Letters

The Temik Story

I would like to commend Eliot Marshall on his even-handed treatment of aldicarb in his article "The rise and decline of Temik" (News and Comment, 27 Sept., p. 1369). While we would dispute some of the interviewees' comments, the article on the whole evidences an all too rare sense of balance regarding this compound.

Several comments seem in order, however. Hale Vandermer's statement that 1000 Florida wells have been tested and 500 have been found to contain aldicarb refers to test wells set just into shallow water tables and not to drinking water wells. To date, more than 2500 drinking water wells in Florida have been tested, with fewer than a dozen positive detections. No residues have been found over the guideline concentration as a result of labeled use of the product in Florida.

We have installed more than 200 shallow test wells in Florida, purposefully placed in treated groves. These test wells are designed to provide a better understanding of the movement and degradation of aldicarb in shallow ground water. Under the conditions in Florida, residues, when seen, are quite transient. The number quoted by Vandermer refers to these test wells.

Two comments about Long Island need correcting. First, approximately 2250 (not 6000) filters have been installed on Long Island wells. By comparison, fewer than 100 filters have been installed in the rest of the country. Retesting of 1450 filtered Long Island wells indicates that more than half of that number now show residues below the guideline concentration, or no residues at all. To us this means that aldicarb residues are declining.

Finally, contrary to the article, Keith Porter of the Cornell University Center for Environmental Research did not conclude in his July 1985 draft report that aldicarb residues on Long Island would last for a century.

If the special review of Temik aldicarb pesticide "will be the hardest case to decide this season," the Environmental Protection Agency should keep in mind the compound's merits and make the decision promptly.

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Eliot Marshall, in his article "The rise and decline of Temik," grapples with multiple and diverse views about Temik and the "agony" of which he claims it to be "the center." I acknowledge his difficulties in achieving an accurate and balanced report on such a controversial and technically complex subject. Nevertheless, the article is unnecessarily contentious and careless.

Marshall writes that H. B. F. Hughes and I "concluded in a July 1985 report that at present rates of decline, Long Island's aquifer could be contaminated for a century." I object to this statement. First, we made no such conclusion. Second, the report is a draft that has been circulated for review purposes only and should not have been cited at all.

As the principal investigator responsible for the original work on Long Island that determined that aldicarb residues could reach ground water, I found Marshall's account of this work to be misleading. Marshall reports that, in 1971, the Environmental Protection Agency "learned that aldicarb moieties could go into ground water." This is untrue. When we did our original work in the mid-1970's, the conviction in EPA and in the general scientific community was that pesticides either did not migrate in soils to a significant extent or they degraded rapidly. The data cited by Marshall were considered so innocuous by Union Carbide that some of them were included and discussed in a multicolored glossy publication printed and widely distributed by the company. At that time the scientific literature was preoccupied with persistence in soil, biomagnification, and effects on wildlife. This was true internationally. For example, the fourth edition of *Pesticides*, prepared by the Council of Europe for its member nations (Strasbourg, France, 1977) mentions leaching only in passing and states that pesticide residues in ground water are "generally without toxicological significance" (p. 80). In the sixth edition of 1984, this virtual indifference has changed to "contamination of ground water resources by pesticides must always be considered as a potential danger, and special attention should be focused on the protection and monitoring of its quality" (p. 128). A corresponding change in perception has obviously taken place in the United States, as the Temik case illustrates. It is a deception to claim retrospectively that we understood the risks to ground water in the early 1970's and to imply that EPA, for example, was irresponsible in not taking preventative steps at that time. Trace concentrations of residues observed several feet below the soil surface were then considered to be insignificant. It is important to recall that at that time there was no drinking water guideline for aldicarb, for example, against which observed concentrations could be compared.

In 1977, when we produced our final report for EPA, I found virtually no support, from my colleagues or from others, for our conclusions that aldicarb residues could contaminate ground water. The only exception that I am aware of was within EPA, where Robert Carsel of the Office of Pesticide Programs carried out his own review. Although his conclusions concurred with those in our report, others were unconvinced and EPA took no action. In fact, it was Union Carbide that initiated action. In 1978 the company voluntarily performed analyses for aldicarb in ground water samples collected by William Selleck of the Cornell University Department of Vegetable Crops.

Since that time, Union Carbide has made a huge effort to monitor aldicarb residues in soil and ground water throughout the United States. This conduct is in sharp contrast to that of other chemical companies whose pesticides have also been detected in ground water. At a time when there is considerable journalistic opportunism at Union Carbide's expense, it is worth noting that these other companies are receiving little incentive to voluntarily carry out similar ground water monitoring for their own pesticides.

A dictum about ground water that is especially apt in this unfortunate situation states, "the more one looks for contaminants the more they will be found." Union Carbide has done "a lot of looking." Nevertheless, Marshall ex-

aggerates the findings. I am currently preparing an overall assessment of the environmental fate of aldicarb. According to my information, aldicarb residues are undetected in the greater part of soil and ground water samples collected throughout the nation. Excluding Long Island, about 100 domestic and no public wells have residues above the guideline for aldicarb. While these findings do justify attention, they are of much less significance than, for example, the ubiquitous presence of organic solvents in water supplies throughout the country.

