Letters

In a Democracy: The Privilege To Pursue the Inner Logic

Herrnstein's eloquent statement of the importance of being unimportant (Letters, 24 May): "The basic researcher may be wise to put considerations of importance out of his mind and attend instead to the inner logic of the subject he is studying" deserves a far wider echo than it is likely to receive in the mission-oriented climate of today. For the freedom to pursue the inner logic of one's subject—particularly if the subject is not in vogue—is still unnecessarily hard to come by. And this despite the overwhelming historical evidence that true innovation—as opposed to technological advancement—rests almost solely on those who had or took such freedom.

On closer examination the existing state of affairs is hardly surprising, because the freedom that Herrnstein calls for is often thought of as not merely foreign, but outright inimical to the very basic precepts of the egalitarian society in which we live. In a world in which all men are supposed to be created equal, we are bound to respect and support performance, not individuals. Thus, every individual must perform in some way that we can all judge and he must be held continuously accountable. Freedom to pursue the inner logic of one's subject is equated with freedom from accountability to one's fellowmen. Worse yet, it must be accorded *so that* the individual may perform, which necessarily means—*before* he has performed. This puts him into a privileged position....

Few will seriously question that a federal judge needs autonomy and security to do his job properly or that providing such autonomy and security is a proper use of public funds. Few will argue that the institution of federal judgeships is undemocratic as long as the road to a judgeship is, in principle at least, open to all. Why then the outcries against the scientist? Perhaps there is not sufficient recognition that just as the federal judge is a guardian of our constitution, the serious scientist is a guardian of our civilization. Autonomy and security are essential for him to do his job properly and there should be no objections *of principle* in according them to him. Practice, to be sure, is another matter. But a few bad scientists no more invalidate the point than a few bad judges. We will do well to remind ourselves that we live in a world which still rests largely on individual wisdom. Wisdom indeed dictates that we learn the lessons of history and place greater trust in individuals and less trust in our criteria of their performance. Such trust extended privately or publicly has proved essential in the past. There is as yet no reason to expect that it is not essential for the future.

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Nods from Author and Reviewer

While reading David Krech's review of my book *The Ghost in the Machine*, I had the distinct impression of being decapitated by a guillotine and subsequently administered an affectionate kiss of life (10 May, p. 649). But I do protest against Krech's reproach that I have neglected psycholinguistics and brain research. The entire second chapter of the book ("The chain of words and the tree of language," pp. 19–44) is devoted to psycholinguistics, and the entire 16th chapter ("The three brains," pp. 267–296) to brain research. I am an old admirer of Krech, and even Homer may nod—but through 57 pages?

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As a practicing polemicist I regret that I cannot (with honesty) take advantage of the opening Arthur Koestler provides when he asks whether anyone could nod through 57 pages of his. Koestler in his book induces interest, thought, and irritation for 384 pages. But drowsiness? No, not even for 57.

I *had* read the disputed 57 pages, and in my review I had discussed "The three brains" (even by name). As for "The chain of words and the tree of language," one might be tempted to ask: "This is psycholinguistics?" But I had hoped—because I admire Koestler so much and (*vide supra*) he, me—that I would not have to give chapter and verse for the few gentle reproaches which found their way into my review of his book. Nor will I even now.

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Pursuit of Women at Yale

I was intrigued by Boffey's implication that my fellow deans suspect me of "pursuing female graduate students" with greater zeal this year than formerly ("The draft: Grad schools, students feel impact of new regulations," 7 June, p. 1088). This "bastion of male supremacy" has "pursued" female graduate students ever since 1892. For the last 10 years, women have represented between 20 and 23 percent of our enrollment. Of all offers of admission this year, 27 percent were made to women compared to 26 percent last year. It would appear, therefore, that the ardor with which we "pursue" women has not been significantly affected by the draft of men.

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IBP: International Goals

Several statements in Boffey's report, "International Biological Program suffers another setback" (24 May, p. 865), while referring to the current situation in the United States, might be interpreted as having wider application. This is particularly so if statements are quoted out of context, such as "[it was] questioned whether the IBP can achieve the rather grandiose goals that have come to be associated with it."

The United States is not, of course, the only country where money is at present in short supply, and there are few in which progress in carrying out

agreed national IBP plans is not retarded through lack of funds. But there are now 55 countries which formally participate in this program, and a number of others which make contributions thereto. Although the national programs of most are relatively modest compared with that of the U.S., many of their projects have already been in operation for several years, and results are beginning to come forward. A comprehensive index of national projects, which will be published shortly, includes more than 1500 entries classified under the seven main section headings and some 50 themes of the agreed international program.

Take the theme, for example, of the grassland ecosystems of the world: the largest study yet proposed and already underway is the Matador Project in Canada, and there are 40 other grassland projects of some 20 other countries. One of the biggest, in Colorado, will now go forward with a grant of $350,000 from the National Science Foundation. The U.S. is also a major contributor to a coordinated program on the study of human adaptability to living in the Arctic zone. It would be highly regrettable if U.S. scientists had to defer scheduled studies of certain Eskimo populations, but this would not stop other countries which contribute to this particular theme, namely Canada, Denmark, Finland, France, and Sweden, from continuing their parallel investigations on Eskimos, Scolt Lapps, and other Arctic peoples.

The U.S. plans for new biological research under IBP have been carefully developed by many leading scientists, under the guidance of Roger Revelle and Frank Blair as successive chairmen of the national IBP committee. To withdraw or defer these plans will obviously retard, but will not necessarily prevent, the achievement of IBP in reaching its goals. I am sure that all other participating countries, as well as IBP international, trust that ways will be found through the present financial impasse.

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Mathematics: Catalyst to Science

The National Study of Mathematics Requirements for Scientists and Engineers survey reported by G. H. Miller (17 May, p. 742) provides some interesting facts, but omits many others. . . . My major disagreements with the study are:

1) It has assumed that science in the future will consist simply of more people doing the same things being done today. The scientists responding to the survey were reporting on methods they have found to be useful for the problems they have solved. Scientists in the future will be working on problems which are not yet solved; problems for which present methods have not worked. We wish education to prepare scientists to walk new paths, not to retrace the old ones. The history of the partnership of science and mathematics has one lesson: that mathematics has contributed to science with a success fantastically beyond what could be reasonably expected. No one understands why. But certainly, by this time, scientists should expect that great contributions will be made by parts of mathematics which appear, at first glance, to be irrelevant. These contributions, however, can only come about if there are scientists who know and appreciate the mathematics.

2) The questions about use of course content are off the point. The important aspects of mathematics courses are the habits of thought, the ways of approaching problems, the attitudes. For example, although I now work with problems of systems analysis and electromagnetic phenomena, my Ph.D. research and 2 years of teaching experience were in pure abstract algebra. The thought patterns I developed in abstract algebra allow me many insights and a freshness of approach not available to my colleagues. Thus, I "use my algebra" every day, even though I rarely use any of the "content" of abstract algebra.

Most of the theoretical work in organic chemistry and zoology, which were mentioned by Miller as having "less need for advanced mathematics," is in fact almost identical in spirit and technique with much of modern algebra and combinatorial topology. I am dismayed that the scientists in these fields don't seem to know that.

3) For this survey to be meaningful, it needs to be compared with surveys of other groups of scientists, notably (i) scientists who have been successful in the managerial, political, and educational areas of science, rather than being successful researchers in their own right; and (ii) scientists who have not been very productive. The last group would include, for example,