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Agricultural Pesticides: The Need for Improved Control Legislation

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Agricultural Pesticides: The Need for Improved Control Legislation

I. INTRODUCTION

There has been a growing public awareness and concern, particularly since the publication of Rachael Carson's *Silent Spring*,¹ over the health threat caused by the widespread use of chemical pesticides. Presently, some two hundred basic chemicals, and thousands of commercial formulations are being used in agriculture.² In the continental United States alone some two hundred and twenty-five million pounds of pest control materials are annually applied to crops and forests, while fourteen million pounds of fumigants are used each year for stored materials.³ These control chemicals are designed to kill living organisms. When used prudently they kill only those destructive organisms for which their use was intended. However, when used without caution they can be a serious threat to human health.⁴

1. R. CARSON, *SILENT SPRING* (1962). Several others have written about the dangers inherent in the use of pesticides. See, e.g., L. HERBER, *OUR SYNTHETIC ENVIRONMENT* (1962); J. RODALE, *OUR POISONED EARTH AND SKY* (1964). However, Miss Carson's book created the greatest public awareness of the danger of pesticides. In fact, the PRESIDENT'S SCIENCE ADVISORY COMM., *REPORT ON USE OF PESTICIDES 23* (1963), specifically acknowledged the important role that *Silent Spring* played in alerting the public to pesticide toxicity.

Miss Carson's work has also been criticized. In 1965 the Surveys and Investigations Staff of the House of Representatives' Committee on Appropriations reported that scientists and physicians thought the book drew incorrect conclusions from given facts and made misleading implications of fact based on unproved possibilities. *Hearings on Dept. of Agriculture Appropriations for 1966 Before the Subcomm. on Dept. of Agriculture and Related Agencies Appropriations of the House Comm. on Appropriations, 89th Cong., 1st Sess., pt. 1, at 168* (1965) [hereinafter cited as *Appropriation Hearings*].

2. Although there are only about 200 basic chemicals in actual use, 900 pesticidally active ingredients are now known and there are more than 60,895 registered pesticide products. Generally, these pesticides are grouped into classes according to the organisms they kill. These classes are: insecticides, rodenticides, fungicides, and herbicides. The word pesticide is, of course, intended to encompass all of these classes. R. RUDD, *PESTICIDES AND THE LIVING LANDSCAPE 4* (1964).

3. These figures may substantially understate the actual use. See *Science Predicts a Growing Danger*, *BUS. WEEK*, May 13, 1967, at 43, for a chart showing recent increases in pesticide sales.

4. The use of pesticides may also cause harm to adjoining crops. While a chemical is being applied it will often be carried by wind or air currents to an adjoining field, killing valuable crops. For a discussion of the relative rights involved in this type of situation see Chapman, *Crop Dusting—Scope of Liability and a Need for Reform in*

Governmental authority has recognized this threat. President Kennedy appointed a panel to investigate the use of pesticides in the United States,⁵ Congress has taken an independent look at the problem,⁶ and state authorities have also shown interest.⁷ Extensive governmental testing programs have been carried out and others are presently being conducted.⁸ Moreover, agencies using some of the most dangerous chemicals have openly recognized the need to curtail, or at least use caution in their activities.⁹ Despite all this activity, the use of pesticides in the private sector has continued without adequate governmental control.

The concern over the continued use of agricultural pesticides is clearly justified. The average concentration in human fatty tissue of DDT, the most widely used chemical pesticide, has risen constantly over the last fifteen years.¹⁰ In 1958 the average amount of DDT and its metabolites found in the human body was estimated to be between five and six parts per million, while

the Texas Law, 40 TEXAS L. REV. 527 (1962); Note, *Regulation and Liability in the Application of Pesticides*, 49 IOWA L. REV. 135 (1963); Note, *Liability for Chemical Damage from Aerial Crop Dusting*, 43 MINN. L. REV. 531 (1959).

5. PRESIDENT'S SCIENCE ADVISORY COMM., REPORT ON THE USE OF PESTICIDES (1963).

6. *Hearings before the Subcomm. on Reorganization and International Organizations of the Senate Comm. on Government Operations*, 88th Cong., 2d Sess. (1965) [hereinafter cited as *Operations Committee*].

7. See, e.g., New Hampshire, *Interim Committee Report on Improved Pesticide Controls* (1964).

8. See FISH & WILDLIFE SERVICE, PESTICIDE-WILDLIFE STUDIES BY STATES, PROVINCES, AND UNIVERSITIES: AN ANNOTATED LIST OF INVESTIGATIONS THROUGH 1964 (1965). The Department of Agriculture is setting up approximately fifty-five stations to test pesticide residues. The Public Health Service is also measuring the amount of human exposure to pesticides. See J. WHITTEN, *THAT WE MAY LIVE* 65-66 (1966).

