Letters

Moratorium on Fetal Research

Barbara Culliton's account of the National Research Act (News and Comment, 2 Aug., p. 426) does not state—evidently because no one knows—what impact the moratorium on fetal research will have on the continuing attempt to determine the effect of attenuated rubella vaccines on the fetus. Presumably, the law will damp down such studies, thus interfering with the search for knowledge aimed at protecting other, future fetuses from unnecessary or unwitting damage. Is this what the sponsors of the bill intended?

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According to the letter from Charles C. Edwards (13 Sept., p. 900), the Department of Health, Education, and Welfare (HEW) "may not conduct or support research . . . on a living human fetus, before or after the induced abortion of such fetus, unless such research is done for the purpose of assuring the survival of such fetus."

1) By what criterion is an aborted fetus adjudged "living"?

2) Does Edwards' directive imply that HEW *will* support research for the purpose of assuring the survival of an aborted fetus? Shades of Frankenstein!

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The Delaney Clause

The position of the Teratology Society on the Delaney Clause, as presented by Staples (Letters, 6 Sept., p. 813), contains a most illuminating non sequitur.

It is stated in the first paragraph of the society's resolution that there is seldom any conclusive evidence demonstrating that a suspect teratogen will be teratogenic in man. It is concluded, therefore, that (second paragraph) it would be inappropriate to apply a "Delaney regulation," and that (third paragraph) each case should be decided on its merits by competent scientists.

However, the facts stated in the first paragraph will equally support the converse of the society's conclusions. Because there is no hard evidence, the desirability of a "Delaney regulation" must be decided on philosophical or moral grounds. Here the members of the Teratology Society presumably have no more expertise than the same number of, perhaps, politicians. Also, in individual hearings, the scientific evidence will not be the decisive factor (as in the case of diethylstilbestrol). Competent scientists may find they have neither the expertise nor the power to make such decisions.

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Robert E. Staples speaks for the Teratology Society in opposing extension of the Delaney Clause to include teratogens. The Delaney Clause, he explains in a footnote, refers to an amendment in the Food, Drug, and Cosmetics Act which "mandates as law inferences about human hazards from observations in any lower organism at any dose of exposure." It applies in the case of possible carcinogenic food additives.

While it is quite possible that the Delaney Clause was ineptly drawn, I am disturbed by the position of the Teratology Society as quoted by Staples.

The central thrust of the Teratology Society's resolution is to shift the burden of proof from the promoters of a new technology or substance to those few volunteer organizations which have sufficient funding to present their case before such regulatory agencies as the Food and Drug Administration. The resolution cites the danger that extended application of the Delaney Clause ". . . . may falsely implicate agents that are or would be of social value." It refrains from adding that such agents might be of immense *economic* value to their manufacturers. The society prefers "to have policy decisions on these matters made by regulatory agencies. . . ." It is almost a cliché today that federal regulatory agencies tend to be dominated by those whom they regulate. As the mass application of new technologies and biochemical agents continues to proliferate, it is increasingly apparent that these regulatory agencies as constituted are incapable of assuring an adequate level of public health and safety.

I agree with the society that whatever bodies make the regulatory policy decisions should be "advised, if not administered, by competent and responsible scientists. . . ." The problem lies precisely in finding the necessary numbers of such scientists (or engineers) who are not subject to a conflict of loyalties. A scientist or engineer who feels it his duty to expose a public hazard in a product of the industry that provides his livelihood may risk economic reprisal by doing so. More subtly, his sense of loyalty to the industry may lead him subconsciously to discount or minimize evidence pointing to such a hazard.

Professional scientific and engineering societies, including the Teratology Society, could do much to resolve this problem were they to establish unequivocal standards supporting individual ethical actions by their members. Scientists, whether directly or indirectly working for an industry, would find it much easier to carry out their ethical responsibilities with respect to possible public hazards caused by that industry if they could be confident of full support from professional societies.

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Detection of Polarized Light

Porges (14 June, p. 1133) makes an interesting point about the use of polarized light for navigation by birds and insects. The curious yellow "fans" that one sees when looking at a brightly lit white surface through a polarizer show that the human eye also can detect polarized light. The mechanism of detection remains obscure. Fankuchen and Fankuchen (*1*) used a bundle of birefringent fibers immersed in a fluid with

a refractive index equal to one of the indexes of the fibers as an analyzer. They suggested that such a structure was the basis of biological detection of polarized light. The suggestion seems plausible. Has it been confirmed or refuted?

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References

1. A. N. Fankuchen and I. Fankuchen, *Nature (Lond.)* **182**, 1372 (1958).

Aldrin and Dieldrin

In the report (News and Comment, 16 Aug., p. 601) of the suspension of the manufacture of aldrin and its metabolite dieldrin by the Environmental Protection Agency (EPA), it is not mentioned that the EPA will continue to permit the use of these compounds against termites, as a dip for roots and tops of nonfood plants, and against clothes moths under certain circumstances (*1*). As a result of these exemptions, aldrin and dieldrin will in all likelihood continue to be manufactured.

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References

1. Environmental Protection Agency, "Aldrin and dieldrin may be used for termite control and two other uses" (News Release R-558, EPA Information Section, Washington, D.C., 1974).

Evaluating Acupuncture

It was refreshing to read Clark and Yang's report (7 June, p. 1096) attempting to objectively evaluate a procedure used in acupuncture. Although I have no scientific evidence to support or refute the use of acupuncture as an analgesic, I have had the opportunity of seeing many unfortunate individuals from various parts of the United States who were "treated" with acupuncture for a neural hearing loss, and I have yet to see a change for the better. I might add that such evidence has not slowed down those who benefit financially from the practice of acupuncture for "nerve deafness."

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Clark and Yang suggest that many studies similar to theirs must be done "before it can be concluded that acupunctural analgesia is a myth." No one thinks acupunctural analgesia is a myth any more than many other unknowns, such as the placebo effect, hypnosis, and the workings of some analgesic medications that we cannot explain, are a "myth." They are real, and the only myths are some of the explanations for them. This is an important distinction. Highly useful techniques may remain unused because adequate physiological explanations for them do not exist.

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Success in Graduate School

As a recent graduate in the biological sciences, I read with interest Warren Willingham's "Predicting success in graduate education" (25 Jan., p. 273). However, I believe it is virtually impossible to predict success in graduate education with any reasonable degree of surety. The data in Willingham's Table 2 indicate that no predictor currently employed is a valid indicator of success in graduate education in biology. This is especially true today, when so many seemingly equally qualified students are entering graduate programs, but not all are attaining a degree.

Perhaps the emphasis of graduate schools, in the absence of any predictor that can measure the myriad intangibles that make successful graduate students, should be on developing valid criteria for judging success. I note with dismay the scarcity of data on the use of departmental qualifying examinations as a criteria of success. As Willingham notes, this "could provide the most reliable and valid criteria of subject competence."

A properly constructed examination, consisting of both objective and subjective written and oral portions and prepared by a well-chosen doctoral committee, serves several functions. First, it provides the student with an opportunity to demonstrate the wealth of important factual knowledge he or she possesses. Second, it provides the doctoral committee, if well chosen, an opportunity to evaluate how well the student can integrate and synthesize the