DDT: Its Days Are Numbered, Except Perhaps in Pepper Fields

It would be premature to write the obituary of DDT, a chemical whose persistence in the biosphere has been more than matched by the perseverance of the pesticide industry and the Agriculture Department in sustaining its use under 10 years of fire from environmentalists. But if DDT is not actually dead yet, it is clearly in its twilight days.

In retrospect, the turning point—and the beginning of the climactic chapter in DDT's turbulent history—was the Nixon Administration's decision in 1970 to shift federal pesticide authority from the Agriculture Department to the newly created Environmental Protection Agency. Last week's order by William Ruckelshaus, administrator of the EPA, to ban virtually all remaining domestic uses of DDT at the end of the year, closed that chapter. Now, for its epilogue, the struggle moves back to the federal courts, where lawyers for both the EPA and environmental groups seem confident that DDT's death warrant will be upheld.

Ruckelshaus' decision marked the end of a long series of administrative appeal proceedings open to the industry under the Federal Insecticide, Fungicide, and Rodenticide Act. These opportunities for second thoughts on the EPA's part spanned nearly 18 months, dating from January 1971, when environmental groups won a federal appeals court order asking the EPA to cancel the government's formal approval of DDT as an "economic poison." The EPA complied, and the industry immediately requested its full due under the law—mainly in the form of a study of DDT's benefits and hazards by a panel of scientists nominated by the National Academy of Sciences (and selected by the EPA) and in the form of a quasi-judical public hearing (*Science*, 10 December 1971). In the end, the NAS panel called for virtual elimination of DDT, but the hearing was another matter. A sometimes stormy affair, it lasted 7 months, then finally brought a ruling from federal hearing examiner Edmund Sweeney that DDT's benefits tended to outweigh its risks and that certain "essential" uses should be retained. Among those uses was the protection of cotton, which accounted for 86 percent of the 12 to 14 million pounds of DDT sprayed in the United States in 1970.

Sweeney's ruling was not binding on the EPA however, and, while Ruckelshaus avoided explicitly saying so, he effectively reversed it. In the text of a 40-page decision, Ruckelshaus wrote, "The evidence of record showing storage [of DDT and its metabolites] in man and magnification in the food chain is a warning to the prudent that man may be exposing himself to a substance that may ultimately have a serious effect on his health."

That opinion coincided closely with the view of the NAS panel. It also paralleled the sentiments of a 1963 report by the President's Science Advisory Committee advocating the eventual "elimination" of persistent pesticides. And it is worth noting that still another major pesticide study group, the so-called Mrak Commission appointed by former Secretary of Health, Education, and Welfare Robert Finch, urged in December 1969 that the federal government "eliminate within two years all uses of DDT and DDD in the United States," except those uses for which no substitutes are available. That is precisely what the EPA has now decided to do—and only 1 year behind the Mrak timetable.

The banning of DDT was an act of political courage that went considerably further than a number of EPA staff members were willing to predict late last year, and it certainly went further than the federal courts were able to persuade the Agriculture Department to go while it still held sway over pesticides. Most directly, Ruckelshaus' decision dealt a blow to Representative Jamie L. Whitten (D–Miss.), a cotton state Congressman whose appropriations subcommittee controls funds for the EPA. Whitten's ardent support for the agricultural chemical industry in general and for DDT in particular is set forth in his 1966 book *That We May Live*, a rejoinder to the late Rachel Carson's *Silent Spring*.

The ban imposed by the EPA is not quite absolute, however. It does not affect the annual exportation of some 30 million pounds of DDT, nor does it prohibit government agencies from using DDT in public health emergencies. Moreover, the EPA left the door ajar for minor applications of the pesticide to three crops—onions in the Pacific Northwest, sweet potatoes in storage, and green peppers grown on the Delmarva Peninsula along the Chesapeake Bay. (Unless growers or the industry present some compelling new evidence to support the use of DDT on these crops within 30 days, the ban will be extended to include them as well.)

In the case of the green peppers, the loophole Ruckelshaus left attests more to the influence of an old Washington law firm than to the voraciousness of the corn borers that allegedly threaten to devour the Delmarva's peppers in the absence of DDT. The exemption came about at the behest of Henry P. Cannon and Sons, the peninsula's leading pepper processor, which hired the Washington firm of Covington and Burling to plead its case during 1 day of the 7-month hearing. Oddly enough, the pesticide industry itself raised no objection to the cancellation of DDT's registration for use on peppers, and, as Ruckelshaus candidly admitted in his decision, his own staff had advised against granting exemptions to any crops. "All this yelling about DDT is totally unfounded," Henry Cannon said by telephone from Bridgeville, Del. "Who's it ever hurt?"

If Cannon continues to win his way, he—or the local growers who contract to him—may be the last to use DDT in the United States. While the 13,500 pounds of DDT they apply to the peninsula's land each year may be inconsequential on a national scale, local environmentalists argue that it is a significant input to the Chesapeake Bay and to the bay's vulnerable population of ospreys.

Still, environmentalists have professed themselves generally pleased at the EPA's action. "We won more than 99 percent of what we wanted," said William Butler, a Washington attorney for the Environmental Defense Fund (EDF), the group most closely identified with opposition to DDT.

