Their memories of the days when all learning could be counted upon to make a whole man from varied disciplines are longer.

There is much to deplore in the prospect of colleges becoming preparatory schools for graduate study. There is much to deplore in the loss of the *uomo universale*. But these are facts. Western society (if there is such a thing) has begun to impose them; the existence of the two cultures, elusive and insubstantial, is a passing phase in the progress toward an age of far greater specialization than we have yet imagined. The tendency may end in catastrophe or salvation or, more probably, in further vexing and insoluble but not fatal problems; but to mistake one stage in the development for a symptom of a fatal social illness is to imagine that every suggestion of numbness in the great toe inevitably portends expiry.

News and Comment

Grant System: Elliott Committee Finds Flaws, Diversity in Study of Practices of Federal Agencies

"The federal research grant program must be rescued from the morass of administrative detail in which it appears to be drowning," said Chairman Carl Elliott (D–Ala.) last week in releasing the first detailed study prepared by his House Select Committee on Government Research.*

It is, of course, possible, that "drowning" properly sizes up the situation, but, on the basis of a great deal of evidence brought together by Elliott and his colleagues, a more likely conclusion is that, given the complexities of reconciling scientific independence with federal financing, government and research have worked out a reasonably functional and effective relationship. If there is a "morass," it might be said that science has learned to swim in it. Needless to say, the system is neither tidy nor consistent, and Elliott's group —in reporting what for most of its working staff was a first journey through the wonders of grant-land—comes up with some extremely useful observations and recommendations.

But the committee, whose creation last year caused considerable alarm throughout the scientific community, concludes by calling for a tuneup, rather than an overhaul, and those who were anticipating a blast that would rock the system can now relax.

Last week's report, which is the first in a series of ten planned by the committee, was based on a survey of the grant procedures of more than 85 offices in 30 federal departments and agencies, and followed a format of studying the rules and practices employed from receipt of a grant application through termination of the grant. As might be expected, the committee found that those responsible for dispensing federal money for research follow manifold ways to get it into the hands of their clients. Problems do exist, but the money goes out, scientific research seems to be thriving, and it would be difficult to demonstrate that federal administrative practices are "drowning" the grant system, let alone significantly interfering with the quality of research. The situation is perhaps best revealed by the committee's summary of a viewpoint expressed to it by some institutions of higher learning: "We have by now become accustomed to the erratic nature of the Federal grant, and we have arrived at a modus vivendi; any changes in existing procedures would simply create more problems, at least at the outset."

In its survey of how science and government work, the committee found that it works in lots of different ways. Outside advisory panels are regularly employed to pass on grant applications to the National Institutes of Health, which last year awarded 15,233 grants totaling $425 million, and the National Science Foundation, which funded 2657 grants for a total of $112 million. However, 15 agencies, including the Army, the Navy, the Weather Bureau, the National Bureau of Standards, and the National Aeronautics and Space Administration, relied upon their own staffs to evaluate applications. By the committee's reckoning, these amounted to 802 grants funded for a total of $91 million. While the Army and Navy work without outside advisory groups—for a total of 285 grants costing $5.5 million—the Air Force, with $20 million going to 398 projects, used outside panelists "to some extent, at least," in mathematics, environment, biology and medicine, the psychological and social sciences, and the physical sciences. As to the merits of these differing arrangements, the committee said that it will reserve judgment until it has completed a separate study of the panel system, but it noted that there has been "increasing criticism" of advisory methods on two grounds: that in some cases government agencies abdicate their judgment to the panelists, and that a "panel establishment" has grown up, which utilizes the "same panelists or . . . panelists from the same institutions, over and over."

"Is the repeated use by some agencies of particular panelists (or their protégés) resulting in, or likely to result in, creation of an 'advisory elite' with a vested interest?" the committee asked. And it went on to note that a study of NIH panels, covering the past 5 years, found that "40 percent of the names occur again and again," an observation which may suggest that the committee tends toward an affirmative reply to its question.

