News and Comment

Pesticides: White House Advisory Body Issues Report Recommending Steps to Reduce Hazard to Public

The long-awaited pesticides report of the President's Science Advisory Committee (PSAC) was issued last week, and, though it is a temperate document, even in tone, and carefully balanced in its assessments of risks versus benefits, it adds up to a fairly thorough-going vindication of Rachel Carson's *Silent Spring* thesis. (The report, "The Use of Pesticides," may be obtained without charge from the Press Release Office, Executive Office Building, Washington 25, D.C.)

Rachel Carson can be legitimately charged with having exceeded the bounds of scientific knowledge for the purpose of achieving shock; but her principal point—that pesticides are being used in massive quantities with little regard for undesirable side effects—permeates the PSAC report and is the basis for a series of recommendations aimed at minimizing risks and maximizing the benefits of pesticide use. The report stands as no more than an expression of influential opinion on what should be done, and it should be recognized that there is a big gap to be filled between recommendation and achievement.

But widespread public concern linked to a PSAC imprimatur provides impressive thrust for a technical-political cause, and if at year-end there is not something new in government policy and procedure on pesticide use, it will indeed be remarkable. Viewed in terms of the immediate issue—safer use of pesticides—this is a worthy attainment, but from a broader point of view it also indicates that you *can* fight city hall if the cause is good and the shots are well aimed. Rachel Carson's stretching of scientific points is not easily excused, but she can be defended on the grounds that she did no more than shout that the whole city was on fire, when, actually, only two-fifths was ablaze. Prior to her shouting, virtually no one was paying attention, and it is a fact that the PSAC study itself, though previously contemplated, finally got under way only after she aroused a public furor.

Though it ranges broadly over the pesticide issue, the report particularly concentrates attention on the long-range effects of low-level doses and possible synergistic effects of pesticides and other substances. Opening with a defense of the "proper" use of pesticides, the report states that they are here to stay as the means for protecting the nation's food supply and controlling disease; the task, it says, is not to revert the pre-pesticide days but to devise the means for extracting good and eliminating harm from necessary attempts to manipulate nature. It does not rule out alternative methods of pest control—such as predators, parasites, and sterile males—but, while urging an expansion of research in these areas, it argues that they have limitations which make chemical control a necessary part of the anti-pest arsenal.

Pointing out that the United States alone used 350 million pounds of pesticides in 1962, the report estimates that 1 out of 12 acres in the 48 mainland states were treated with pesticides in that year; that 45 million pounds are used each year in urban areas and around homes; and that aerosol "bug bomb" sales amounted to more than one per household. "In recent years," it adds, "we have recognized the wide distribution and persistence of DDT. It has been detected at great distances from the place of applications. . . . DDT has been found in oil of fish that live far at sea and in fish caught off the coasts of eastern and western North America, South America, Europe and Asia. . . . Residues of DDT and certain other chlorinated hydrocarbons have been detected in most of our major rivers, in ground water, in fish from fresh waters, in migratory birds, in wild mammals and in shellfish. Small amounts of DDT have been detected in food from many parts of the world, including processed dairy products from the United States, Europe, and South America." These levels, it emphasizes, have been "very low and rarely above the legal tolerance limit" for products in interstate commerce, and "people ingesting large amounts of DDT usually suffer no apparent ill effects," but it goes on to point out that the tolerances are backed by seemingly inadequate research on longterm effects. Then, in Rachel Carson fashion, it proceeds to some vivid and, to the uninitiated, hair-raising examples of what a lot of damage a little pesticide can do. "For example, pink shrimp have been experimentally poisoned by 0.9 parts per billion of heptachlor. . . . The growth of young oysters has been inhibited by concentrations as low as three parts per 100 million of chlordane, heptachlor, or rotenone. Five other commonly used pesticides inhibit oyster growth in concentrations of 1 part per 10 million.

"An entire year's production of young salmon was nearly eliminated in the Miramichi River in New Brunswick in 1954, and again in 1956 . . . from DDT applications of one-half pound per acre for control of spruce budworm. Stream insects, which are a most important food for young salmon, disappeared and failed to return within two years. Surviving young salmon were very thin. In British Columbia, mortality of coho salmon approached 100 percent in at least four major streams after the surrounding forests were sprayed with one pound of DDT per acre for control of the blackheaded budworm."

In appraising the government's procedures for controlling the use of pesticides, the report finds that the "present mechanisms are inadequate" and that "the existing Federal advisory and coordinating mechanisms [should] be critically assessed and revised as necessary to provide clear assignments of responsibility for control of pesticide use." This is a courteous way of saying that at present, pesticide control constitutes a case study in administrative confusion. Regulations governing the use of pesticides are administered by the U.S. Department of Agriculture (USDA). If a proposed pesticide is not intended for use on food crops, USDA is authorized to certify it for use on the basis of experimental data submitted by the manufacturer. If it is intended for food crops, however, and its use leaves a residue on the product, the Food and Drug Administration (FDA) must establish a tolerance. When a tolerance has been set by FDA, it is then certified by USDA for interstate and foreign commerce, but there is a loophole that could easily accommodate a squadron

of crop dusters: if the manufacturer protests a USDA refusal of certification, USDA *must* grant certification, and, as the PSAC report points out, "At present, the purchaser cannot distinguish such a product from one which has been accepted for registration because the label does not carry any indication of its unsanctioned status." (The "protest" registrations, like the sanctioned registrations, remain in effect for 5 years, unless USDA successfully assumes the burden of establishing that the substance is unacceptable. In actual practice, the protest registrations are relatively insignificant, at least in number. According to USDA, they now total fewer than 25 out of 54,000 registrations.)

