a number of schools to ban the company from campus or, at least, to postpone the planned interviews. No less than five universities have reacted in this way, but Dow officials believe that visits will be rescheduled at some of them. As far as numbers are concerned, Dow is running campus interviews at about the same rate as last year, when 11,000 were held and 1300 new employees—more than half of whom came directly from universities—were hired.

Quality, not quantity, is what worries some company officials. There are no signs yet that the caliber of job candidates is dropping; but nevertheless Raymon F. Rolf, Director of Corporate Recruiting, explains, "you just don't know what it's [the demonstrations and the publicity] doing to the quality of students we're talking to." Dow's biggest needs are for chemists and mechanical and chemical engineers, and competition for new people in these fields is fierce. Rolf points out, however, that not everyone has to be a prospective Nobel laureate; a strong engineering candidate, he says, might have a C+ average and be a "good, husling, clean-cut guy who wants to go out and do a job."

Despite the absence of tangible evidence that the antiwar protests have hurt the company materially, Dow is acting as though its stock had just dropped 20 points. It is not panicking, but it is making a concerted effort to explain itself and dispel the image of a "soulless" company. It has carefully prepared a public relations kit for newspapers in cities where demonstrations might occur, and Dow officials have consistently sought to be open about the problem.

What clearly bothers Dow is that things may get worse before they get better. Recently in St. Louis, for example, a group of housewives demonstrated against the company by publicly burning packages of Saran Wrap. The impact of these events may be small on a $1.4-billion business enterprise, but not on the men who run it. Having formed company policy, Dow's executives now bear the onus of standing up in public for their position. That job, by all indications, is growing increasingly time-consuming and increasingly irritating.

Though individual recruiters are warned against debating with demonstrators, Dow sent the head of its industrial relations department from Midland, Michigan (company headquarters), to Cambridge, Massachusetts, to participate in a panel discussion at M.I.T.; the discussion is credited with having helped to avert a disruptive demonstration there. Dow has constantly stressed the smallness of the napalm contract—less than ½ of 1 percent of total earnings—and the company's commitment to principle: support of a determined national policy. The company's directors also discussed napalm at length last spring. More than ever, "morality" is becoming a corporate anxiety.—ROBERT J. SAMUELSON

Academic Research: Foster Defends DoD Support in Universities

Against a background of increasing opposition toward military-supported research in academic institutions, the Department of Defense has undertaken a review of its activities in the nation's institutions of higher learning. One consequence of that review was a decision to discontinue the support of classified basic research in universities (Science, *10 November, News in Brief). The rationale for this decision and the Department's general policies toward its university relations have now been spelled out in detail by John S. Foster, Jr., director of Defense Research and Engineering, in a statement made on 2 November, titled "On the Relationship between the University and the Department of Defense." The complete text follows.*

For more than twenty-five years there has been a productive, vital relationship between the Department of Defense and the academic research community. This relationship has both contributed to and benefited from the development of our superb national scientific and technological base. Yet from time to time, there are some who question this relationship. Some maintain that universities should not accept research support from the DoD; they argue that DoD research cannot be consistent with the spirit and goals of the academic world. Some argue that the DoD has, or is gaining, an undesirably predominant position in supporting university research.

We are concerned about these issues, and sympathetic to the interests involved. But there is misunderstanding of our goals and policies as well as past and current trends.

First I should state briefly the reasons for DoD needs for research. Next we should examine our basis for believing that defense and academic research objectives are compatible. We then should review funding data comparing the DoD position with other Federal agencies as sponsors of university research. Finally we should discuss the issues related to security classification and reviews of publications.

DoD Research Responsibilities

National security depends critically upon first-rank science and technology. From a technical perspective, DoD must assure that the pool of knowledge and understanding on which we draw to maintain our security, grows as fast as new understanding and new opportunities permit. We cannot afford to lag behind any nation in any important area of science and engineering. Thus the DoD must provide its share of support to enable talented scientists and engineers to push the frontiers of what is known and what can be achieved in practice. Research to support our future national security is consistent with Einstein's injunction: "The concern for man and his destiny must always be the chief interest of all technical effort. Never forget it among your diagrams and equations."

In addition, the Federal Government, through the DoD, must insure that this

country has an adequate supply of highly trained scientists and engineers to staff defense industries and defense laboratories. Whenever this need is not met adequately, the DoD must take steps to provide the national capability.

There are many fields upon which defense draws heavily and sometimes uniquely: electronics, solid state physics, most branches of engineering, oceanography, high temperature and ultra-strong materials, mathematics and computer sciences, and many others. When other sources of support do not encourage these basic fields sufficiently, DoD must insure that these areas do not lag.

