

"Section 203" Compounds Research-Funding Squeeze

The Mansfield amendment—known for short as "Section 203"—in the 1970 Defense Appropriations Act (PHYSICS TODAY, February, page 63), along with continuing contractions in government research funding, is generating concern and confusion in Congress, in the agencies supporting research (not only in the Defense Department), and among scientists. Section 203 aims at restricting Defense-supported research to projects clearly related to military needs, but its effects appear to be spreading to other agencies.

Recently Congressman Emilio Q. Daddario identified several physics laboratories as particularly hard-hit by the overall financial squeeze, particularly from the effects of Section 203. These are: MIT's Francis Bitter National Magnet Laboratory and its Haystack radar-radio astronomy facility, the Princeton-Pennsylvania Accelerator, the Cambridge Electron Accelerator, and Florida State's Tandem Van de Graaff accelerator. In addition Cornell's Arecibo Ionospheric Observatory has been hard-hit.

Congressional concern with Section 203 has emerged mainly through the work of Daddario and his Subcommittee on Science, Research and Development of the House Committee on Science and Astronautics. In fiscal-year 1971 budget authorization hearings for the National Science Foundation, the Daddario subcommittee has examined implications of research funding cuts and the particular effects of Section 203. NSF is centrally involved: It is the one agency clearly chartered to support basic research, and everyone looks to it when cuts occur in Defense and elsewhere.

A 25 February report of the Daddario subcommittee's Research Management Advisory Panel deals with *Mission Agency Support of Basic Research*. The Panel urges the government to consider carefully the potentially disruptive effects of a restrictive interpretation of Section 203. Among its recommendations: The government should administer compliance with Section 203 to allow alternative support for individual scientists and

projects. Section 203 should not result in termination of near-complete projects or disruption of competent research teams. When Section 203 unavoidably leads to discontinued support for a project, reasonable advance notice and terminal funding of perhaps one year should be given. The Budget Bureau and the President's Office of Science and Technology should prepare a plan for supporting high-quality research projects in the national interest that are dropped by Defense because of Section 203 (but this should not be done at the expense of present NSF programs).

In a statement on 4 March, Daddario commented on the Research Management Advisory Panel's report. His subcommittee, he said, has "been very concerned about the derailment of basic research support by the mission agencies. We have been acutely conscious of the problem since part of our legislative responsibility is the National Science Foundation, and because the Foundation has been under great pressures to take on many of the good research projects being abandoned by the mission agencies. The Foundation has been able to take up some slack, but relatively little. It doesn't have the budget to handle that need."

Daddario deplored "our myopic preoccupation with budget figures, and the manner in which the mission agencies are beginning to respond to 203." He listed the physics installations noted above, and other research areas and facilities already damaged by fund cuts. On the list: Sharp DOD and NASA cuts in radio astronomy and seismology, NIH cuts in organic chemistry and biology, NASA elimination of its sustaining university program, drastic cuts in federally supported predoctoral training and fellowship programs, and about 25 astronomy programs, dropped by DOD and other agencies, which NSF has adopted (or is expected to take on) since fiscal 1969.

NSF authorization hearings held on 19 March focused on the implications of research fundings cuts and Section 203. The Daddario subcommittee heard statements from: Ivan L. Ben-

nett, Director of New York University's Medical Center; Charles L. Hosler, Dean of the College of Earth and Mineral Sciences at Pennsylvania State University; Thomas Jones, President of the University of South Carolina; Benjamin Lax, MIT physics professor and director of the Francis Bitter National Magnet Laboratory.

Hosler emphasized the importance of higher education and research in advancing social well-being and economic growth. On the economic issue he suggested, among other things, that over the productive life of an individual, an advanced technical degree would effectively return an additional \$100 000 in taxes to governments alone, for an initial investment of perhaps \$20 000. Hosler stressed the interdependence of higher education and research, and the impossibility of carrying on these activities on an on-and-off basis. His remarks stimulated questions and discussion at the hearings.

In discussing the situation at the Magnet Lab, Lax noted ironically AFOSR's (Air Force Office of Scientific Research) former enthusiastic support for advancing the state of the



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art in magnet technology; such work is no longer "relevant" under Section 203. He observed that the French, Dutch and Germans are now building similar magnet laboratories, and the Russians are proposing a larger one. "Unless the National Science Foundation takes on the responsibility for the [Magnet Lab] facility and supports our version of such an advanced project, we will relinquish the leadership we have worked so hard to attain."

