Letters

Protection of Human Subjects

In his editorial "Regulation of human experimentation" (21 Dec. 1973, p. 1203) Amitai Etzioni argues that the prevention of "abuses" by researchers using human subjects should be left in the hands of scientists rather than transferred to the federal government. I believe this presents a misleading dichotomy of choices and overlooks some major problems with "voluntary" control by researchers.

Etzioni argues that scientists should do the regulating because "a lay person can hardly distinguish between [the transgressors] and the overwhelming majority of ethical scientists." The sad fact, as documented by Barber *et al.*, in *Research on Human Subjects* (*1*), cited by Etzioni, is that scientists are equally unable to distinguish between their "ethical" and "unethical" colleagues. Research in violation of scientific and humanistic norms has been carried out despite professional "codes of ethics" and without professional censure since the dawn of human experimentation up to the present day.

Etzioni's second argument is that federal supervision of human research of the type encompassed in Senator Kennedy's "tough regulatory bill" may "unduly bureaucratize or hobble science." Yet his alternative is for the scientific community to establish local review committees, regional appeal boards, and a nationwide board with persons of "national stature." Such a structure is, on paper at least, no more or less bureaucratic than the one adopted by the Senate.

Rather than attack federal "intervention" in the ethics of research, the scientific community should devote its efforts to making sure that such regulation is wise and efficacious. The committees that review human research at most institutions have come about as a result of regulations laid down by the Department of Health, Education, and Welfare and the Food and Drug Administration over the past 8 years. Their less than complete success can be laid at the door of science as much as at the doors of these regulatory bodies.

What is needed, then, is cooperation between the "insiders" and the "outsiders" in the research process. This would entail, for example, a greater willingness to raise and discuss ethical issues in classroom and clinical teaching, and to recognize that time spent in the review process on "ethical" matters is as important to the success of the venture as that spent on the "scientific" aspects. Indeed it may involve the realization that the two areas are nearly inseparable—that misuse of human subjects can inject error into research results and that "bad science" (that is, poorly designed or pointless studies) is the most "unethical" kind of research. As Etzioni rightly notes, such considerations extend beyond "federally funded programs," and the process will need the participation of other disciplines and representatives of the subject pool as well. The aim ought not to be to create a top-heavy national superstructure, under either governmental or scientific egis, but to devote careful attention on the local level to the merit of research protocols and to the means by which subjects are selected and their "informed consent" is actually obtained.

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References

1. B. Barber, J. Lally, J. L. Makarushka, D. Sullivan, *Research on Human Subjects* (Russell Sage Foundation, New York, 1973).

I see a need for government control —as a last resort. (My editorial closed: "If the scientific community does not act, government regulations will and should follow.") Recent experiences remind us all that government is a very dangerous tool, and the story has only been partially told. (State and local abuses far exceed federal ones, now in the limelight.)

Second, I did not call for scientists to control themselves but for review committees "composed of scientists; persons from other academic disciplines, such as humanities, law, theology; and some representatives of the subjects themselves." Actually, Capron's position and mine are rather close. The main point is that, at the moment, voluntary controls are not being set up, and both Senator Mondale's and Senator Kennedy's bills are stalled.

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Fuel Technology Directory

I am compiling an informal directory of all university departments and institutes (and the names of the relevant faculty members) that offer or plan to offer courses on industrial fuels and related topics—a subject best described as fuel technology or fuels science and engineering. This listing is prompted by the dramatic increase in the number of inquiries we have had in the last few months from industries looking for graduates with training in fuel technology. This is a consequence of the developing energy famine and industry's greater need for specialists who are familiar with fuels and fuel utilization.

Fuel technology is primarily concerned with the utilization of fossil fuels and their manufactured and related derivatives. It includes the study of coal, oil, and gas—their sources and reserves, physical and chemical properties, and methods of analysis and structure determination. The subject is vast and is relevant to many scientific and engineering specialties, including ceramic science and metallurgy, in addition to chemical and mechanical engineering.

At present there may be only two universities in the country that even attempt to cover all of the aspects of fuel technology, but the market for graduates in this area is rapidly growing, and it is expected that universities will expand to meet the demand. The present academic base for such expansion is

small, fragmented, and has little overall "visibility" to industry. A fuel technology directory would increase this "visibility" and would also be valuable to universities that are in the process of revising their curricula.

