state & society

Budget outlook bright or dim, depending on your viewpoint

Although the exact dollar figure is unavailable, funds for physics research in the President's budget for fiscal year 1972 are down, especially if you take inflation into account. One educated guess is that funds for basic research in physics at universities in fiscal 1972 will be about $120 million, down about $5 million from fiscal 1971.

Presidential Science Adviser Edward E. David Jr is billing the budget outlook as favorable to science, pointing to an increase in research obligations of 9.3% and an increase in research at colleges and universities of 14.7%. But the Administration's emphasis is on relevance to the immediate needs of society and on the social sciences at the expense of the physical sciences. The budget is, of course, only a proposal and must await Congressional action over the next several months.

The picture for physics at NSF looks good, but the losses at other agencies, such as the Defense Department and Atomic Energy Commission, appear to be greater than NSF's gains. Furthermore, some of the DOD agencies are tending to change their definitions of basic research to include topics considered "applied research" in the past. Current estimates of projects being dropped by Federal agencies other than NSF are between $80 and $90 million. NSF has budgeted $40 million to respond to the scientific pressure generated by "dumping" from other agencies. In addition, NSF has asked for $12.8 million to pick up the 12 Interdisciplinary Laboratories being dropped by the DOD's Advanced Research Projects Agency (*physics today*, February, page 61) and $1.8 million to support the MIT National Magnet Laboratory being dropped by the Air Force Office of Scientific Research.

The NSF budget is for $622 million, 23% more than FY 1971. The budget includes a large increase for individual research project support (see table 1), an emphasis on the program called "RANN" (Research Applied to National Needs), increased support for projects previously funded by other agencies and reduction or elimination of direct student and postdoctoral support and institutional development.

In the Physics Section, research project support, not including that for the National Magnet Lab, is up about $10.2 million, from about $31 million to $41.2 million (see table 2).

One problem facing the Atomic, Molecular and Plasma Physics Program will be to increase its support of basic plasma research because the AEC has tended to concentrate its plasma effort on fusion research; at the same time the program will try to meet the flood of proposals in atomic physics and other related areas.

The $4-million increase in the Elementary-Particle Physics Program is

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Employment debated at meeting

During the joint APS–AAPT meeting, held in the New York Hilton and Park Sheraton Hotels, 1–4 February 1971, a total of 855 invited and contributed papers describing current activity in many fields of physics were delivered. At the same time, considerable activism was displayed by a small group of physicists and students concerned with the interaction of physics and society.

Much of the visible activism consisted of placard-carrying and leaflet distribution. Some members of Scientists and Engineers for Social and Political Action (SESPA) discussed the social significance of physics research at sessions where staff members of the Los Alamos and Livermore laboratories presented papers.

A vociferous debate occurred during the ceremonial session, when the Richtmeyer lecturer, Edwin Land of the Polaroid Corporation, was confronted by a group of dissidents about the role of the Polaroid Corporation in South Africa. A spokesman for the group stated that the sale of Polaroid camera systems to South Africa helps that country in furthering the Apartheid program (see page 9).