To illustrate that "pure" science in an interdisciplinary setting leads to re-

sults of practical, social importance, Lax took his Magnet Lab as one example. At MIT, research in magnet technology and in plasma physics is contributing to an AEC-supported controlled-thermonuclear experiment. The search for a magnetic monopole has resulted in techniques for removing pollutants from air and water. The Magnet Lab is working with medical researchers on neurosurgical procedures, magnetoencephalography and magnetocardiography, and cardiac defibrillation.

Lax also noted the impending shutdown of the Haystack facility and

the curtailed funding of MIT's Space Science Center. The latter is an interdisciplinary laboratory with participation from sixteen MIT departments. Its general research funds are expected to drop from \$1 million to zero in 1972; this will sharply reduce the Center's scientific space projects.

Affected laboratories. Lax told PHYSICS TODAY that, with some small cuts that had been expected, but largely because of Section 203, the Magnet Lab's annual funding from AFOSR dropped at the beginning of this year from \$2.4 to \$1.8 million.

THE PHYSICS COMMUNITY

Astronomy Survey to Assess Ground and Space Priorities

A new Astronomy Survey Committee has been named by the National Academy of Sciences and the National Research Council to study and to assess the priorities of optical, radio, ground and space astronomy. The committee, headed by Jesse Greenstein, professor at Cal Tech, was requested, and later funded, by the National Science Foundation and the

National Aeronautics and Space Administration because, as Greenstein says, "federal expenditures in astronomy have reached the point where the federal government felt it was necessary to consider the balance within the total astronomy program, which is now, including the space-astronomy program, at a 'big science' level." In addition, he said that "... the study is necessary, especially at a time when prospects for support of basic research seem poor; it may be necessary to work very hard merely to stand still."

Initiated in September 1969, the committee has already met four times this winter. Most of its seven panels have each met at least twice, and the optical and radio panels have had their interim reports approved by the committee. In addition to these panels, there is a panel on relativity and astrophysics that is working for both the astronomy committee and the Physics Survey Committee, headed by D. Allan Bromley (PHYSICS TODAY, February, page 65).

The study plans to enlarge upon the 1964 Whitford Committee Study on ground-based astronomy, which omitted certain areas that the new study will explore, such as space astronomy and solar physics. To make the report comprehensive and well balanced, the committee is cooperating with the American Astronomical Society and is studying the earlier reports of the NSF Ad Hoc Advisory Panel for Large Radio Astronomy Facilities, headed by Robert Dicke (see PHYSICS TODAY, December 1969, page 56) and of NASA's Astronomy Mission Board.

Although the present panels are technique oriented, after their reports in Oc-

tober 1970, they will be formed into new panels that will concentrate on subject matter. These new panels will incorporate the work of the current panels and present their results by spring 1971. In June of 1971 the committee will meet to write the final report, which should be available by fall 1971. Greenstein stated that the committee "is not sponsoring or recommending project support. The procedures for funding by federal agencies is the same, except insofar as our report provides a planning guide to facilities' requirements for various subdisciplines."

AIP To Publish Conference Proceedings; Wolfe Is Editor

The American Institute of Physics has initiated a new program for publication of proceedings of selected, high-quality physics conferences. These proceedings will be published in a book-form, serially numbered sequence titled *The AIP Conference Proceedings Series*.

Hugh C. Wolfe, director of AIP publications, is editor of the new series and will work with an advisory committee in selecting the conferences to be included. AIP will handle the book manufacture, promotion, warehousing and distribution. The officials for each conference will probably handle the refereeing and editing of the papers; if camera-ready copy is prepared by either the author or the conference, there will be no page charges.

Although prices have not yet been set, conference participants will be given a reduced rate. Wolfe told

ASTRONOMY SURVEY COMMITTEE

Jesse L. Greenstein, *Cal Tech*; Helmut Abt, *Kitt Peak*; Jacques Beckers, *High Altitude Observatory, Boulder, Colo.*; Geoffrey Burbidge, *University of California, San Diego*; Bernard F. Burke, *MIT*; A. G. W. Cameron, *Yeshiva University*; Frank D. Drake, *Cornell University*; George B. Field, *University of California, Berkeley*; Herbert Friedman, *Naval Research Laboratory*; Leo Goldberg, *Harvard College Observatory*; Robert Hardie, *Dyer Observatory, Vanderbilt University*; Geoffrey Keller, *Ohio State University*; Robert P. Kraft, *Lick Observatory*; Robert Leighton, *Cal Tech*; Donald Morton, *Princeton*; Robert W. Noyes, *Harvard College Observatory*; Charles R. O'Dell, *Yerkes Observatory*; Donald E. Osterbrock, *Washburn Observatory, University of Wisconsin*; Jeremiah P. Ostriker, *Princeton*; Bruno B. Rossi, *MIT*; Harlan J. Smith, *McDonald Observatory, University of Texas*; Lyman Spitzer Jr., *Princeton*.

