepts to culturally disadvantaged elementary school students was demonstrated during a recent New York City meeting of the National Council of Teachers of Mathematics. William Johntz, director of Project SEED (Special Elementary Education for the Disadvantaged) presented in his first lesson concepts including truth and false sets, infinite sets, substitution rules and operations with zero and negative numbers, to a fifth-grade class

selected at random from a ghetto elementary school in the Bronx. Johntz employs in the SEED Project a "discovery" teaching technique similar to the ancient Socratic method. Because of their training in abstract mathematics, many physicists may be well equipped to participate in this program as instructors.

Johntz told us that SEED offers an alternative to university teaching and corporate research, "placing mathematicians and scientists directly in

contact with the true intellectuals of our society—namely, children. We have in our project dozens of mathematicians who have given up university and industry employment in order to involve themselves full time in Project SEED. Others who continue to work in both worlds report that their research has improved."

Project SEED was initiated in the Berkeley, California school system in 1963 by Johntz, who had previously studied psychology and mathematics