Letters

Student-Teacher Interaction

Philip Abelson's editorial (3 Mar., p. 947) accuses the government of meddling in higher education because its cutback of fellowship funding is allegedly hitting the "Cartter" schools harder than others—not because its earlier policies encouraged an untenable expansion of graduate programs. He further suggests that it is in these prestige schools that students receive "good training and the stimulus of interaction with a sufficiently large group (critical mass) of their peers."

Many students have chosen to do their graduate work at "Cartter" schools because in the past the prestige has guaranteed them a good job. It is their misfortune, and ours, that past federal funding, together with prestige-seeking publish-or-perish policies (and professors) encouraged such large research groups that graduate students have, indeed, often been trained by their fellow students and by postdoctoral students. It is a pity that so many have not been educated through close interaction with a mature investigator. Some of these former apprentices to apprentices are obtaining positions in "un-Carttered" institutions, and the more adaptable are transcending their often useless technical expertise and educating themselves under the stimulus of contact with students and colleagues outside their often narrow specialty. Hopefully this will encourage cross-disciplinary endeavors, and widespread federal support at moderate levels will enable these young faculty and their colleagues to truly educate small groups of budding scientists.

John Walsh's report (News and Comment, 3 Mar., p. 973) points out that the research excellence of the little Carlsberg Laboratory has clearly depended upon the leadership of a few investigators like Lang, who interacted closely enough with his postdoctoral students to "turn a good idea into a terrific idea." The same kind of interactions that produce good science at the postdoctoral level, and at the undergraduate level, can be expected to produce it at the doctoral level as well. The inexperienced want and need close contact with an experienced and creative investigator, one whose judgments they can see in the making and compare with their own. The really critical "critical mass" in university science at all levels is that of one human mind, the mind of a creative scientist desiring to work closely with a few of his fellow men.

Congress would do well to insist that federal fellowship funds be denied university investigators whose research groups comprise more than a very small number of people—a number small enough to ensure that each student in the group receives several hours of personal attention from the faculty member each week.

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The Uses of Knowledge

In his article "Can science survive in the modern age?" (1 Oct. 1971, p. 21), Harvey Brooks describes an "extreme view" which "argues that new knowledge can always be more readily used by those with political and economic power, therefore knowledge inevitably leads to concentration of power and is thus inherently evil, at least in the present arrangements of society."

From the general tenor of Brooks's article, I assume that he does not accept this "extreme" argument, yet having raised it, he nowhere attempts to refute it. Is his silence the silence of assent? Does he accept this proposition as self-evident (which it seems to me it indeed is)? If not, perhaps Brooks will provide us with two or three nontrivial examples of new knowledge in the 20th century that has resulted in the equalization of power between the possessing and the nonpossessing nations, or between those who own the means of production and those who labor for them or are unemployed. If no such examples exist, if new knowledge leads "inevitably" (Brooks's word) to the further concentration of power in the hands of the powerful, what is the meaning of the distinction between knowledge and the use of knowledge that Brooks and other liberal commentators are at such pains to draw? If the concentration of power is really the inevitable consequence of science, then what is the meaning, except in some curious metaphysical sense, of the "neutrality" of science? Why should we distinguish science from its effects, if those effects are "inevitable"? Is the pursuit of new knowledge, irrespective of its social consequences, a *religious* value, transcending mere earthly suffering, a good in itself? If that is all the excuse that science can offer for itself, it will be swept away by the suffering indignation of its human sacrifices.

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Brooks states that since the scientific revolution, every political revolution in the West has attempted to ally itself with science. However, this is not the case; the Nazi revolution of 1933 in Germany was extremely antiscientific and antirational, and many people were intoxicated with its criminal attitude. The consequences are well known. The only way out of the present situation is to come to a real and honest synthesis between "the new social priorities" and modern science, including modern fundamental science not "relevant to society."

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Lewontin is quite right in assuming that I rejected the extreme argument he appears to regard as self-evident. In fact I assumed that the argument was so self-evidently absurd as to not require explicit refutation, or even serious discussion, certainly to a scientific audience. In any event, silence on my part was not intended to imply assent.

Implicit in Lewontin's letter is an assumption that we are dealing with a zero-sum game in which every scientific