ASTRONOMY SURVEY Panels and Chairmen

Infrared, Robert B. Leighton; *Optical Telescope*, Helmut Abt; *Radio Astronomy*, David S. Heeschen, *National Radio Observatory*; *Solar*, Jacques Beckers; *Space*, A. G. W. Cameron; *Statistical*, Geoffrey Keller; *X-ray, Gamma-ray*, Herbert Friedman.

At the latter figure the Lab is operating at about one-half shift, almost no money is available for graduate and postdoctoral research support or for visiting researchers, and further staff cuts impend. Lax declared that over the years AFOSR has done a "superb job" in helping the Magnet Lab to become a unique national facility. Now, because of Section 203, AFOSR cannot support the Lab as such a facility. In a letter to NSF Director William McElroy, Air Force Assistant Secretary (for Research and Development) Hansen has asked NSF to assume this responsibility.

The MIT Lincoln Laboratory's Haystack radar and radio astronomy facility will have to shut down on 1 July unless new funding sources can be found, reports Lincoln Director Milton Clauser. Haystack, built in the early 1960's for \$20 million, has had an operating budget of about \$1.5 million, very largely from the Air Force, for the last two years. Primarily as a result of Section 203, this funding must now be cut to zero; whether or to what extent NSF or NASA can keep Haystack operating is so far unclear. Haystack's 250-300 kilowatts at X-band complement Arecibo and

Goldstone. Recently, under an NSF grant obtained with the cooperation of the 13-university Northeast Radio Observatory Corporation (NEROC), Haystack has increased its operating schedule from 40 to 120 hours a week. As a national facility, it now serves NEROC and is available to the US astronomy community.

The AEC-supported Princeton-Pennsylvania Accelerator has had its operating budget cut from \$4.0 million in fiscal year 1970 to \$2.0 million in fiscal 1971 and zero in fiscal 1972 (see page 55). AEC has cut the Cambridge Electron Accelerator bud-

PHYSICS TODAY, "As part of AIP's promotional effort, libraries and booksellers will be encouraged to enter standing orders for the series." For further information contact Wolfe at AIP.

Shoemaker Elected as ACA President; Succeeds Hamilton

David P. Shoemaker, chemistry professor at MIT, is the new president of the American Crystallographic Association, succeeding Walter C. Hamilton of the chemistry department, Brookhaven National Laboratory. Shoemaker, with MIT since 1951, will become physics chairman at Oregon State University, as of 1 July.

He will serve with William R. Busing as vice-president and Walter

L. Roth as secretary. Busing is with the chemistry division, Oak Ridge National Laboratory and Roth with General Electric Research and Development Center. Robert A. Young, physics professor at Georgia Institute of Technology, is continuing the second year of his three-year term as treasurer.

IEE Physics Abstracts Is Now Available on Microfiche

Physics Abstracts, published by the Institution of Electrical Engineers, London, and distributed in the US by the American Institute of Physics, is now available in microfiche. The subscription rate is \$192 per year, which is the same as for the journal, but a joint microfiche and journal subscription is set at the reduced rate of \$288. IEE is handling the microfiche distribution, with AIP supplying the mailing list; AIP will continue US journal distribution.

NSF Gives Over \$1 Million To AIP Information Division

In March, the American Institute of Physics received \$1 003 800 from the National Science Foundation for continued planning and initial implementation of its national information system for physics. The grants, requested by the AIP Information Division, cover the remainder of 1970 and are the first part of a \$4.2-million request for a three-year period.

The grants consist of \$265 300 for current operations and service;



FREDERICK SEITZ, president of Rockefeller University and former president of the National Academy of Sciences, has become chairman of the AIP Committee on Physics and Society (COMPAS). Appointed by the governing board at its 21 March meeting, Seitz succeeds H. R. Crane, physics chairman at the University of Michigan.



SHOEMAKER

\$640 200 for development of stage two, which will include file searches based on requests, and microform copies of the primary articles, and \$98 300 for advanced planning (PHYSICS TODAY, December 1969, page 29).

get from \$3.5 million to \$2.4 million; the present staff of 180 will be cut to 112 in July (see page 55).

At Florida State, after about 10 years of steady support, the Air Force is cutting by about 2/3 its funding of the Tandem Van de Graaff Accelerator Program. Robert H. Davis, the program's Principal Scientist, told *PHYSICS TODAY* that, under a planned phasing down begun two years ago, AFOSR support has declined from about \$440 000 in fiscal 1968 to \$320 000 this year, with \$150 000 expected for fiscal 1972. NSF supports nuclear-theory work related to the Accelerator Program, but NSF and AEC have not been able to take up the much larger experimental funding slack as had been expected. The impact of Section 203 remains to be seen. The cuts in research support come at a particularly inopportune time: With an NSF Science Development grant awarded two years ago, Florida State is just now replacing its 10-year-old 6-MeV-terminal Van de Graaff with a new 9-MeV machine, and the Air Force has recently made available to the Program an XDS-9300 computer.