Indeed, the victory was especially sweet for the EDF, which owes its existence to DDT. The organization began with a small and unusual nucleus of New York scientists and

lawyers who banded together in 1966 to protest the use of DDT for mosquito control in Suffolk County, Long Island. From this community squabble, the EDF has since grown to the stature of a national organization, with 32,000 paying subscribers; a pool of 700 scientists on call as expert witnesses; and offices in New York, Washington, and Berkeley. The EDF is currently a party to 40-odd court cases running the gamut from air pollution to water resource litigation.

As the organization grew, it escalated the fight over DDT to the federal level. In October 1969, the EDF, representing itself and four other groups, petitioned then Secretary of Agriculture Clifford Hardin to halt interstate sales of DDT. Under threat of court action, Hardin did eliminate home use of DDT and some 50 other minor applications. When federal pesticide authority changed hands to the EPA, the EDF redirected its petition for a complete domestic ban—this time successfully.

During the public hearings that ensued, environmental groups coalesced with the EDF and joined the EPA's Pesticides Office as an equal partner in defending the proposed ban; the Agriculture Department, as if to substantiate Ralph Nader's characterization of it as the "Department of Agribusiness," joined the case on the side of the industry.

With appeals to federal agencies now exhausted by the industry, the action has shifted to two federal courts. One is the Fifth Circuit Court of Appeals in New Orleans, where the industry is now seeking to have the EPA's ban set aside by a panel of judges it apparently hopes will be more sympathetic to the cotton industry than to federal agencies and environmental groups. With the opposite strategy in mind, the EDF is seeking to make the ban immediate —and to keep the case in Washington —by a motion pending before the Court of Appeals of the District of Columbia. Few observers, however, see much chance of either court reversing the EPA, particularly since the ban does not affect public health applications of DDT—which have dwindled almost to the point of nonexistence in the United States anyway.

It may still be, of course, that DDT's proponents fear that its use in the United States is only the first of the dominoes to fall and that a hasty worldwide ban may follow. Such fears may be exaggerated, though, if the views of EDF's Butler are any indication. He says that he personally accepts the World Health Organization's argument that DDT is still essential for controlling disease in less developed nations. "What we hope will happen," Butler says, "is that other nations will begin to question for themselves the advisability of using DDT in agriculture. We think that a combination of less persistent pesticides and proper crop management can be more economical than DDT."

—ROBERT GILLETTE

Soviet Science: Levich's Delayed Emigration Stirs Concern

An issue that has stirred concern in some scientific circles in the United States and Israel over the last month has been the case of a well-known Russian physicist and electrochemist, Veniamin G. Levich, who has expressed a wish to leave the Union of Soviet Socialist Republics (U.S.S.R.) to take an appointment at Tel Aviv University. Subsequently, he is said to have lost one of his two jobs and to have been demoted in the other. His family are alleged to have suffered some setbacks, too.

Levich, a corresponding member of the Soviet Academy of Sciences, decided to go to Israel early this year. Then, on 28 March, he was apparently fired from his post as professor of mathematical physics at the University of Moscow. On 11 April, he was allegedly demoted from his position as head of the theoretical electrochemistry group at the Institute of Electrochemistry. In addition, one of his sons, an engineer, lost his job, and the other was "refused the right to apply for an emigration permit."

Levich, 55, has written a number of textbooks on physics and physiochemical hydrodynamics, a field with applications in fuel cells, batteries, and electrolysis. At least one of his works is recommended reading in graduate courses in the United States. Levich's main work, as head of the theoretical group in the Institute of Electrochemistry of the Soviet Academy of Sciences, has been considered fundamental, and the institute is said to be one of the most outstanding of its kind. He is also vice-president of the International Society of Electrochemistry.

Levich's story has been publicized principally by three professors of chemistry at the Tel Aviv University: E. Gileadi, J. Jortner, and E. M. Kosower. A series of interviews with scientists in the United States, particularly those in chemistry and chemical engineering who are familiar with the Levich case, confirmed that the Tel Aviv group's version of what has happened to Levich is probably correct.

According to this group, Levich had been offered a position as professor of chemistry at Tel Aviv University both by telegram and in a telephone call. He accepted the offer by phone, but never received the telegram.

The first public appeal to other countries seems to have been a statement dated 24 April and signed by Levich and another Academy corresponding member, Aleksandr Voronel. It has been circulated by the Tel Aviv group. Addressed "To the presidents of the Academies of Science of the U.S.S.R., of the Royal Society of Great Britain, of the United States of America, Israel, and to the presidents of International Unions of Pure and Applied Physics and of Pure and Applied Chemistry," the statement spoke of "official persons in the U.S.S.R." as "denying Jewish scientists and qualified specialists their right to go to Israel."

The statement did not mention Levich personally, but appeared to describe what might befall him and what would motivate the Soviet authorities to act in an oppressive manner:

> It is well known that a Soviet scientist who announces his desire to go to Israel is automatically deprived of the possibility to continue his scientific activity and feels his high qualifications are a superfluous