There were 4640 registrants at the New York meeting. For the 1970 meet-

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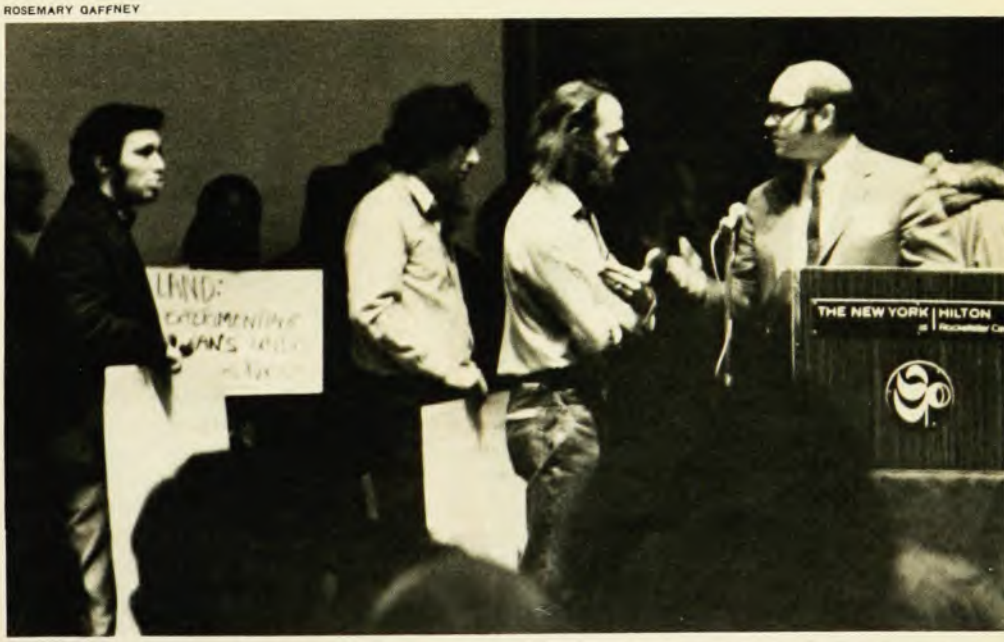

Demonstration at APS–AAPT ceremonial session. Bailey Donnally (right), who was presiding, confronts dissidents protesting Polaroid Corp. role in South Africa.

time they are submitted for publication. For further information write to: PPMFC, Office of Standard Reference Data, National Bureau of Standards, Washington, D.C. 20234.

Budget outlook

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intended to help user groups working at the National Accelerator Laboratory and the NSF-supported Cornell electron synchrotron (which is in greater demand now that the Princeton–Pennsylvania Accelerator and other machines are being phased out). Furthermore a substantial fraction of the AEC support for university-based particle physics is expected to shift to NSF.

The Nuclear Physics Program has also been affected by substantial cuts to the AEC and DOD as well as other agencies. These new demands for research funds will have severe impact on the program. The Florida State University Van de Graaff, which has lost its Air Force support, will receive $390 000 from NSF for one year. Meanwhile the new separated-magnet cyclotron at Indiana University being constructed with NSF support is expected to be running in late 1972.

Theoretical physics is probably the field of physics hit hardest by the reorientation of research in other federal agencies. Young theorists have been meeting a special difficulty in competition for grants because in evaluating proposals reviewers often emphasize the past reputation of the researcher. The requested increase in the Theoretical Physics Program from $3.8 to $5.6 million is intended to help the young investigators and to respond to the dumping from other agencies.

The National Magnet Laboratory had been operating over the past several years at about $2.5 million; its current operating level is now $2.1 million, and the NSF request for this project in FY 1972 is $1.8 million. The Air Force ends its support on 30 June.

The ARPA Interdisciplinary Laboratories, which are losing most of their ARPA support, appear as a line item of $12.8 million, under Scientific Research Project Support in the NSF budget request.

Some projects involving physics are included under RANN, such as research to develop superconducting linear accelerators as low-cost therapeutic pion sources; these would be small enough to allow their construction in major hospitals and cancer-treatment centers. Another physics-related project under RANN is one to explore the potential for large-scale use of superconducting materials in long-distance, high-capacity power transmission. NSF is pushing RANN in a big way this year, boosting its initial funding (it was started in FY 1971) from $34 million to $81 million. The major research efforts brought together to form RANN include: Weather Modification, Earthquake Engineering, Interdisciplinary Research Relevant to Problems of Our Society, problems associated with energy production and distribution, and some other efforts formerly funded under Scientific Research Project Support.

