Federal University-Laboratory

If the proposal of Weinberg [*Science* **136**, 27 (6 Apr. 1962)] that federal laboratories be converted into federal universities be adopted, I believe that Weinberg himself will preside over the demise of a national laboratory that is *now* a good place to do basic research and that it is *now* filling a unique niche in our national research effort. The national laboratories are institutions where nuclear research can be done through utilization of special facilities unencumbered by the usual fund-raising activities and endless committee duties that are found on a university campus. If the national laboratories were to become federal universities (and to undertake research in nonnuclear areas, as suggested by Weinberg on other occasions), would not the national laboratories become so large and cluttered by staff members whose primary responsibility was not in nuclear research that their present usefulness would be diluted to a point no greater than that of a university? There is no doubt in my mind (and evidence for the following view can be provided) that if the national laboratories were to become degree-granting institutions, nonresearch activities would be imposed upon the staff, as follows: development of classroom lectures; development of course work; development of laboratory courses; development of structures to relate the content of one course to that of another (that is, a curriculum committee); development of grading procedures (a grading committee); development of admission policies (an admissions committee); development of teaching opportunities for graduate students (an instructional committee); and perhaps development of administrative structures (deans and vice presidents). Even if a staff should be brought to the national laboratory site from an existing academic institution to handle these nonresearch duties, I cannot see that any increased, total number of graduate students could be trained without increasing the staff of both institutions.

This is not to say that national universities are not needed (how about international universities?), but rather to urge that such institutions be created from new sources, and not by a process whereby we are left with no national laboratories as we now know them.

CLAIRE J. SHELLABARGER
Zoology Department and *Medical School, University of Michigan, Ann Arbor*

I congratulate Alvin Weinberg for his article, "The federal laboratories and science education." It is an excellent suggestion for a policy that would not only increase the supply of scientists but also energize them. Weinberg's suggestion has that combination which someone characterized as the wonderful dialogue between teacher and student in which each transcends himself.

It seems appropriate to me that big users of the output of education (graduates) should reimburse the education bank for what they draw out. Smaller users, both private and public, probably can't practice this policy, but big users of high-talent manpower ought to establish at least an equilibrium position in their balance of payments with education. Better yet, some should deliberately get into a creditor position. Fortunately, a few companies seem to be doing just this. It is heartening to see the director of one of the top federal laboratories adopt a philosophy so essential to the long-run regeneration of talent.

It is good, too, that Weinberg took a straight-faced look at the implications his proposal has for getting the federal government further into graduate education. This debate (and there is bound to be one) can best be conducted with candor at the start. The fact is that federal big science is already involved, through research grants and contracts and through scholarships. The additional step, suggested by Weinberg, of recasting federal laboratories into combination graduate schools and research institutions is one that deserves discussion, to see if benefits will offset potential hazards.

WILLIAM J. PLATT
Management Sciences Division,
Stanford Research Institute,
Menlo Park, California

I certainly agree with Alvin Weinberg that the federal laboratories should play an increasing role in science education to help the 19 out of 20 qualified individuals who are not currently getting their doctorates in science. However, I doubt that the granting of graduate degrees by federal laboratories, as proposed, would do anything except divert graduate students from universities. Currently there are ample opportunities for every qualified college student to undertake graduate training. The problem is getting those 19 students to the point where they can undertake graduate training.

Expansion of the present programs

of the Oak Ridge National Laboratory that are concerned with science education and increased attention to the quality of high school science teaching in the South would be much more valuable than a graduate training program. In Tennessee there are few able science teachers in either the colleges or the high schools; this has been particularly true since the formation of Oak Ridge. One means of combatting the siphoning off of present and potential science teachers by federal laboratories such as Oak Ridge would be for these laboratories to supplement the salaries of high school science teachers and employ them during the summer months. Another suggestion is that some of the scientists currently employed by these laboratories be given a leave of absence, with full pay, to teach in neighboring small colleges and high schools each year.

JOHN N. FAIN
National Institutes of Health, Bethesda, Maryland

The suggestion by Weinberg that, by playing a greater role in education, big science can diminish the manpower shortage it has created is worthy of the most careful consideration. The counterpart to this suggestion, described below, may also warrant consideration.