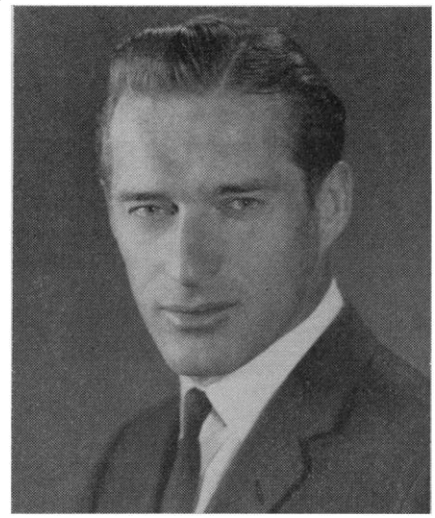
The defense area is, I believe, analogous to the health area. To provide better medical care now and in the future, and to keep our people healthy in the first place, the Federal Government through the Department of HEW encourages training and research in all the sciences related to health. While there are differences in programs and missions, in both cases—DoD and HEW—there is a special public need for major R&D investments to insure meeting present and future national requirements.

Academic and DoD Research Objectives

The DoD has two related major purposes in supporting research at universities. First, we need to advance knowledge and push technological limits in those fields of science and engineering that are relevant to long-range defense problems. And second, we must assist in assuring that the national effort in graduate education and research in these fields is adequate to the defense needs of our country.

Similarly, our universities have two general purposes in carrying out research as they fulfill their primary job of educating people. First, they conduct research to advance and integrate knowledge into their instruction at all levels. And second, they introduce research as an indispensable component of the graduate educational experience.

The objectives of DoD and of universities are therefore neither divergent nor antagonistic. Indeed, they lead to complementary, compatible, even symbiotic activities. Our relationships, beginning on a significant scale with the astute activities of the Office of Naval Research immediately after World War II, have been productive. They have led to fundamental, internationally recognized results in almost every area of science and technology, and have helped put the United States in the forefront of science. Surely this is much more than a limited technical activity, more than of transitory professional interest.



John S. Foster, Jr.

We should remember another dimension, central to public policy. The U.S. defense posture is strengthened by the frequent exchange and challenge of views among professionals from both inside and outside the government. Academic consultants are critically needed for this priceless American asset in defense planning.

Project THEMIS—A Special Case

Project THEMIS is a new program responding to the President's request to broaden the base of academic excellence. It is designed to provide a special opportunity to universities which have had little or no participation in the past in defense-related research. All work under THEMIS is unclassified, and all work is funded fully by the DoD. Central to the THEMIS concept are three requirements: (1) there are scientists at the institution who desire to work in fundamental research areas of interest to DoD; (2) the proposed research plan is approved by the institution's president as completely consistent with the long-term goals of the university; and (3) the effort is managed by a senior university investigator, not the DoD. In the initial year of THEMIS, we received 483 separate proposals from 173 institutions throughout the country, and finally selected 50 projects. We believe this indicates acceptance by academic scientists and university administrators.

Some have argued that THEMIS means new "invasions" by the DoD into the academic community. But clearly, scholars and institutions are free to submit proposals to the DoD or to other agencies. In fact, why should a faculty member not be permitted to work with the DoD if he chooses and his university permits? Academic freedom is maintained not externally, but internally by the universities themselves in their autonomy to select and promote faculty, to set their own internal priorities. If an institution is strong and independent, each new potential association merely provides opportunities and a need to make choices. We do not entice academic research groups to help us. Our situation is precisely the opposite. We do not have the funds to support all of the research which university groups would like to carry out.

DoD Funding to Universities

The funding data shown in Table 1 reveal several significant points. First, before other support became available, the DoD pioneered in the support of almost all branches of academic science and engineering. In 1952 it provided 73 percent of all Federal funds for research and training in universities. Second, in the last decade, as the country has taken up a range of scientific challenges through other agencies such as HEW, NSF, AEC and NASA,

Table 1. Funding to universities over a 15-year period from the five largest federal contributors—DoD, National Aeronautics and Space Administration (NASA), Atomic Energy Commission (AEC), Department of Health, Education, and Welfare (HEW), and the National Science Foundation (NSF)—and total federal funding.

Year	University support ($2 million)										Total Federal
	DoD		NASA		AEC		HEW		NSF		
52	100	73 %			3	2 %	14	12 %	1	1 %	136
59	179	36 %			167	34 %	79	16 %	37	7 %	497
64	351	27.1%	147	11.4%	197	15.2%	417	32.2%	120	9.3%	1293
67	365	21.0%	179	10.3%	264	15.2%	625	36.0%	191	11.0%	1736

the DoD portion has declined to about 20 percent. Thus, we do not now have, nor are we developing, a predominant position. Third, about 90 percent of the Federal support of research at universities is, in fact, oriented to national missions.

DoD Research and Security

Finally, the issue of classified research. In the past fiscal year, DoD funds supported approximately 4152 contracts in what the NSF defines as "basic research." Of these, 138 (or 3.3 percent) were classified. These few contracts were classified usually because the individual investigator's work was more applied and required limited access to classified information, rather than because the research itself was classified. I am taking steps to assure that in the future all basic research supported by DoD at universities will be unclassified. However, because universities possess special skills unique for necessary national security activities, we will continue to support a very small number of exploratory development and study efforts at universities, as well as occasional consulting arrangements.

We recognize that any requirement to review publications—for security or other reasons—can pose problems for the university. For many years we have been sensitive to this issue. With one exception, the DoD policy places no restriction on the publication of work done under unclassified contracts. The exception is this: results of research in the behavioral and social sciences related to foreign policy must be reviewed prior to publication as a safeguard against creating or increasing international tensions. This is a general governmental policy; it is not confined to DoD.

