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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 re-orientation 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

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."

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

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