tle University has had some recent experience with industrial participation in our graduate engineering program, I thought the types of participation might be of interest to other science and engineering educators facing this problem.

Our Graduate Program in Software Engineering, introduced 2 years ago, illustrates seven ways in which industry involved itself directly with our program:

1) Industrial representatives participated directly in design of the overall program and in drawing up detailed syllabi for individual courses.

2) Industry donated money up front to cover some of the start-up costs, such as hiring the program director and acquiring a software library.

3) The software engineering program was used as primary justification for the gift of a new computer system by a major computer manufacturer.

4) Another computer manufacturer loaned us a variety of peripheral devices and terminals which we could not afford to purchase.

5) An industrial firm allowed us access to its computer system to provide more computer power and software packages.

6) Several of the software engineering courses are taught by part-time instructors drawn from industry.

7) In virtually all cases, the students (all of whom hold full-time jobs) have most, if not all, of their tuition reimbursed by their companies.

Industry and academe should not be viewed as competitors. Rather they have a common stake in one another's health, and it is vital that both find mechanisms for closer cooperation in the educational enterprise.

TERRY J. VAN DER WERFF
Office of the Dean, School of Science and Engineering, Seattle University, Seattle, Washington 98122

Patent Rights

I applaud Marjorie Sun's perceptive article (News and Comment, 11 Sept., p. 1234) on the new federal patent law implementation. Universities are smarting from what appears to us to be a heavy-handed, shortsighted, bureaucratic approach to wrest away the patent rights that Congress intended should be given to us. The clause that mandates disclosure to the government 3 months before a researcher submits a manuscript for publication creates a bottleneck that serves little purpose. The penalty imposed for failure to meet this arbitrary deadline is extreme. It means the university may forfeit its right to own any ensuing patent. The plan is blatantly impractical and would be laughable if its consequences were not so dire.

It seems ironic that, when the government had all rights to such inventions, it was not necessary to have a 90-day period before submission to a publisher. The usual and accepted practice then was to disclose inventions concurrently with the submission of the manuscript.

ALLEN J. SINISGALLI
Office of Research and Project Administration, Princeton University, Princeton, New Jersey 08544

Medfly Sterility

Eliot Marshall, in his article on the Mediterranean fruit fly infestation in California (News and Comment, 24 July, p. 417), implied that monogamy of wild females of an insect species is necessary for the success of the sterile insect release method of population suppression. Marvin K. Harris corrects this "seemingly ubiquitous misconception" (Letters, 4 Sept., p. 1058). This misconception has a longer history than Harris suggests. It ironically was the inspiration for E. F. Knipling's original idea of using sterile males to control insects (*1*) and perhaps was first corrected by von Borstel in 1960 (*2*). The misconception *is* fundamentally wrong. But paradoxically it is also right, in ways not considered by Harris.

The paradox comes from a consideration of sperm competitiveness. Sterilization, whether by irradiation or chemosterilants, is aimed at producing "dominant lethals," that is, genetic effects which are only manifest after fertilization and which yield a dead egg. Unfortunately, there often are other effects of the drastic methods needed to produce dominant lethals in an organism: considering only males, these include inactivation of sperm, aspermia, inability to mate, or decreased activity or longevity (*1*). If dominant lethals can be produced without affecting the competitiveness of the sperm of released males, then Harris is completely correct. In this case, polygamy is irrelevant to the effectiveness of the release, and mating success of the released males is the only relevant parameter. If, however, released males are aspermic, or their sperm is immotile or of decreased competitiveness with wild sperm, then multiple matings by females will yield higher fertility than expected based on the ratio of sterile to fertile males (*3*). This can occur. For example, Ito and Kawamoto noted that, in the melon fly *Dacus cucurbitae* Coquillet, sequential mating of a wild female with the sterile males they were using and with normal males, in either order, yielded eggs of nearly normal fertility (*4*).

A college junior biologist, presumably having learned a bit more biology than the hypothetical college freshman referred to by Harris, would be extremely puzzled by Harris's assertions, especially as Zouros's discussion (*3*), cited by Harris, clearly pointed out the role of sperm competitiveness. Zouros noted that polygamy will reduce the effectiveness of sterile male releases if the sterile sperm is of reduced competitiveness.

Harris has done a service in debunking the common assumption that a species *must* have monogamous females for the sterile insect release method to work. Viewing the system as one of egg-killing clarifies the important role of sperm competition.

IAN A. BOUSSY
Department of Genetics, University of California, Davis 95616

References

1. L. E. LaChance, C. H. Schmidt, R. C. Bushland, in *Pest Control*, W. W. Kilgore and R. L. Doutt, Eds. (Academic Press, New York, 1967), pp. 147–196.
2. R. C. von Borstel, *Science* **131**, 878 (1960).
3. E. G. Zouros, *Ann. Inst. Phytopathol. Benaki* **9**, 20 (1969); A. A. Berryman, *Can. Entomol.* **99**, 858 (1967).
4. Y. Ito and H. Kawamoto, *Res. Popul. Ecol.* **20**, 216 (1979).

Nuclear Nitty-Gritty

Now, let me see if I have this straight: The Air Force and the President are worried (News and Comment, 25 Sept., p. 1475) that dust, raised by a nuclear attack on the United States that would almost certainly have been brought on by their own failures, might get in the engines of the planes keeping them aloft and thus prevent a retaliatory attack on our behalf.

Well, if that situation arose, the dust would consist in large part of civilian America—that is, us, our homes and families, our students, colleagues, and life work. As new regolith, I would have a hard time being concerned about retaliation; but there might be a rough justice in doing my bit to bring our leaders back to earth. All it would take is some good old American grit.

THOMAS R. BLACKBURN
Program in Chemistry, St. Andrews Presbyterian College, Laurinburg, North Carolina 28352