Conclusion

The United States has evolved a pattern of association between our universities and the Department of Defense. This association has led to major achievements in science and engineering, and has strengthened both national security and the national academic research base. Those who would make sweeping changes in this successfully evolving pattern should consider the whole case, all of the consequences for the country, from the many points of view. The issues must be tested in the larger context of all support to academic research, and the entire range of national groups and goals.

APPOINTMENTS

Thomas C. Chalmers, chief of medical services, Lemuel Shattuck Hospital, Boston, and professor of medicine, Tufts University School of Medicine, to head of the Veterans Administration medical research and education program. . . . **Allen J. Enelow**, director of the postgraduate division of the University of Southern California School of Medicine, to director of the Mental Health Unit, St. Lawrence Hospital, and chairman of the department of psychiatry, Michigan State University. . . . **Peter C. Badgley**, program chief, Earth Resources Survey Program, Office of Space Sciences and Applications, NASA, to program director, Gulf Universources, Avco Corporation. . . . **Ernst R. Pariser**, research chemistry, fish protein concentrate program, Bureau of Commercial Fisheries, Department of the Interior, to chief scientist and director of engineering for marine resources, Avco Corporation. . . . **Hans Fisher,** professor of poultry nutrition, Rutgers, to chairman of the department of nutrition at the university. . . . **Giovanni Giudice,** molecular embryology unit, C.N.R.S., department of comparative anatomy, University of Palermo, Italy, to visiting lecturer during the fall quarter, department of zoology, University of Chicago. . . . **H. Vasken Aposhian**, associate professor of microbiology, Tufts University School of Medicine, to head of the department of cell biology and pharmacology, University of Maryland School of Medicine. . . . **Arthur Hess**, associate professor of physiology, University of Utah College of Medicine, to chairman of the department of anatomy, Rutgers Medical School. . . . **Bruce M. Breckenridge**, associate professor of pharmacology, Washington University School of Medicine, to chairman of the department of pharmacology, Rutgers Medical School. . . . **O. Hugo Schuck**, director of research, Honeywell Inc., to director of a new office of guidance and control research, Electronics Research Center, NASA. . . . **Jack L. Kostyo**, professor of physiology, Duke University, to chairman of the department of physiology, Division of Basic Health Sciences, Emory University . . . **Riggsby**, professor of science, Troy State College, to visiting professor, Auburn University. . . . **Manuel Diaz-Piferrer**, University of Puerto Rico; **Meredith Jones**, Smithonian Institution; **Alain Liogier**, West Indian Herbarium, New York Botanical Garden; and **Albert Schwartz**, Dadeco Junior College, Miami; visiting honorary professors in the faculty of scientists, Autonomous University of Santo Domingo. . . . **Richard L. Barrett**, dean of the College of Arts and Sciences, New Mexico State University, will retire after 22 years next fall. . . . **Herbert P. Riley**, professor of botany, University of Kentucky, to visiting professor, Department of Population and Environmental Biology, University of California, Irvine. . . . **Gordon C. Ring**, chairman emeritus of the department of physiology, University of Miami School of Medicine, to visiting professor of physiology, faculty of medicine, University of Malaya, Kuala Lumpur. . . . **Mildred S. Dresselhaus**, research scientist, Lincoln Laboratory, Massachusetts Institute of Technology to Abby Rockefeller Mauze Visiting Professor, M.I.T. . . . **Arthur A. Dole**, professor of psychology, University of Hawaii, to professor of education and coordinator of the Counseling Program Graduate School of Education, University of Pennsylvania. . . . **Joseph T. Velardo**, director, Institute for the Study of Human Reproduction, Cleveland, to chairman of the department of anatomy, Strictch School of Medicine, Loyola University. . . . **John Troan**, former science writer for Scripps-Howard newspapers, to editor, Pittsburgh *Press*. . . . **Trevor R. Cuykendall**, professor of enineering, at Cornell University, to director of the newly created School of Engineering Physics at the university, and **Norman Rostoker**, manager of fusion and plasma physics, General Atomic Division of General Dynamics Corporation, to chairman of the newly created department of applied physics, and IBM professor of engineering at Cornell. . . . **John C. Laidlaw,** professor of medicine and director of University of Toronto's Clinical Investigation Unit, Toronto General Hospital, to head of the newly created Institute of Medical Sciences, School of Graduate Studies at the university. . . .

Erratum: In the paper "Strophanthidin-sensitive transport of cesium and sodium in muscle cells," by R. A. Sjodin and L. A. Beauge [*Science* **156**, 1248 (2 June 1967)] line 10 of the legend to Fig. 2 should show that 25 m*M* of cesium, rather than 25 m*M* of potassium, was present in the Ringer fluid.

Erratum: In "Student Demonstrations" (News in Brief; 3 Nov., p. 613), the University of Wisconsin, Milwaukee, was erroneously identified as the site of a student demonstration. The demonstration took place at the University of Wisconsin, Madison.