Finally, on the subject of advisory panels, the committee produced a survey aimed at examining whether a relationship exists between institutional affluence, institutional excellence, and membership on advisory panels. This is a difficult order, heavily weighted

* *Study Number 1, Administration of Research and Development Grants, Report of the Select Committee on Government Research*, 106 pp., 40 cents, U.S. Government Printing Office, Washington, D.C. 20402.

Table 1. Summary of selected factors, institutions receiving greatest amount of federal research funds, 1960–63.

Universities collectively receiving 38 percent of federal research funds	NAS members on staff	Representation on federal review panels	Doctorates conferred 1960-63
University of California	69	168	2,575
Massachusetts Institute of Technology	30	46	908
Columbia Universiy	16	58	2,195
University of Michigan	8	82	1,381
Harvard University	52	92	1,563
University of Illinois	10	61	1,717
Stanford University	23	54	956
University of Chicago	29	76	937
University of Minnesota	10	55	1,067
Cornell University	10	67	960
Total doctorates conferred 1960-63			45,245
Doctorates conferred by above 10 institutions			14,259
Percentage			31.52
Total representation on federal review panels			2,062
Total representation from above 10 institutions			759
Percentage			36.8
Total of NAS membership association with universites			474
Total of NAS membership association with above 10 institutions			257
Percentage			54.2

with uncertainties, but the results can at least be described as interesting. The committee safely concluded that there is a "consonance" between federal funding and representation on advisory panels, but it added that "it does not appear . . . thus far, that the allotment of funds has been disproportionate to the indicated capacity of the institutions to perform the research." Using membership in the National Academy of Sciences and doctorates conferred in 1960-63 as "not infallible guides . . . [but] . . . marks of distinction which support an inference of capacity to meet the high standards required for quality research," the committee tabulated the advisory roles held by members of the ten universities which in 1960-63 received 38 percent of federal research funds. The results, as shown in Table 1, demonstrate that the rich institutions are amply represented in Washington advisory panels, the National Academy of Sciences, and the production of doctorates. But the findings shed no light on the increasingly loud contention of the have-nots—namely, that the rich operate in a closed community of talent, influence, and money.

Review Procedure

In examining the duration of grants and the agencies' procedures for reviewing research projects in progress, the committee again found considerable diversity. NASA grants run for up to 3 years; the Public Health Service has a 7-year maximum; the Agricultural Research Service sets a limit of 5 years, and prefers grants exceeding 2 years; NSF and, in most cases, the Defense Department, have 5-year maximums; the Air Force Office of Scientific Research has no set duration but generally does not exceed 5 years. On the other hand, the Atomic Energy Commission, which does all funding by contracts rather than grants, usually works on a year-to-year basis.

NSF reviews its projects "on the basis of semi-annual technical reports and of articles published in scientific literature." NSF also regularly visits its major grant holders, and visits smaller ones on a "sample basis." NIH requires annual progress reports, but does not insist upon a "detailed review" until the grant has expired. The Agricultural Research Service requires an annual fiscal report accompanied by a "brief descriptive statement of the scientific aspects of the research," the committee reported. "Only as such review requirements are met does the program division authorize payments." NASA usually requires semiannual statements of "research performed and appropriate expenditures under the grant in reasonable detail." The Weather Bureau appoints a "monitor" to provide a "continuing review" of its projects. The National Bureau of Standards does the same in its international grants program. The Office of Naval Research appoints a "scientific officer" to look after the technical aspects of its grants, and also has its contract administration personnel attending to the financial aspects of the grants. The Air Force Office of Scientific Research has a staff scientist visit each grantee annually. The Arms Control and Disarmament Agency requires that researchers holding grants of more than 6 months' duration must submit a "brief interim status report" every 3 months.

Proceeding with its survey of agency practices, the committee came upon more evidence of diversity. Some agencies permit grantees to use grant funds for page charges in scientific and technical publications. But this is forbidden by the Department of Agriculture, the Coast and Geodetic Survey, the Office of Education, and the Housing and Home Finance Agency. The time required for processing applications for renewal of grants also varied. NASA and the Defense Department require 4 to 6 months; NSF and the Air Force, "at least six months," and Agriculture will settle for 6 months but prefers, if possible, a year.