Furthermore, the panel notes, while the Fish and Wildlife service is responsible for protecting the nation's wildlife, existing pesticide control regulations are directed toward the well-being of man and domestic animals, leaving wildlife without any legal or administrative protection against the spray nozzles.

Appended to these jurisdictional arrangements is a further source of confusion—a number of interdepartmental bodies whose performance inspired no praise from PSAC. First of all, there is the Federal Pest Control Review Board established in 1961 and consisting of representatives of the Departments of Agriculture, Interior, Defense, and Health, Education, and Welfare. Then there is an Interdepartmental Committee on Pest Control, which exchanges information on control programs, and an Armed Forces Pest Control Board, which is concerned with Department of Defense pest control activities.

None of these, the report states, has power to regulate the use of pesticides after sale, except in federal programs and by the indirect means of establishing residue tolerances. The Interdepartmental Committee, it adds, has not used consultants from outside the government, and, although programs have been modified as a result of reviews, "the discontinuation of a program has not been recommended."

This is the closest that the PSAC group comes to acknowledging that among the involved agencies, with their varying jurisdictions and goals, a mighty row has been going on, mostly out of public sight, for some time now. Stated simply, the Department of Agriculture is against bugs, and wants to go after them wholesale; the Fish and Wildlife Service is aghast, but largely helpless, in the face of broadcast spraying of vast regions by Agriculture; and the Food and Drug Administration, which is understaffed for the enormous task of setting tolerances on the flood of pesticides that hit the market each year, would like everyone to slow down, in and out of government, while it catches up with its work.

The PSAC report generally treads a diplomatic line through these interagency disputes, but it does come out flatly against massive efforts at pest eradication. The goal is "laudable" it says, "but seldom realistic," in comparison with "control" programs. Such programs, it says, "apply pesticides in less volume, to a smaller land area, with fewer undesirable side effects at any one time, yet produce the same economic results. The gypsy moth, fire ant, Japanese beetle, and white-fringed beetle programs, which have continued for years, are examples of failures of the 'eradication' approach. The acceptance of a philosophy of control rather than eradication does not minimize the technical or economic importance of a program, but acknowledes the realities of biology. As new control techniques such as male sterilization or highly specific attractants are developed for practical use, the elimination of some of our alien pests may become technically and economically feasible.

"In 1962," it continues, "the Federal Government supported control programs involving the application of pesticides to more than four million acres of land at a cost of about $20 million. . . .

"The Panel feels that Federal programs should be models of correct practice for use in the guidance of states, localities and private users. They should, therefore, be conducted not only with attention to maximum effect on the target organisms, but with further evaluation of the associated hazards. . . ."

Specifically, the PSAC group recommended the following:

1) Development under HEW auspices, of a comprehensive data gathering program and, in cooperation with other departments, a continuing network to monitor residues;

2) Federal funds to assist states in monitoring pesticide levels in intrastate products;

3) Rapid completion of FDA's current review of residue tolerances, to be followed by a re-evaluation of toxicological data; for this purpose it was recommended that the National Academy of Sciences nominate a panel;

4) Improved coordination among federal agencies;

5) An expansion of research on specific controls, and a shift away from broad spectrum chemicals;

6) More research on toxicity, especially on reproduction, chronic effects, and synergism and potentiation with such commonly used drugs as sedatives, tranquilizers, analgesics, antihypertensive agents, and steroid hormones;

7) Expanded research, by the Department of the Interior on toxic effects of pesticides on wild vertebrates and invertebrates;

8) A general expansion of training and research financed with grants to universities and other nongovernmental research organizations;

9) Elimination of protest registrations; and

10) With a gesture of appreciation to the public education role performed by Rachel Carson, public education programs on the use and toxic nature of pesticides.—D. S. GREENBERG

NIH officials are considering experiments that might be performed to determine the perspiration-producing qualities of vinegar (*Science*, 3 May 1963). Interest in vinegar's utility for this purpose was expressed at NIH's appropriations hearings by Congressman John Lesinski (D.-Mich.). Lesinski told G. Donald Whedon, director of the National Institute of Arthritis and Metabolic Diseases, that vinegar, taken internally, "has the ability to bring out perspiration" and should be compared with pilocarpine, a substance which is placed on the skin to produce sweat for cystic fibrosis testing. At the hearing, Whedon indicated his doubts, but said he would be glad to comply with Lesinski's request. NIH officials said they are examining a range of possibilities from "a formal experiment," to simply collecting material on what is known on the subject. They added that they do not intend to volunteer a reply to Lesinski, but because of increasingly difficult relations between Congress and NIH, they feel they "have to have an answer."—D.S.G.