academic ecologists are quite willing to help, fewer have the requisite information, and fewer still the time to fulfill satisfying roles as advisors. Because of the structure of the universities themselves, science professors do not become involved in the affairs of government at a level other than that of the occasional testimony at a hearing. Universities were intended for teaching and research, and the reward structure is so oriented. A professor who is asked to supply a detailed memo on a topic of immediate concern to a congressional committee cannot drop other responsibilities for 2 weeks while he completes the task. Not, that is, unless universities provide some mechanism and incentive to make such involvement possible. Allowing interested professors a term off, at full pay, independent of sabbatical leave, to research some issue of concern to Congress, is one possibility. Encouraging a professor to spend sabbatical leave in Washington, and giving credit to such experience when promotions are made, is another. Acknowledging the merit of research of an immediate and applied nature, is a third. These are certainly departures from traditional academic roles. Those university administrators who proclaim a desire for university involvement in community affairs need to determine whether the priorities and rewards characteristic of their own institutions are at all conducive to such activity.

In addition to a lack of professors' time, there is currently a deficiency of requisite environmental information. This phenomenon may stem from the stigma still attached to applied research in some circles of academic ecologists, as well as to the difficulty of doing such research without the sponsorship of a government agency or company with a bias about the desired results. The new Institute of Ecology, the RANN (Research Applied to National Needs) program of the National Science Foundation, and the National Environmental Center bill (S.1113) which has passed the Senate, may help the latter situation.

Clearly, there is much more that politicians could do to encourage the involvement of academic scientists—publish in *Science* or elsewhere an account of current problems that need to be solved; embrace facts offered in their full complexity, without simplifying problems to the extent that scientists are turned off; support the appropriation of funds for long-term basic research and immediate problem-solving research.

At the same time, immediate steps can be taken within the universities to bring the expressed concern for involvement in environmental problems, and incentives for such involvement, into closer consonance.

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Technology Assessment

The report on the Office of Technology Assessment (News and Comment, 3 Mar., p. 970) contains an unfortunate non sequitur which might lead some readers to infer that Raymond Bowers and I feel that our technology assessment of microwave devices (*1*) was a complete assessment —even though we did not consider the social impact of the use of these devices.

The original title of our paper, when it was given at last summer's Cornell Conference on High Frequency Generation and Amplification, was "A preliminary technology assessment of solid state microwave devices." Within the *Scientific American* article itself, we admitted that, "Our attempt cannot be comprehensive. . . . We hope these first steps will lead to an analysis of broader social implications."

We agree entirely with the Congress that technology assessment must include the "physical, economic, social, and political" effects of a technology.

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PCB's in the Environment

It is simple to assert that an event, having once occurred in a laboratory, "may" take place again. Thus it took no great foresight for Mosser *et al.* (14 Jan., p. 191), in their study of the effects of polychlorinated biphenyls (PCB's), to conclude:

> Selective inhibition of sensitive phytoplankton species by PCB's, DDT, and other stable pollutants in the environment may alter the species composition of natural algal communities. . . . Such effects at the base of aquatic or estuarine food webs could profoundly affect higher organisms as well.

The authors' conclusion that selective species alteration "may" occur is indisputable but obvious, since the addition to an ecological system of almost any long-lived contaminant is likely to alter species composition.

An estimate of the probability of ecological damage likely to occur as a result of PCB usage would have been meaningful. C. G. Gustafson (*1*) has pointed out that "All studies of PCB's in animals indicate that acute toxicity is not a significant factor . . . ," and, further, "Compared to DDT . . . PCB's have a relatively low acute toxicity. . . ." That PCB's "could profoundly affect higher organisms" is dubious because, as the authors failed to mention, PCB distribution is much more tightly regulated than it was a few years ago, and the levels prevalent in the environment are likely to cause little, if any, harm to plants or to animals. Statements to the contrary sound like the fantasies that robins are "on the verge of extinction" (*2*), and that the supply of planetary oxygen could diminish as a result of DDT usage.

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The alteration of species composition within phytoplankton communities is indeed the expected result of differential sensitivity to long-lived environmental contaminants, but documentation for its occurrence is lacking. Our laboratory studies (*1*) provide suggestive evidence that it may occur with PCB's and DDT, among the most widespread of all pollutants. We cannot assess fully the ecological significance of our findings because we do not know to what extent such alteration is occurring in nature, but we doubt that our conclusions can be considered "fantasies." We would point out that we have never subscribed to the theory that DDT (or PCB) usage could diminish the earth's oxygen supply (*2*). Hopefully, our reports will lead to the required studies on natural algal populations.

Acute toxicity tests with animals have no bearing on the potential hazard of phytoplankton species alterations by PCB's or DDT. Changing the food source at the base of a food web would be expected to affect animals higher in

the web, since many herbivores have specific food requirements. Higher organisms therefore need not be directly sensitive to these substances to be affected.

The tight regulation that Adler claims for PCB distribution has not been manifested by any decline in PCB concentrations in environmental samples. Furthermore, we are aware of no law that permits regulation of their escape into the environment. Pesticides, at least, can be regulated under the Federal Insecticide, Fungicide and Rodenticide Act, but PCB's are not pesticides. Who, then, is tightly regulating PCB's?

We believe that the environmental impact of a chemical should be studied before it is released into the environment; DDT and the PCB's were released first and studied later. Assurances of safety based on little or no evidence, such as those by Adler, are no longer sufficient for most environmental scientists. Too often these assurances have proven misleading and naive.

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Canceled Invitation

I was invited to attend the 2nd International Ocean Development Conference and Exhibition, which will be held in Tokyo, Japan, from 4 through 9 October 1972. My paper "Strontium distribution in sea waters from the South China Sea" was accepted for presentation.

However, because several oceanographers from Communist China were later invited to participate, my invitation was canceled by the chairman of the organizing committee, Seiichi Tagawa. Apparently, politics is governing science at the conference, which is not only regrettable, but also harmful to the world's scentific community.

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