I would appreciate receiving the following information from those who teach or plan to teach courses in fuel technology: name of responder; title or position; department; institute, university, and address; fuel technology courses offered at present (course number, title, catalog description, and year); and fuel technology courses planned (title, brief description, and year). The directory will be circulated to all responders. I am also exploring means of distributing this information to relevant industries.

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Optical Brighteners

Deborah Shapley's report on the achievements of Björn Gillberg in Sweden (News and Comment, 12 Oct. 1973, p. 145) deserves some comment. We have recently been collaborating in an attempt to repeat some of Gillberg's published experiments on the mutagenic effects of optical brighteners (*1*). In our experiments we used the same genetic system and the same compounds as those used by Gillberg. We were unable to confirm that the suspected agents acted positively when incorporated in the growing medium of the organism (*2*). None of the several trials carried out produced a positive result. At a meeting in Stockholm at which one of us reviewed the genetic activities of optical brighteners, Gillberg himself admitted that he is now unable to obtain positive results with these compounds. In the second part of our experiments, in which nongrowing yeast cells were exposed to visible light in the presence of the brighteners, we were able to duplicate his findings of an apparent increase in mutation frequency. However, on closer examination, we were able to show that the entire effect could be attributed to selection of preexisting mutants under the treatment conditions. Because the changes studied by Gillberg and by us were probably cytoplasmic changes, that is, nonnuclear, we repeated the experiments measuring nuclear changes by the occurrence of gene conversion. In these experiments no positive results were obtained.

We do not think that our experiments indicate unequivocally that no danger exists from optical brighteners. The data are insufficient at present for this conclusion to be drawn. Several laboratories, our own included, are trying to obtain this information. We also do not wish to imply that public watchdogs, such as Gillberg, do not perform a useful function. However, we must be sure that a full-sized, hungry, four-footed wolf, with teeth, is coming before we start crying out about it. For environmental biologists, this means doing all in our power to be sure that the right experiments are done, positive results are reproducible, and any artifacts of method are excluded. It also means that data should not be taken out of context, but should be considered in the light of information from other sources. In the case of contaminating chemicals, this means that their distribution in the biosphere, their accumulation, their usage, and their persistence must be taken into account. If we startle the public too many times with sensational claims that are later retracted, we run a real risk of losing our most valuable ally if and when a real crisis comes.

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1. B. Gillberg and J. Aman, *Mutat. Res.* **13**, 149 (1971).
2. B. J. Kilbey and G. Zetterberg, *ibid.* **21**, 73 (1973).

History of Life Sciences

The Division of Research Grants of the National Institutes of Health, citing insufficient workload, did not renew the charter of the History of Life Sciences Study Section for the 1973–74 fiscal year; therefore, the study section was terminated as of June 1973. This decision was made at a time when the peer review system was being critically examined throughout the federal establishment. A protest on the part of the members of the History of Life Sciences Study Section did not avert the decision, although it elicited the indication that, should the number of applications in the field grow to a point at which the panel could again be justified, the Division of Research Grants would consider reconstituting the study section. Scholars of the history of the biomedical sciences need to be informed that the abolition of the History of Life Sciences Study Section does not mean the termination of research funds in this field of scholarship. The National Library of Medicine continues to award research grants in the history of life sciences, and applications continue to be evaluated by the peer review system through ad hoc meetings of a special study section of the Division of Research Grants. Scholars interested in securing information about the eligibility of biomedical history projects or application forms should write to Ileen E. Stewart, Executive Secretary, Division of Research Grants, National Institutes of Health, Bethesda, Maryland 20014, or to Jeanne Brand, Extramural Programs, National Library of Medicine, Bethesda, Maryland 20014.

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FDR's Science Policy

Some words of elaboration are in order about Milton Lomask's account (Letters, 12 Oct. 1973, p. 116) of the origins of President Franklin D. Roosevelt's letter to Vannevar Bush requesting the report which became the famed *Science, the Endless Frontier* (*1*). Lomask's version is based upon the recollections of Oscar M. Ruebhausen, the highly able General Counsel of Bush's wartime Office of Scientific Research and Development (OSRD). A close examination of the contemporary documentary record yields an account which differs significantly in detail from Ruebhausen's and may also be instructive with regard to the considerations which go into the shaping of federal policy for research and development.

Ruebhausen may be right that the idea for a presidential letter came from Oscar S. Cox. In mid-October 1944, perhaps with an eye on the upcoming election, Cox and Harry Hopkins agreed that FDR should request a report from Bush. But it does not ap-