NSF project support for astronomy will increase from $6.4 million to $8.6 million. Recently NSF began supporting radio telescopes and receivers previously funded by DOD. In FY 1971 it gave Cal Tech's Owens Valley Observatory $300 000 while the Office of Naval Research gave about $295 000. The previous year ONR gave $425 000 while NSF gave $190 000. At MIT's Haystack antenna, previously wholly supported by the Air Force Systems Command, in FY 1971 NSF gave $580 000 for the radio-astronomy effort while NASA gave $502 000 for the radar aspects.

NSF is asking for $40.2 million to support its five National Research Centers. For Arecibo Observatory (whose management NSF assumed from DOD in October 1969) NSF is asking for $4 million in FY 1972. In addition, it would like to add $1.8 million to the $3.8 million requested in FY 1971 for resurfacing the antenna. The request of $7.7 million for Kitt Peak is $0.5 million higher than last year. For Cerro Tololo the request is $2.5 million, $0.3 million higher than last year. The

David sees large increase in university research

Presidential Science Adviser Edward E. David Jr had some illuminating comments about science manpower and education during the press briefing on the President's budget. On NSF educational programs, David said that "those institutional programs that are pointed towards sustaining the universities and upgrading their quality are going to be maintained. Those that were primarily pointed at expansion will not be. They will be phased out." Similarly, on student support, David said "there will be a continuing phase-down." But, he went on: "Due to an increase in research in the universities and colleges by a very large amount, we would actually expect the number of students supported to go up."

The nation should respond to existing shortages in some fields, increasing production of scientists and engineers in those categories, David feels. "I do not think we should continue along the same path that we have been following in the past in training students in the same fields. We have to continue training some in those fields and educating some in those fields, but we certainly shouldn't expand it when it looks as though we need these people in different fields."

Elaborating on the point, Hubert Heffner, deputy director of the Office of Science and Technology said, "If one foresees the cutbacks in space and defense as we are changing our priorities, and if one looks at the saturation, in essence, that is coming in university faculties, then it is not at all clear that there is further need for government stimulus for the production of scientists and engineers as there was felt to be in the early part of this decade as we began to build up our space and defense programs."

David feels that people with good basic backgrounds in the sciences and in mathematics are going to be able to make the transition from one speciality to another. He expects that some people now working in aerospace would switch to the environmental field instead. "I would also expect to see more programs such as the one at Oak Ridge, which the National Science Foundation is sponsoring, on environment. That represents a transfer from nuclear energy work to environment."

Table 1. NSF Scientific Research Project Support

Discipline	FY 1971 (millions of dollars)	FY 1972 (millions of dollars)
Atmospheric sciences	$9.2	$11.9
Earth sciences	8.0	10.0
Oceanography	10.0	15.0
Biological sciences	43.5	57.8
Physics	30.8	43.0
Chemistry	19.5	27.7
Astronomy	6.4	8.6
Mathematics	13.4	15.9
Social sciences	17.4	27.5
Engineering	17.7	27.6
Interdisciplinary laboratories	—	12.8
Total	175.9	257.8

Table 2. NSF Physics Section Budget

Program	FY 1971 (millions of dollars)	FY 1972 (millions of dollars)
Atomic, molecular and plasma physics	2.7	3.6
Elementary particle physics	10.8	14.7
National Magnet Laboratory	0	1.8
Nuclear physics	9.0	11.3
Solid state and low-temperature physics	4.7	6.0
Theoretical physics	3.8	5.6
Total	31.0	43.0

Table 3. AEC Division of Research Operating Budget

Program	FY 1971 (millions of dollars)	FY 1972 (millions of dollars)
High energy	$118.6	114.4
Medium energy	13.0	12.8
Low energy	27.7	25.3
Mathematics and computers	5.4	4.8
Chemistry	51.6	49.0
Metallurgy and materials (solid state physics)	26.8	25.2
Controlled fusion	28.4	28.0
Total	271.4	259.5

National Radio Astronomy Observatory is budgeted for $7 million, up from $6.4 million last year. For the National Center for Atmospheric Research the request is $19.2 million, up from $15.5 million last year.