Funds for Cornell University's Arecibo Observatory, in Puerto Rico, are now about 20% below what is needed for full utilization of the world's largest radio-radar telescope. But because of the high fixed operating and maintenance costs, Frank Drake, head of Arecibo's Ithaca group and Associate Director of Cornell's Center for Radiophysics and Space Research, estimates that this funding gap means in fact a 50% loss in scientific output. The Observatory expects about \$2 million for 1970, largely from NSF. But the termination, as a result of Section 203, of relatively small AFOSR and ONR contracts will seriously curtail pulsar and quasar research. Present money limits also prevent the introduction of needed low-noise and maser equipment, and other steps to upgrade the overall facility. The Observatory has been in operation since 1964 for work in ionospheric physics, planetary radar and radio astronomy. Most of the money for a recommended resurfacing of the main "dish," firmly estimated at \$4.2 million, is included in the fiscal 1971 NSF budget. But Congress specifically rejected this item for fiscal 1970; so far Arecibo's scientists are "hopeful" for 1971.

These several examples are probably representative of the current money problems of many physics research projects. Particularly serious is the fact that cuts in the 10-40% range may very disproportionately hurt "good science," even though there is enough money to keep the project going at some minimal level. This is especially likely for research that depends on expensive equipment, where operating costs—"just keeping the tubes warm"—consume most of the budget. —JBP

Daddario Introduces Bill for Technology Assessment Office

Congress would have its own Office of Technology Assessment if the bill to be introduced early in April by Congressman Emilio Q. Daddario were approved (*PHYSICS TODAY*, April, page 61). The new office would be the first new Congressional arm since the General Accounting office was formed in 1921.

Functions of the proposed Office include: identifying existing impacts, or providing "early warning" of future impacts, of technological developments; trying to establish cause and effect relationships; reviewing alternative technological or other routes to desirable goals; identifying areas needing new research or facts; and presenting findings to Congress.

The Office of Technology Assessment would be guided by a 13-member Technology Assessment Board, consisting of two Senators, two Representatives, the US Comptroller General, the head of the Legislative Reference Service of the Library of Congress, and seven public members from various backgrounds appointed by the President. The Board would elect one of the public members as chairman. It would appoint for a six-year term a full-time Director of the Office, who would rank in the government just below a Cabinet officer (roughly equivalent to the NSF Director and the AEC Chairman). The new Office would work closely with the Legislative Reference Service and with NSF's technology-assessment activities. Congress would appropriate funds for its work, and it would be administratively attached to the General Accounting Office.

The new Office would not have nor operate any laboratories or test facilities of its own. But it would have money to pay for technology assess-

ments deemed necessary, it would know how and where to get them done, and it could organize *ad hoc* task forces. Assessment findings would be only additional information inputs to Congress, and they would not supplant hearings or any other legislative procedures.

The new bill is the culmination of five years of work by Daddario and his Subcommittee. If the Office of Technology Assessment is created, it will be a governmental innovation with major impacts on American science and technology in the future. Informed guesses in Washington put the chance that the Daddario bill will be enacted this year at about 50%. Because Daddario is running this year for Governor of Connecticut, and not for Congress, the bill's prospects will not be helped. Even if the bill should not pass this year, there will almost certainly be continuing efforts to institutionalize technology assessment in the government—in the Executive as well as the Legislative branch. But, without Daddario, it is not clear who will take the lead in Congress. —JBP

IN BRIEF

Revised vapor-pressure tables have been published by Richard E. Honig at RCA Laboratories, Princeton, N. J., and can be obtained in either $8\frac{1}{2} \times 11$ inch or 20×25 inch size, from the Technical Publications Office. Also available are copies of the revised fundamental physical constants, which were determined by Barry Taylor, W. H. Parker and Douglas Langenberg.

The National Science Foundation is seeking grant proposals for institution-wide, interdisciplinary programs of research and education in science planning and policy. Details are available from the Office of Planning and Policy Studies.

A "minispectrometer," a microwave ESR spectrometer that uses Gunn diodes instead of klystrons, has been developed by Bell Labs; the devices are being furnished to qualified colleges as teaching aids.

Directors of Bolt Beranek and Newman Inc of Cambridge, Mass., and Graphic Controls Corp of Buffalo have agreed to merge, subject to stockholder approval. In their last complete fiscal years, sales of the two firms totaled \$36 million. □