

in the scientific community," says Julian Lasky, executive secretary for the last 9 years of the NIMH study section that awarded Ullman his research grant. "They are perfectly well trained, respectable scientific investigators. They are sincere and serious and they deserve a chance." (Asked if there had been much debate in the NIMH council about the Ullman grant, Lasky says there had not, because the council had other, more controversial matters to deal with.)

Surveys among the scientific community hint at some of the complexity in the change of attitude toward psychic phenomena. Polls conducted among members of the American Psychological Association in 1938 and 1952 indicated that the attitude toward the study of ESP had become significantly more favorable between the two dates. The same questionnaire was recently sent out to its readers by *New Scientist*, an English scientific magazine. The returns—from 1500 readers, most of them scientists, and 29 percent with higher degrees—showed that a quarter of the respondents believed ESP to be an established fact and another 42 percent considered it a likely possibility. Not so heartening for parapsychologists is that less than a third of the sample thought that they were tackling their problem in the right way. More than half considered that parapsychology was making "little if any progress"; as against which only 4 percent view it as a "pseudoscience" (*New Scientist*, 25 January 1973).

Although some progress is being

made in relations with the external world, parapsychologists still face the same set of internal problems. Maybe because of the lack of any unifying theory about psychic phenomena, there seems to be little debate or even doctrinal differences between the various centers. "You hesitate to say someone's ideas are nonsense in this field," remarks one psychical researcher. Another problem is money. There are numerous rich widows prepared to support attempts to put them in touch with their late husbands, but parapsychologists cannot risk their credibility with the scientific community by accepting this kind of money. In fact, they would have had trouble keeping their heads above water were it not for the success of the Xerox Corporation. Chester F. Carlson, the inventor of xerography, left some 2 percent of his estate for psychical research. The FRNM, the ASPR, and the University of Virginia are said to have received about \$1 million each from the Carlson bequest.

Another important patron is the Chicago publisher and Nixon crony W. Clement Stone, who has settled some \$200,000 on the FRNM and at one time was a regular visitor at the foundation's meetings. A less well-known benefactor of psychical research is James Kidd, an Arizona gold miner who disappeared from the world without a trace in 1946 but left a will (discovered 18 years later) which revealed an estate of \$270,000 and instructions that the sum be spent on "research or some scientific proof of a soul of the human body which leaves

at death." The trial court received more than 100 claims but awarded the legacy to a local neurological institute. The decision was contested by the ASPR, which won its case last year after 6 years of litigation. The Kidd legacy was not only a windfall but proved the parapsychologists could at least convince a court of the seriousness of their intentions. And dead donors, be it said, do not give the same trouble as the living. One parapsychologist who has relied on private patrons for support describes his experience as "rather like working with Renaissance Popes—the level of intelligence and corruption is about the same."

"Among the scientific professions of the Western world," Rhine remarked in a lecture given in London in 1965, "there has grown up a conviction that the universe is physical, and that anything that does not fit the physical picture is unreal and should be ignored if it cannot be disproved. . . . The natural result is a silent boycott of any unassimilable claim that arises, and this is the real opposition parapsychology has now to encounter." Even a profession, however, can change its mind, sometimes overnight—as witnessed by the medical profession's sudden acceptance of acupuncture. The climate is probably now more favorable than ever for parapsychologists to break the boycott and secure a fairer hearing for their claims. But there is probably some little way yet to go before parapsychology becomes assimilable into the realm of natural science.—NICHOLAS WADE

## Pesticides: Environmentalists Seek New Victory in a Frustrating War

The effort by environmentalists to eliminate the use of the chlorinated hydrocarbon pesticides seems to have settled into a long war of attrition in which clear-cut victories are few and the frustrations many. The clearest victory to date was the nearly total ban last year by the administrator of the

Environmental Protection Agency (EPA) against use of DDT. Yet, although DDT has been the most widely and heavily used of the chlorinated hydrocarbons, several others remaining on the market all share, in varying degree, the same characteristics regarded as undesirable and dangerous in

DDT—persistence and mobility in the environment, a tendency toward "biomagnification" at higher levels of the food chain, and a broad, nonspecific biocidal effect. The persistent pesticides still available for various specified uses include mirex, chlordane and heptachlor, and aldrin and dieldrin, these last two deemed by some to be an especially serious threat because of their high toxicity and pronounced tumorigenic effect on test animals.

A current priority of the Environmental Defense Fund (EDF), the environmental law group that has led the fight against persistent pesticides, is to bring about a ban of aldrin and dieldrin, which must be thought of together because aldrin converts to dieldrin in

soil, in water, and in living organisms. This particular campaign in the war of attrition is now entering a critical stage. A long series of administrative hearings is about to begin in which the opponents and proponents of aldrin and dieldrin will present scientific testimony on a scale never before equaled in any previous pesticide case and probably never in any other environmental controversy of whatever kind.

In fact, the demands posed by this campaign are such that EDF alone could never meet them—just the cost of paying the expenses of witnesses would be quite beyond EDF's means. What makes the campaign possible is that EDF now can look to EPA to carry the main burden, an advantage scarcely imaginable a few years ago when, without help from any governmental agency, EDF stood against a recalcitrant U.S. Department of Agriculture (USDA).