NSF education programs are being redirected: The Science Development Program is being discontinued altogether, dropping from $20 million in FY 1971 to zero in FY 1972. Since its establishment in 1964 the program gave over $200 million to support 100 colleges and universities in increasing the quality of their graduate science and engineering programs. The Institutional Grants for Science are being reduced from $14.5 million to $12.0 million.

Direct student support programs are being reduced or phased out, NSF says, "in recognition of the existing balance of supply and demand for graduates with advanced science and engineering degrees and projected surpluses in some areas." Graduate fellowship and traineeships, for example, are dropping from $28.3 million in FY 1971 to $20.0 million in FY 1972. Postdoctoral fellowships have been eliminated.

The AEC Division of Research has been hit hard, its operating budget declining from $271.4 million to $259.5 million (see table 3). Each of the programs has been trimmed, roughly in proportion to its size, although the controlled-fusion effort was given the benefit of a little priority, dropping only $400 000.

The medium and low-energy physics programs are being affected because of the high priority given to operating funds for the Los Alamos Meson Physics Facility; it received its final construction budget of $6.7 million, completing its $56-million finding. Roughly 20 nuclear-structure contracts are being terminated. The largest of these programs are at Texas A & M (which has a large cyclotron), University of California at Davis (which also has a large cyclotron) and Purdue University.

Construction funds for the National Accelerator Laboratory are pegged at $48 million, bringing the total obligated almost to $200 million; total construction cost is to be $250 million. Because the operating budget at Batavia was boosted from $9.15 million to $11.9 million, other high-energy programs have been cut.

The Defense Department budget for physics is unavailable, although, in principle the roughly $15 million from the IDL's and the Magnet Laboratory would be available for basic research. Total obligations for DOD reserach are $1625 million, up from $1472 million. Emphasis will continue to be placed on fundamental and applied research in electronics, oceanography, materials science and lasers.

David says that despite easing of the Mansfield amendment's restrictions on research support, "the overall DOD thrust. . .is quite compatible with the notion of relevance."

NASA's budget for research is planned to increase from $1474 million to $1582 million, while its development budget is down. Work will begin on the High Energy Astronomy Observatory, which is the first of a series of satellites to study x-ray and gamma-ray sources and cosmic rays. Research funding is planned for design of experiments and instrumentation for the "Grand Tour" unmanned missions to the outer planets in the latter part of the decade and for the 1975 Viking unmanned orbiter lander exploration of Mars. In addition to completing three more Apollo missions, there will be an increase in the earth-orbital manned-flight program for Skylab, an experimental manned space station. —GBL

the physics community

Twelve SPS chapters receive Bendix support

The Society of Physics Students has announced that 12 SPS chapters have received research support from the 1971 Bendix Awards program.

The chapters are at Andrews University, Mich., Bowling Green State University, Mich., Creighton University, Neb., East Stroudsburg State College, Penna., Gannon College, Penna., Iowa State University, Iowa, University of Santa Clara, Calif., University of Scranton, Penna., Southwestern State College, Okla., and Thomas More College, Ky.

Unpaid page charges will delay publication

If the publication charge is not honored for papers accepted by certain AIP journals, publication of a paper may be considerably delayed. Noting the large backlog of papers for which page charges have not been paid, the executive committee of the AIP governing board has set a limit on the number of pages that can be published in 1971 without payment of these charges.

Five journals are affected. Papers accepted and tentatively scheduled for publication in the *Journal of Chemical Physics* and *Physics of Fluids* for issues later than April, and in the *Journal of Mathematical Physics* for issues later than June, will probably not be published in 1971 unless the charges are honored. For the *Review of Scientific Instruments* and the *Journal of Applied Physics* the delay will be at least two months if publication charges have not been paid; there will be no delay when the author's institution honors the publication-charge obligation.

Publication policy may be further revised after the executive committee reviews the AIP budget in June. □