

Letters

Shapiro's Defection

As responsible biological scientists with a concern for the society in which we live and flourish, and cognizant of the problems which face that society, we endorse the active participation by colleagues in the body politic of our times. Nevertheless, we take strong exception to the attitudes of James Shapiro and the uncritical way in which they were extolled ("Harvard genetics researcher quits science for politics," 13 Feb., p. 963). This article does American scientists and the cause of science in our country a grave injustice.

First, to put two points in perspective: the nature of the accomplishment of Beckwith's group, the isolation of a gene, represents a fine example of genetic engineering, but it certainly is not a significant advance of fundamental knowledge. It is rather a technical feat that depended upon a large effort by many scientists in several countries working over many years to understand the basic genetic mechanisms of viruses and their hosts. Second, it should be appreciated that the knowledge and tools for employing genetic engineering to modify heritable characteristics of higher organisms, including man, are not now available and are likely not to be much before the end of this century. Thus, it is a gross exaggeration that this work can, now or very soon, lead to adverse social consequences, as has been implied by Shapiro and others. Moreover, responsible scientists have begun to give serious and learned attention to such problems of the future.

Indeed, the specter of fear of science (and knowledge in general) that Shapiro and others are raising is not a phenomenon peculiar to our times and our society. The suspicion of knowledge and the subversion of science to the needs of the state are dangerous attitudes that have plagued man for centuries. Were not these the factors leading to the demise of Socrates, to the Dark Ages, and to the persecutions of Galileo? Did not men fear the ideas of Darwin and

Freud? And in this century we have witnessed the destruction of German biochemistry and physics, and of Soviet genetics because they served the state according to the prevailing wind.

If the quest for knowledge has brought us the atom and hydrogen bombs, it has also led to the electric light and the atomic power plant; if bacterial warfare is an outgrowth of modern biology, so is freedom from the scourges of malaria, tuberculosis, and polio. No doubt, the delivery of health care requires substantial improvement in our country, but what, in fact, can we now deliver other than palliative treatment for heart and circulatory diseases, and for malignancies? Can the subversion of basic science for the application of knowledge we have at hand provide the panaceas we require? Do these problems "need political solutions more urgently than scientific ones"?

We recognize that the increase of scientific knowledge carries the burden of civilizing man for the better use of that knowledge, and that scientists must carry some of this burden. But the fear and rejection of new knowledge provides no solution, not even a temporary one, and only makes for stagnation and decay of the human spirit. The determination of priorities in scientific research is a very difficult matter on which few can claim special insights; and the needs and plagues of our times deserve important consideration. But it must be realized that knowledge per se is the ultimate source for dealing with such problems, and therefore requires continuing expansion. It is hard to cite an example of an applied problem that has been faced directly and solved, in the absence of prior fundamental knowledge; and it would be foolhardy to think that we now have in our hands all the understanding necessary to cope with the problems of health and environmental pollution.

In view of all this, the thesis that the entire community has the capacity and scientific sophistication to arrive at priorities for basic scientific research is

unacceptable. Admittedly, society as a whole must decide how to distribute its resources, and what the applied problems are; and responsible scientists can contribute to those decisions. But the nature of fundamental knowledge, and the processes of discovery are such that our society as a whole is ill-equipped to decide the directions of basic research; indeed even scientists are at times. If physicists of 1890 had attempted this, the notions of the quantum, of the modern atom, and of relativity could not have been foreseen; and as late as 1940, the illuminating and simple ideas of molecular biology were not in the offing. Thus, it would be as much a mistake to try to have the whole society dictate the directions of basic research, as to have scientists exclusively decide the directions of applied research.

It may be worth noting, finally, that the choice of active participation in the social aspects of science is one that some scientists will make; others will not, and so it is with citizens at large. Shapiro has chosen to do so; it is his privilege and his opportunity, but it represents no sacrifice.

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Glassman states that "even the older, more conservative scientists will have to agree that Shapiro has made a large sacrifice in an effort to get the word across." I would question that the definition of large sacrifice is doing what one desires most to do. If Shapiro really wanted to make a large sacrifice, he might donate the inheritance from which he is living to the health care of the poor. In this way he would be making a substantive contribution to increasing the general well-being of the economically disadvantaged. Of course, if he did this, he would then have to work in order to support himself. However, this would also be an advantage since it would afford him the opportunity to empathize more closely with the vast numbers of "workers" in this country. . . .

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. . . Those who reject the scientific "establishment" apparently share the contemporary conviction that social, economic, and political conditions can only be improved by radical change. Although I cannot agree to the abandonment of science because it "could be perverted and used for evil purposes," I cannot find fault with James Shapiro's decision to forsake a promising scientific career for activism consistent with such ideology.