In his review, Marshall uses unnecessarily emotive phrases that he may find fitting for "the dark tradition of pesticides." He even overstates the disreputable ancestry of aldicarb. It is true the development of carbamates can be traced to the Calabar bean used in "trials by ordeal." However, interest in the bean has been in its medicinal as much as in its poisonous properties. Extracts from the bean are used especially in ophthalmology. It is also an antidote to poisons such as strychnine and curare. I also question Marshall's statement that the Egbo of Nigeria were the first to use the Calabar bean in trials by ordeal. The Efik Egbo migrated into the Calabar region in the late 17th or early 18th centuries. It is probable that Efiks adopted a local custom for their own judicial purposes.

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Porter is evidently right that he and his collegues did not realize the ground water risks posed by Temik in the 1970's. It is also apparent that EPA considered the problem "insignificant," as Porter notes. However, one reason the problem may have been overlooked is that early signals were ignored.

Robert Haines, who was Union Carbide's entomologist responsible for registering Temik, writes that in 1971: "A test in Arizona showed ASO [aldicarb sulfoxide] and ASO_2 [aldicarb sulfone] to be found 12 feet deep in soils growing sugar beets. Less than 0.1 part per million was found but the ratio of ASO to ASO_2 was 1:1. It was at that time EPA (now operating) learned that Aldicarb moieties could go into the ground water, but there was no U.S. ground water program at that time." In view of this statement, is it "untrue" to say that EPA learned of the potential ground water problem in 1971?

The Porter-Hughes paper on Long Island ground water was, as Porter writes, a draft. It did not reach a direct conclusion about the time it would take to clear the aquifer, but did mention a Suffolk County Health Department study [J. H. Baier and S. F. Robbins, in *National Conference on Environmental Engineering, Proceedings*, A. Medine, Ed. (American Society of Civil Engineers, New York, 1983), pp. 1–13] which concluded that it would take "over 100 years for the water containing aldicarb residues to be flushed completely from the aquifer in that area, assuming that no degradation occurs beforehand." Porter and Hughes found that attempts to determine the rate of degradation were "inconclusive."—ELIOT MARSHALL

Breast Cancer: Adjuvant Chemotherapy

In Gina Kolata's article about the breast cancer consensus conference (Research News, 27 Sept., p. 1378), I was quoted as saying that only 10 percent of younger women respond to adjuvant chemotherapy. I would like to correct and clarify those figures. The 10 percent figure comes, not from the consensus panel's review of the data, but from the review conducted by Richard Peto. When the panel considered the effects of cytotoxic therapy on older women, it concluded that the efficacy of adjuvant chemotherapy for this group was less well established than for premenopausal women. In other words, adjuvant chemotherapy trials have failed to show an increase in overall survival for postmenopausal patients with histologically positive axillary lymph nodes. However, in a series of trials from one major cooperative group, a modest increase in disease-free and overall survival has been observed. When the sum of the evidence from all randomized trials is examined, the estimate of increase in disease-free and overall survival is "small but statistically significant."

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The Space Test Program

I wish to comment on the use, as an antisatellite (ASAT) target, of the P78-1 satellite that included the Naval Research Laboratory's (NRL's) Solwind experiment (News and Comment, 4 Oct., p. 44). It is inappropriate for me to discuss the Air Force policy that led to their choice of targets; I can, however, discuss the Space Test Program (STP), which was responsible for the satellite.

The STP is a Department of Defense (DOD)–sponsored activity managed by the Air Force and designed to provide space-flight opportunities for small projects where programmatic support for space flight is lacking. The Air Force has established a procedure whereby proposed experiments are evaluated and priorities are established. Flights are arranged through a combination of the use of excess space on other missions and the development of independent missions. P78-1 was an example of the latter and made use of a NASA spacecraft remaining from the Orbiting Solar Observatory series. The current list of experiments in the STP includes a wide mix of scientific and technical experiments from almost every DOD agency, many with heavy university involvement. The STP is frequently held up to NASA, probably unfairly, as an example of the way to do experiments in space cheaply and quickly.

In managing the STP, the Air Force has been extremely supportive of the science. P78-1 was supported in orbit for a longer period of time than other space missions, and this support was given largely on the basis of the Solwind results.

The STP fills an important niche in the U.S. space program. As an example, at NRL we are embarking on what is for us a major research program in the area of upper and middle atmospheric research with the principal objective of developing a global, remote-sensing capability for determining certain important atmospheric parameters, such as the state of the ionosphere. This program will include a number of small experiments to be conducted in flight on the space shuttle and on independent missions such as the National Oceanic and Atmospheric Administration's TIROS satellite. A crucial result that has emerged from this program, relating to the transport of singly ionized oxygen radiation, came from the analysis by NRL scientists of data from an Army-sponsored experiment developed by the University of California, Berkeley, and flown on the P78-1 satellite.

The Air Force is to be commended for their management and support of the Space Test Program.

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