If money is left over at the conclusion of the project, the Army wants it back, but the Air Force seeks recommendations for further projects. All agencies allow for some leeway in the use of funds, but there are great variations. The Defense Department states that "once the grant has been made, the investigator and the institution are free to spend the funds for the proposed research without strict adherence to the original budget estimates." However, NSF, which does not share in the benevolence that Congress usually bestows on the military, requires specific approval for deviations from the original proposal when permanent equipment and salaries are involved. The Office of Education requires permission for even $100 deviations, and the Public Health Service must give its approval for budget changes involving more than $1000 for equipment and $250 for travel.

Communications Malfunction

In discussing the manner in which federal agencies deal with their research grantees, the committee's most barbed remarks were directed toward a not-very-comprehensible episode involving the Office of Education, an episode which the committee referred to as "an aggravated case of communications malfunction."

In July 1963, following a general study of federal payment procedures, it was decreed that all agencies, so far as possible, should pay out grants on a monthly basis, rather than in lump sums that might remain tied up for extended periods. The Department of Health, Education, and Welfare, of which the Office of Education is a part, directed all its subdivisions to comply with the rule. But the Office, for reasons which the committee says it "hopes soon to ascertain," went for a year

without complying. At the end of last May, the Office sought HEW approval for a form that it wanted to use in implementing the monthly payment procedure. But the form was held up by the Bureau of the Budget, presumably because of some uncertainty over whether it conformed with a newly issued Treasury Department regulation on the new payment method. By 24 June, the Bureau was persuaded that the Office in fact could not conform to the new treasury regulation unless it used its proposed form, and the Bureau approved the form.

The committee then goes on to relate what happened in the weeks prior to this 24 June approval, and in this instance, at least, it is easy to find justification for Chairman Elliott's contention that administrative procedures could stand improvement:

Meanwhile, the committee has learned, the Office of Education on June 10, 1964, sent to some 1,600 institutions a Financial Management Bulletin, Series II, No. 4, headed: "Subject: Payments of Federal Cash for Contract and Grant Programs." In it, Office of Education stated that "in accordance with the Treasury Department's policy . . . the Office of Education will make monthly payments on its grant and contract programs effective July 1, 1964." It went on to say that those who receive advances of Federal funds "will be required to submit (1) a quarterly 'Estimated Requirements for Federal Cash' Form No. OE-5141 and (2) a 'Monthly Report of Disbursements of Federal Cash,' Form No. OE-5140." It asked for submission of the first estimate of cash requirements "*as soon as possible before June 30, 1964.*" [Emphasis was Office of Education's.]

On the very day that the Bureau of the Budget approved forms 5140 and 5141 —June 24, 1964—the Office of Education sent to the 1,600-odd institutions a telegram stating that "unexpected developments require cancellation" of the Bulletin of June 10. "Alternative procedures," it said, were "under consideration and will be announced as soon as possible."

The very next day, the Office of Education sent another telegram to the same list. This one read in part: "Reverse night letter dated June 24. . . . Procedures outlined in . . . Bulletin . . . will be implemented July 1. Forms in transit for programs involved."

"This sequence of events . . .," the committee concluded, "indicates that there is at the very best a deplorable lack of intramural communication in HEW. It bespeaks a condition which must inevitably produce waste of time, effort, and money, and a loss of confidence, by those who must deal with it, in a great and important department of the government."

What was referred to as "a want of consistency" was also turned up by the committee's examination of the question of whether grant funds may be used to purchase equipment, and, if so, who then owns it. However, before the committee could deal with this matter, "it found itself under the need to determine the meaning of 'equipment.' " It might be thought that this would be a relatively simple matter, but when the returns were in from 85 or so responding agencies, the committee found that "equipment" is categorized as permanent, major, capital, standard, movable, special, nonexpendable, and expendable; "and then," the committee reported, "there appeared 'supplies,' which could sometimes not be distinguished from one form or another of 'equipment.' " Needless to say, the committee found a diversity of regulations and practices, and concluded its discussion of the subject with a question that gives pause: "If a structure to house a project, built on the spot, is a 'facility' subject to Public Law 87–98, does that same structure become 'equipment' disposable under Public Law 85–934 if it is prefabricated elsewhere and assembled on that spot?"