I do find fault, however, with James K. Glassman's decision to abandon a career of accurate reporting with a number of misleading statements; for example: "The original site [of the Affiliated Hospitals Center] was abandoned, largely because of student protests that use of the site would mean displacement of 180 black families." The original plans for the Center were rejected because of serious financial problems, according to F. Stanton Deland, president of the board of trustees of the A.H.C. Those plans did require the removal of 180 units from the housing market, but less than half that number were occupied by families and few of those were black families. These and other relevant facts appear, among other places, in past issues of the *Harvard Crimson*, which Glassman obviously does not read although he was a Harvard student and it is the students' newspaper.

The land Harvard owns in Boston was not purchased for investment purposes but for the construction of health or educational facilities, and for student housing. Responsible officials of both Boston and Cambridge have urged Harvard to reduce its impact on the urban market by housing its own students. The Harvard Corporation, accordingly, committed itself to construction of 1100 units of new housing—including sufficient new housing to replace that on land to be used for the construction of modern health facilities. Some issues such as where the replacement housing will be constructed and what rents will be are unresolved. This is not to say, however, that officials are not discussing the appropriate issues with the residents of Harvard-owned housing.

Social problems are no longer only problems but often are made political issues. The politicalization of a problem can obstruct even the best efforts to seek rational solutions. Harvard is actively seeking to minimize its impact on Boston's crowded housing market. An effort of the size proposed must

include concern for the needs of many groups—married students, employees, and the community-at-large as well as the 180 tenants of Harvard-owned housing. Replacement housing is another issue and Harvard has placed the needs of present tenants above those of other groups. It is one thing for present residents to negotiate issues that affect only them; it is something else for one group to determine Harvard's total housing effort in Boston.

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Esthetics of Asymmetry

In his alternate explanation of some studies regarding Trinity Chapel in Canterbury Cathedral, Barmore concluded that the deviation of the nave axis from the choir axis resulted from an error by the builder (7 Nov., p. 772), and stated that such errors are common even now: that the axis of the nave of Washington Cathedral deviates from the axis of the choir by about 2°.

The deviation of the Washington Cathedral nave axis from the choir axis was laid out by Philip Hubert Frohman, F.A.I.A., our cathedral architect who is still living. The deviation was created intentionally without the slightest degree of error and was done for esthetic reasons to enhance the visitor's view when entering the eventual west portal doors. It would be an insult to the George A. Fuller Company, builders of this cathedral since 1910, to think that their engineers had not the ability to lay out axis lines correctly. The offset of the nave axis to the choir axes is 1 in 48. This results in an angle of 1°11'38". When the center section of the west portal doors are built, their center point will be 5 feet 7 45/64 inches north of the projected axis of the choir.

Iconographers and clergy frequently like to assume that a broken axis in a cathedral represents the broken or hanging body of Christ from the cross. This has nothing to do with the fact in Washington Cathedral. The architect planned it to give, in his judgment, the best visual perspective and prevent the converging of lines at the east end of the cathedral, such as one sees on distant railroad tracks.

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Defense of Science

Weinberg, in his article "In defense of science" (9 Jan., p. 141), refers to scientific muckrakers as journalists who "see corruption in the scientific-political system" and suggests that "it would be more accurate to say their sensibilities are hurt by the existence of a scientific politics."

In deciding what is "accurate" surely it will not suffice to raise issues of "corruption," "self-service," and "venality" without addressing them seriously. In deciding what is accurate it is pertinent to ponder the results (1) of a survey of "Scientists' Views on Ethics and Responsibilities" conducted in 1967 among AAAS members by an ad hoc study group under the chairmanship of Anatol Rapaport. This survey showed strong support for a code of ethics and responsibility for practicing scientists, analogous to codes which govern some other professions (medicine and law). Specifically there was very strong support for the creation of procedures to deal with cases of alleged plagiarism.

A valid "defense of science" requires special objectivity in collecting and weighing evidence which is allegedly adverse to the scientific community, and a vigorous implementation of solutions to bona fide internal problems. Shouldn't this be one of the first of the responsibilities for social engineering to which Weinberg says scientists and technologists should address themselves?

What has happened to the AAAS ad hoc study group which did the "Study of Scientists' Views on Ethics and Responsibilities"? What is being done to implement the findings? When do we start?

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Reference

1. L. Cranberg, *Bull. At. Sci.* 24, 39 (1968).

Latin America: Bedeviled Science

Nussenzweig in "Migration of scientists from Latin America" (26 Sept., p. 1328) has presented a discouraging picture of the technical and political problems of research and teaching in Latin America. I participated in the First Latin American Solid State Physics Institute in January 1969 and was able to visit a number of Latin American