It is widely recognized that big science is playing an ever-increasing role in the academic world. The effects of this role are not always wholesome; they include too frequently decreasing attention to teaching as the academician's research responsibilities increase. Aside from certain improvements in academic research management, it is suggested that big science in universities be organized into research institutes, somewhat like the federal laboratories described by Weinberg; from there on, the plans are similar.

Thus, the universities living with big science provide for dual roles: those academicians most capable as researchers emphasize the search for *new* truths; those most capable as teachers emphasize the presentation of truths. In only rare cases need an academician be only a researcher or only a teacher. Perhaps the researcher deals mostly with postdoctoral fellows and really advanced courses while the teacher works mostly with graduate and undergraduate students. The essence of the idea is the establishment of emphasis, frankly recognized, without the attempt to be all things to all men.

Many simplifications should derive

from such organization of academic activity, not the least of which would be clarification of the roles being played. It would no longer be necessary for the highly talented researcher to pose as a popular teacher for large groups of students, and vice versa. That all researchers are teachers is implicit, and this is exactly what Weinberg wishes to exploit. By organizing big science into research institutes on university campuses, the best in teaching *and* research would emerge.

R. C. BARD

200 Foxcatcher Lane,
Media, Pennsylvania

In his thoughtful letter Shellabarger makes several points, and I shall discuss them one by one.

1) He seems to imply that, because of the pressure of committee work and so on, modern American universities are fast becoming impossible places in which to do basic research or to educate graduate students. I think the situation is not as bad as Shellabarger suggests; certainly if so much of the average research professor's time is taken up with things not relevant to research, he must be getting support from NIH and NSF under false pretenses. Nor do I believe the teaching of bordering areas of science detracts from one's research potential; in general, I should think that teaching would add to this potential.

Actually, the adjoined or neighboring graduate school which I envisage is small, averaging about one or two graduate students per staff Ph.D. I cannot believe that so few graduate students could create an undue amount of busy work.

2) Shellabarger suggests that a cooperative arrangement with a graduate school would divert the federal laboratories from their primary missions. I have already dealt with this point in my article, but I will add the following: insofar as the mission is basic research, graduate students ought to help, not hinder, the laboratory to fulfill its mission. For applied research the problem is more complicated. One would have to move slowly and feel one's way; any scheme which reduces the ability of a national laboratory to move swiftly into important areas of development would be self-defeating. On this score our own experience with a branch of the M.I.T. Practice School has been most reassuring.

3) I have no intention of presiding over the demise of any institution, least

of all the Oak Ridge National Laboratory. There already are federal laboratories in this country, notably the Lawrence Radiation Laboratory, that follow a variant of the pattern suggested in my article. In Europe, especially in the Soviet Union, the pattern seems to be a good deal more prevalent than here. The experience of these institutions leads me to believe that such university-laboratory arrangements are fundamentally sound.

ALVIN M. WEINBERG
Oak Ridge National Laboratory, Oak Ridge, Tennessee

Civil Service Salaries

I agree in principle with the view expressed in the editorial "Federal pay reform" in a recent issue of *Science* [**136**, 461 (11 May 1962)] but do not feel that it would be appropriate for me, as a federal employee, to comment upon the recommendations in detail. However, I would like to point out a factual error, which tends to give a somewhat poorer picture of the present situation than is actually justified.

The current salary range of a GS-7 position is $5355 to $6345 (not counting longevity increases) rather than an average of $5280, as stated in the editorial. In addition, since July 1960, most physical scientists and engineers and many biologists and scientists of other types at the GS-7 level have been paid the maximum salary—namely, $6345. Therefore, at the lower levels (recent college graduates), Civil Service salaries for scientists are reasonably comparable with salaries in private industry.

BENJAMIN LEPSON
Numerical Analysis Branch, U.S. Naval Research Laboratory, Washington, D.C.

NASA's Fellowship Program

The piece in a recent issue by Daniel S. Greenberg on NASA's new fellowship program [*Science* **136**, 305 (27 Apr. 1962)] contains two excellent points—namely, that the Executive branch of the federal government should bring more information, coherence, and rationality to its multitudinous fellowship programs and that the Congress should consider more positively the need for support below the graduate