By any measure, the 7-month-long administrative hearing that preceded the DDT ban was itself extraordinary in the scope and extent of the testimony presented. Some 125 witnesses were heard and 10,000 pages of testimony taken. But, already, parties in the aldrin-dieldrin case have given notice of plans to call 272 witnesses, and the list is expected ultimately to exceed 300. There will be scores of agricultural witnesses, especially from the Midwest where aldrin is often used by corn growers as insurance against outbreaks of soil insects, but the majority of testimony will be given by scientists.

The hearings will be conducted by EPA's chief administrative law judge, Herbert L. Perlman, beginning with field hearings this summer. Judge Perlman will eventually submit an advisory opinion to the administrator of EPA, who will decide whether to proceed with cancellation of the registration of aldrin and dieldrin for most currently permitted uses. The first EDF petition to EPA for a ban of these compounds dates back to late 1970. A final ruling by the administrator is not likely before mid-1974 at the earliest, and that ruling will be subject to judicial review. (The EPA ruling in the DDT case is now under such review, but the court has allowed the ban to go into effect.)

The first step in the tortuous process prescribed by law for the banning of a pesticide is to have the EPA administrator issue a "notice of cancellation," which, if appealed, means only that a substantial question has been raised as to whether use of the pesticide

should continue. Such a notice was first issued against aldrin and dieldrin in March 1971, then reconfirmed in July 1972, all uses to be banned except a few minor ones such as subsurface applications against termites. Although EDF had sought to have use of these compounds immediately suspended as an "imminent hazard," it could persuade neither the administrator nor the U.S. district judge to whom it appealed that so compelling a hazard existed. The forthcoming hearings will help the administrator decide whether aldrin and dieldrin fail by a less stringent standard—that is, whether these pesticides will cause "unreasonable adverse effects on the environment" when economic benefits as well as hazards are taken into account. In this matter, EPA must perform two quite different functions, some of its staff scientists and attorneys serving (in effect) as prosecutors, while its administrator (staying aloof from the aforementioned activity) serves ultimately as judge.

#### Formidable Opponent

The Shell Chemical Company, a subsidiary of Shell oil and the sole manufacturer of aldrin and dieldrin, is a far more formidable opponent for EDF than was the Montrose Chemical Corporation, the manufacturer of DDT. As one of the world's largest companies, Shell has vast resources, including laboratory facilities in the Netherlands for research on possible carcinogenic effects in experimental animals. Moreover, having been able to witness the battle over DDT, Shell will mount a more sophisticated defense than any attempted by Montrose. Attorneys from Arnold & Porter, the Washington law firm retained by Shell, attended part of the DDT hearings.

Shell will argue that, insofar as there have been well-founded allegations of environmental hazards made against aldrin and dieldrin, the company already has been responsive. According to its pretrial brief, whereas some 20 million pounds of aldrin and dieldrin were used in the United States in 1966, the annual usage today is not more than half that. Its gross income from U.S. sales of aldrin now amount to about \$10 million a year.

In cooperation with USDA, Shell has, since the mid-1960's, dropped the registration of aldrin and dieldrin for a number of uses, such as spraying on forage crops, foliar application to small grains, and use against grasshoppers on cattle ranges. This much done, the

company contends that there is no legal or scientific justification for not allowing continued use of aldrin or dieldrin for treatment of soil in corn fields and citrus groves and for treatment of various seeds. The company will call perhaps as many as 100 scientific witnesses in support of its case, these to include entomologists from the corn belt and the Florida citrus belt and various researchers who can speak to whether dieldrin is a carcinogen in test animals and humans.

For their part, the EPA staff and EDF will call at least 85 scientific witnesses, all but about half a dozen of them to be summoned by EPA. In general, the strategy of the EPA-EDF case will resemble that developed by EDF early in the fight against DDT: Evidence will be adduced to show that, once applied, aldrin and dieldrin spread widely throughout the environment, usually undoing even the best attempts to contain them at the point of application (as in the soil of corn fields); that these compounds can kill or inhibit reproduction in various lower life forms, including fish, wildlife, and beneficial insects; that they are a direct threat to humans; and, finally, that they are in any event not compatible with modern concepts of integrated pest control which rely upon a combination of chemical and biological methods.

As for the threat to humans, it is ironic to note that EPA and EDF, whose attorneys will jointly examine and cross-examine witnesses, will cite data produced in Shell's own laboratory experiments with mice in arguing that dieldrin is a carcinogen. Shell witnesses will find a very different meaning in this data. In dispute will be such questions as whether all tumorigens are potential carcinogens and whether mice were an appropriate test animal.

EDF leaders speak of the aldrin-dieldrin case with high confidence, asserting that the evidence to be presented on the question of carcinogenicity will be overwhelming. They have earned a measure of credibility, for EDF's past cases have been carefully built, and, again this time around, its witnesses include highly regarded people at the National Cancer Institute and other major institutions. EDF and EPA may in fact be slowly closing the ring on another persistent pesticide. If and when they finish this task, they can summon up their patience and look to the list of persistent pesticides still in use.—LUTHER J. CARTER

(Continued on page 204)