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

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

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 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

at Duke and Berkeley, respectively. School systems in Connecticut, Indiana, Michigan, Minnesota, New Jersey, New York, Ohio, Oregon, Pennsylvania, Tennessee, Washington and Wisconsin, as well as California, are currently involved in SEED. In addition, a number of foreign countries have expressed interest in the SEED project.

Presently, most SEED instructors are industrial or university mathematicians; however, there is an increasing involvement of physicists. Many universities and corporations are encouraging involvement of their mathematically trained personnel. These include Rutgers and Yale, the Battelle Memorial Institute, IBM, Lockheed and New York Life Insurance, among others. The University of California has given top priority in its urban crisis package to the Community Teaching Fellowship Program, which is modeled after SEED. Some corporations are even providing paid release time to employees participating in SEED, and many college and university faculty members are including SEED classes in ghetto schools as a portion of their regular teaching loads.

The program is funded using federal, state, local and private sources, and the recommended salary for SEED instructors is $2000–2500 per class, for an academic year. Although most prospective SEED instructors are well-versed in abstract mathematics, they usually have little or no experience with this form of teaching. Therefore, most new SEED instructors serve a one- to three-week classroom apprenticeship before classes are assigned to them.

Instead of lecturing to the class, SEED teachers use carefully chosen questions to spark the class's interest and to challenge the students to progress in a logical fashion, from one mathematical concept to another. To enhance the student's feelings of group participation SEED uses hand signals, which a student can use to indicate pleasure or displeasure with the trend of the discussion, and name cards, which identify the student to his fellow students and the instructor. Wrong answers are not treated as failings of the students. Instead, they are logically discussed and their implications on axiom systems are investigated.

Project SEED's basic purpose is to raise the intellectual confidence of culturally disadvantaged students by proving to them that they are as capable as middle-class students of handling difficult, "culture-free" subjects. Although there are still some unresolved problems, notably the high mobility of the poor, which removes the student from a particular group experience, Johntz noted that SEED project techniques and results have been received enthusiastically by instructors as well as state legislators. Some concepts that undergraduate math majors seem vague about are apparently grasped intuitively by many SEED students. For further information regarding Project SEED, Johntz can be contacted at 1011 Keith Avenue, Berkeley, California 94708. —GM

ROBERT A. ISAACS

Project SEED director William Johntz teaches advanced mathematical concepts to a class of culturally disadvantaged elementary-school children.

New faces at the Astrophysical Journal

The managing editor of *The Astrophysical Journal*, which is sponsored by the American Astronomical Society and published by the University of Chicago Press, will be Helmut Abt (Kitt Peak National Observatory), effective 1 April. At the same time Donald E. Osterbrock (Washburn Observatory, Madison, Wisc.) will become editor of *Astrophysical Journal Letters*. The two men replace S. Chandrasekhar, who has been managing editor since 1952.

Abt has been at Kitt Peak since 1959 and works in double stars, stellar rotation and motions. Osterbrock, who has been at Washburn Observatory since 1958, works on planetary nebulae and interstellar matter.

AIP and Columbia study high-school physics teaching

A study of the materials and methods of high-school physics teaching is underway at Columbia University Teachers College. Its aim is to compile and analyze data on the impact of physics curriculum innovations. Jointly sponsored by the university and by the American Institute of Physics, the project is supported by a $48 600 grant from the NSF.

The main source of data will be an in-depth study of 45 high schools selected from questionnaires sent to all high schools in Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania, Delaware, Maryland and the District of Columbia. George Ivany, who heads the project, will work with two graduate students in visiting each high school for about one week to conduct classroom observations and interviews. The final report is scheduled to be completed by Spring, 1972. □