Letters

Government Grants: Their Effect on Universities

M. King Hubbert's rebuttal of Lee A. DuBridge's letter on the percentage of university income represented by government grants [*Science* **140**, 717 (10 May 1963)] is admirable but it leaves a couple of things unsaid.

In some ways DuBridge's figures are more alarming than Hubbert's. From DuBridge's table (p. 573) we note that 58 percent of the on-campus operating budget at Massachusetts Institute of Technology comes in the form of government grants. The corresponding figures at Princeton are 55 percent and at California Institute of Technology, 38 percent. Whereas government grants represent only 24 percent of the total operating budget at Stanford University, they represent 33 percent at Palo Alto—from which I conclude that Stanford uses federal money for its educational program but spends its own money for off-campus research.

I am not sure that analyzing the situation in percentages is a very fruitful approach. If university "X" is adequately maintaining its educational program on an income of $50 million, an additional $100 million provided by the government for some other purpose should not affect the adequacy of the program still maintained by the $50 million, even though 67 percent of the university's budget would then be represented by federal grants.

What disturbs me is that neither of these analyses adequately shows how the inclusion of grant money gives a misleading picture of the financial condition of the universities. An analysis should be made therefore of the data from Hubbert's table, which is shown here in Table 1.

Judging by the total income, the California Institute of Technology ranks with Harvard, but judging by the amount of income not dedicated to specific research projects and thus available for faculty salaries, teaching assistantships, teaching equipment, classrooms and so on, C.I.T. is little better off than Rice.

Even more instructive is the comparison between C.I.T. and Princeton. Let us say that a prospective graduate student has his choice of two equally eminent men to work under, one at C.I.T. and the other at Princeton. Is he better off going to C.I.T. which has three times as much money in government grants as Princeton? Or going to Princeton, which has twice as much income for pedagogic use?

The point is not to elicit comment from the supporters or detractors of either of these worthy institutions but to raise the question of the degree to which universities should regard grant support of research projects as aids to graduate education. Admitting that there is a large overlap, should we assume that faculty research and graduate education are the same thing?

Table 1. The data from Hubbert's table. [*Geol. Soc. Am. Bull.* **74**, 365 (1963), table 1. This version has the corrected figures for Yale University.]

University	Total income ($)	Income from contracts ($)	Amount income not from contracts ($)
C.I.T.	60,675,342	53,600,442	7,074,900
M.I.T.	101,386,000	67,276,000	34,110,000
Chicago	103,771,777	61,531,262	42,240,515
Princeton	31,563,000	17,723,000	13,840,000
Harvard	67,292,489	16,307,946	50,984,543
Stanford	34,663,961	8,312,208	26,351,753
Yale	36,985,998	5,000,000	31,985,998
Rice	6,366,700	633,300	5,703,400

I do not think so, and if massive government grants have contributed to this belief, I would count that to be not the least of their baneful effects.

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A Stimulating Environment

I would like to add one more element, or factor, to those stated in your editorial defining the environment in which scientists are happy and work most effectively [*Science* **139**, 875 (8 March 1963)].

The factor I would add is an expressed interest on the part of the director, head, supervisor, or chief, in the individuals in his establishment and the work they are doing. Scientists respond delightfully, and delightedly, to an interest expressed in their particular project or piece of research—how are you coming, what's new, tell me how you are going at this problem, let me know how it comes out? It is not only the inquiry that elicits this response but the shared enthusiasm for something new or promising.

I believe scientists are buoyed up and sustained by this kind of genuine, personal interest on the part of their chief not because they are scientists but because they are human beings. They are simply reflecting something that resides deep within us all—a yearning to know that we are wanted, that what we are doing is worthwhile. This is a fundamental property of human beings—and all institutions reflect the quality and satisfaction of the people who run the institution and who do the work. The principle applies just as much to the stock clerk as it does to the most distinguished scientist. Roethlisberger discovered this principle some years ago in his justly celebrated Hawthorne experiment [F. J. Roethlisberger, *Management and Morale,* Harvard University Press, Cambridge, Mass., (1946)].

Finally, the interest shown must be not only genuine but stem from understanding. This is why scientists are happier and work better under the direction of another scientist. For only another scientist is likely to possess the understanding that can generate in him the effective interest.

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