In an aside on the public relations aspects of federal support for science, the Elliott Committee took a swipe at university news offices that are pleased to tell the public about their institutions' research activities but fail to mention that it is the federal government that is paying for those activities. The committee pointed out that, since 1958, Columbia University's Lamont Geological Laboratory has received $6.5 million from the Office of Naval Research, but that, in its news releases on activities of its oceanographic ship, the Laboratory "succeeded in delivering the clear implication that Columbia University, by its unaided efforts, was solely responsible for the financing of the vessel and its scientific expeditions." The committee acknowledged that it might prove difficult for a federal agency to insist that it get due mention

Table 2. Ratings of federal grantor agencies by grantee institutions responding to request to "Indicate level of satisfaction." Numbers are percentages.

Agency	Administrative red tape			Reporting requirements			Budget details and negotiating			Length of decision-making			Fairness of selection process		
	Excellent	Reasonable	Difficult	Excellent	Reasonable	Difficult	Excellent	Reasonable	Difficult	Excellent	Reasonable	Difficult	Excellent	Reasonable	Difficult
Department of Agriculture	48	45	7	45	52	3	41	53	6	45	49	6	56	44	
Cooperative State Research	65	26	9	57	39	4	68	32		68	27	5	71	29	
Agricultural Research	33	56	11	41	59		32	56	12	32	60	8	50	50	
Forest Service	52	43	5	40	55	5	47	42	11	47	48	5	58	42	
Department of Commerce	41	52	7	41	49	10	24	68	8	24	72	4	41	56	3
Department of Defense	31	55	14	37	55	8	32	56	12	22	63	14	40	55	5
Air Force	25	60	15	36	58	6	23	60	17	19	64	17	35	59	6
Army	23	57	20	28	62	10	25	61	14	18	70	12	39	57	4
Navy	41	53	6	46	50	4	44	51	5	28	60	12	46	49	5
Advanced Research Projects Agency	61	33	6	56	33	11	56	39	5	37	53	10	47	53	
Department of Health, Education, and Welfare	29	54	17	34	55	11	35	53	12	28	64	8	45	51	4
Office of Education	34	54	12	39	57	4	37	52	11	34	57	9	45	51	4
Office of Vocational Rehabilitation	25	63	12	25	61	14	24	62	14	22	63	15	43	54	3
National Institutes of Health	29	52	19	37	52	12	40	50	10	29	64	7	45	51	4
Other Public Health Service	24	47	29	34	53	13	36	49	15	29	64	7	53	46	1
Social Security	38	57	5	24	76		24	67	9	19	76	5	50	44	6
Department of the Interior	36	55	9	38	59	3	29	62	9	25	63	12	34	61	5
Department of State	27	27	47	31	55	14	24	41	35	18	32	50	42	42	16
Atomic Energy Commission	46	45	9	46	49	5	47	48	5	38	58	4	49	49	2
Housing and Home Finance Agency	40	52	8	38	58	4	35	61	4	43	57		59	41	
National Aeronautics and Space Administration	23	61	16	37	51	12	23	65	12	13	45	42	34	44	22
National Science Foundation	50	46	4	53	43	8	47	49	4	34	58	8	50	43	7

in news releases, but it expressed the conviction that the "public ought to know, when a newsworthy development occurs during a research project, that their tax moneys contributed to it, and how much."

Having surveyed the manner in which the federal agencies operate, the committee next turned to the receiving end of the grants process and asked 1400 universities for comments. As might have been expected, there were many complaints, criticisms, and suggestions for improving the system. These included a proposal, from "the assistant research coordinator of a small State university," to the effect that grant applications should contain neither the name of the investigator nor his institution. "This procedure," it was stated, "would make it easier for a young scientist to get support for a meritorious project, as well as keep some established scientists on their toes in planning research." The committee, while describing itself as "sympathetic," concluded that "such a 'faceless application' system . . . could fast devolve into a word game for 'brochuresmen'." And, in what may have been a laymen's bow to the mysteries of science, it added, "It is not uncommon to find the most gifted researchers writing the vaguest of research designs or proposals, and producing brilliant results."

