

state & society

Wisconsin physicists pick up the pieces and get back to work

Nuclear-physics research has resumed at the University of Wisconsin in Madison but the building and equipment damage caused by the bombing of Sterling Hall last August is still far from completely repaired. The explosion (PHYSICS TODAY, October 1970, page 73) which took the life of Robert Fassnacht and severely injured David Schuster, had badly damaged or destroyed nuclear-physics, low-temperature and solid-state equipment and portions of the building. Four men have been charged with setting off the bomb but at this writing are still at large.

After the blast, offers of help came from almost every laboratory in the US and from some foreign laboratories as well, according to Hugh Richards, associate chairman of the physics department. People volunteered to come personally, to lend equipment and to make time available on their accelerators to Wisconsin experimenters.

The Wisconsin group decided to repair the Model EN tandem Van de Graaff themselves, and succeeded in running a beam through the repaired accelerator three months after the blast. To repair the machine the entire vacuum system was disassembled and cleaned, the accelerating tubes were replaced and the low-energy vacuum system and ion sources were completely rebuilt. Within a month of the blast the on-line computer, a DDP-124, had been restored to most of its normal operations. (Originally the Wisconsin group thought the computer had been destroyed because two walls of the computer room were blown onto it.)

Although the accelerator and computer operation is excellent, Richards told us, the nuclear-physics research program still suffers acutely from lack of support facilities (shops, preparation laboratories, supplies and equipment). Building repairs are expected to be finished in the fall. Meanwhile the nuclear-physics group operates from the relatively undamaged part of Sterling Hall that the Mathematics Research Center previously occupied.

The CDC-3600 computer turned out to be less severely damaged than the DDP-124. The big machine, jointly owned by the high-energy project and the university, was no longer being used and was for sale at the time of the blast.

It had been replaced by a Univac 1108.

Henry H. Barschall has been scouting for surplus AEC equipment that could be used at Wisconsin. Three laboratories have been extremely helpful and cooperative—the Princeton-Pennsylvania Accelerator (whose AEC support ends in June), Lawrence Radiation Laboratory in Livermore, and Brookhaven. They have provided machine tools, electronic equipment, vacuum pumps and other equipment.

Most of the data have been recovered but graduate students in nuclear physics have had their PhD research delayed about six months on the average. Schuster is still under treatment for his injuries, but he is finishing up his PhD thesis.

Restoration of the building is being paid for by the state's insurance fund. It is not clear how much reimbursement the fund will provide for equipment because it must be appraised and depreciated. Also the fund will apparently not pay for equipment owned by the federal government.

One of the solid-state laboratories of Richard Dexter was effectively demolished

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Repairs under way at Sterling Hall, University of Wisconsin, Madison, following bomb blast on 24 August. The tandem Van de Graaff is underground just beyond the brick parapet in the foreground.

Fewer students enroll in PhD programs

The number of first-year graduate students at PhD-granting institutions for 1970 represents the lowest incoming enrollment in eight years, down 17% from 1969, although the total number of graduate students has remained constant at about 14 300 (see table 1). These statistics were recently compiled through surveys conducted by the American Institute of Physics, education and manpower division.

Responses from the 175 physics and astronomy department chairmen in PhD-granting institutions point to two causes: students' awareness of a tight job market and universities' willingness to use funds to hold present students until the job market improves. This holding pattern is demonstrated by the increase in the fraction of graduate students supported by teaching and

research assistantships, which went from 53% in 1969 to over 60% in 1970.

The situation was reversed for the 130 MS-granting institutions. First-year graduate student enrollment increased from 716 in 1969 to 836 in 1970, a sharp contrast to the decrease in enrollment for PhD-granting institutions, from 3202 to 2658 (see table 2).

An even larger holding pattern exists for those who have already earned their PhD's. In November 1970 the AIP conducted a follow-up to its 1969 employment survey (see *physics today*, July 1970, page 63) and discovered that post-doctoral appointments were still filling the employment gap. By December 1969, 520 persons who had received their degree in 1968 or 1969 had accepted a temporary appointment; a year later, 55% were still in temporary posi-

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