A number of institutions made pleas for the establishment of programs to provide small and administratively simple grants. (In examining this suggestion, the committee noted that, in fiscal 1959, NIH awarded 9166 grants, averaging $15,569 each; in fiscal 1963 it awarded 15,230 grants, averaging $28,287 each.)

There were also pleas for administrative uniformity among the agencies supporting research, for reducing paper work, for permitting greater flexibility once a grant is awarded, and for speeding up the decision-making process on grant applications. But the remarkable thing is that when the institutions were asked to express their "level of satisfaction" in reference to the administrative practices of the granting agencies, they overwhelmingly indicated that they are quite satisfied.

Table 2, which is a tabulation of these responses, is based upon approximately 1000 replies from questionnaires sent to 1400 institutions. Since the questionnaire was sent to the president of the institution and in most cases was filled out by him or by the director of research or the business manager, the responses may not accurately reflect the viewpoint of the man at the lab bench, but it appears to say that at least the administrative levels feel they can live with present procedures. For example, only 19 percent found NIH "difficult" in matters summed up under the heading of "administrative red tape." Ninety-two percent found NSF "excellent" or "reasonable" in "length of decision-making." And, in "fairness of selection process," 22 percent termed NASA "difficult," but all the other major research supporting agencies were marked excellent or reasonable by more than 90 percent of the respondents on the "fairness" question. The grant process should of course be improved wherever possible, but it is difficult to see how these responses can be reconciled with the view that the system is overwhelmed by administrative problems.

On the longstanding problem of overhead allowances, the committee noted "inconsistent and sometimes conflicting rules and practices." And it proposed that matters be simplified by uniform use of the Bureau of the Budget's overhead regulations. In addition, it proposed a system under which an institution could elect to receive a flat 15 percent applied to total direct costs, without itemized justification, rather than itemizing the overhead to qualify for the existing 20 percent maximum.

In concluding its survey of the administration of grants, the committee came forth with a number of recommendations. It strongly supported strengthening of the Science Information Exchange, which is operated by the Smithsonian Institution, as a means for reducing unnecessary duplication and spreading information about research activities. It also recommended that every federal research grant be listed in a "central catalog or docket" in each House of Congress, and "reproduced in some general publication," and that all grants be reported to the congressional committees with jurisdiction over the granting agency. This might seem to be a fairly radical proposal, with implications for encouraging Congress to play a larger role in the details of science administration. But the fact is that any member or committee inclined to play such a role can easily obtain a rundown on who is getting grants for what, simply by pulling together a number of separately issued publications. It would simplify matters to have it all in one binder, and it might possibly encourage improved cooperation among the federal agencies, but Congressmen and their staffs are now inundated with government reports and other reading matter, and it is not likely that the proposed compilation, by itself, would foster any significant changes in Congress' relations with science.

At this point the future of the Elliott Committee remains in doubt. The resolution that established the committee expires at the end of this year, and Elliott himself will depart Congress at the end of the session as the result of his defeat in the Alabama primary. There is no sign that any of his four Democratic colleagues on the committee are interested in taking on the chairmanship. —D. S. GREENBERG

Research Indemnification: New VA "Insurance" Policy Offers Greater Security to Researchers

Although medical research has expanded rapidly in recent years, a legal framework governing research involving human patients has developed more slowly and unevenly. The absence of a legal structure has left not only researchers but all connected with a research project uncomfortably vulnerable to legal action arising from the conduct of an experiment, and in some cases it has actually hindered research. Some government agencies, notably the Department of Defense and the National Institutes of Health, have taken steps to protect their programs by indemnifying their contractors against claims growing out of a research project. A bill just passed by Congress and now awaiting the President's signature provides to contractors of the Veterans' Administration the same degree of security now afforded contractors of the other agencies. The bill, requested by the VA, gives the agency the authority it has heretofore lacked to indemnify contractors involved in experimental research on human subjects.

In recent years, the VA has encountered some difficulty in obtaining equipment or drugs for research purposes, apparently because of the fear among suppliers that they could be held liable for death or injury resulting from use of the material in question. While the law on the subject is not clearcut, the timidity of drug and device suppliers has increased recently because of the implications of a series

(Continued on page 848)