For the results of private studies see, e.g., Barker & Morrison, *Breakdown of DDT in Mouse Tissue*, 42 CANADA J. ZOOLOGY 324 (1964); Pillmore & Finley, *Residues in Game Animals Resulting From Forest and Range Insecticide Applications*, 28 NORTH AM. WILDLIFE & NATURAL RESOURCES CONFERENCE TRANSACTIONS 409-22 (1963).

9. Orders issued by Secretary of the Interior Udall in 1964 instructed that use of compounds "known to concentrate in living organisms" be avoided and that priority be given to nonchemical control methods. *Stringent Rules Ordered in Using Pesticides on Interior-Administered Lands*, Department of the Interior News Release, September 4, 1964.

10. In one study, the average meal in a typical restaurant contained two one-hundredths part per million of DDT. R. RUDD, *PESTICIDES AND THE LIVING LANDSCAPE* 153-54 (1966). DDT accounts for about one-third of the dietary intake of chlorinated pesticides. Duggan & Weatherwax, *Dietary Intake of Pesticide Chemicals*, 157 SCIENCE 1006, 1010 (1967).

in 1963 the average amount was up to approximately twelve parts per million.¹¹ This increase is attributed to the constant presence of DDT in and on our foods.¹² Traces of other chemical pesticides have also been found in the human tissue.¹³

The precise effects on humans of this gradual buildup of chemical residues has yet to be determined. While no reported death has been directly linked to a gradual accumulation of poisonous deposits, several deaths have been caused by direct exposure to these chemicals.¹⁴ A discovery that buildup causes deleterious effects on the general human population¹⁵ may come when the situation is no longer redeemable since buildup will have already occurred.

This poisonous buildup in the human body is relatively slow, and is unnoticed except by those who study the problem and by those who have been crippled through direct contact with the poisons.¹⁶ The deleterious effect of the indiscriminate use of pesticides has been spectacularly illustrated in its effect on wildlife, where the life span is shorter and the body tissues do not admit gradual absorption. For example, a large number of fish were killed in the Mississippi River after riparian fields had been sprayed with DDT.¹⁷ Large quantities of birds, particularly robins, have died from the chemical campaign against the Dutch Elm disease,¹⁸ and in the southern United States, where chemicals are widely used on cotton crops,

11. See R. RUDD, *supra* note 10.

12. See *id.*

13. See Hoffman, Fishbein & Andelman, *Pesticide Storage in Human Fat Tissue*, 188 J.A.M.A. 819 (1964).

14. One hundred and fifty deaths a year have been reported as caused by pesticides. Because of the ineffectiveness of the reporting procedures, some have suggested that the actual number might be many times this figure. *Operations Committee*, pt. 2, at 395. Some of these deaths have led to civil suits. See, e.g., *Hubbard-Hall Chem. Co. v. Silverman*, 340 F.2d 402 (1965); *Tampa Drug Co. v. Wait*, 103 So. 2d 603 (Fla. 1958).

15. It is already known that some chemicals can heighten the effect of drugs introduced into the body. See Graham, *The Effect of Some Organo-phosphorus and Chlorinated Hydrocarbon Insecticides on the Toxicity of Several Muscle Relaxants*, 9 J. PHARM. & PHARMACOL. 312-19 (1957).

16. See *Gonzalez v. Virginia-Carolina Chem. Co.*, 239 F. Supp. 567 (E.D.S.C. 1965).

17. See U.S. DEPT. OF HEALTH, EDUCATION & WELFARE, REPORT ON INVESTIGATION OF FISH KILLS IN LOWER MISSISSIPPI RIVER, ATCHAFALYAN RIVER, AND GULF OF MEXICO (1964).

18. See CRANBROOK INSTITUTE OF SCIENCE, BIRD MORTALITY IN THE DUTCH ELM DISEASE PROGRAM (1961). During some spraying programs all forms of wildlife in the treated area have been either killed or driven off. See J. RODALE, OUR POISONED EARTH AND SKY (1964).

beekeeping as an industry has nearly died out.¹⁹ Whether or not these examples illustrate imminent danger to general human health is unclear,²⁰ but there is no real question that dangers exist.

On the other hand, pesticides are vital to the health of agriculture. Without them, the yields in many of the basic food and fiber crops would be cut from ten to twenty-five per cent,²¹ while fruit and vegetable yields would be cut some forty to eighty per cent.²² Such a drop in production would not only unfavorably affect the farm producer,²³ but according to many farm experts, a long range drop in American farm production could have a very serious effect on the world food supply.²⁴

If insecticide use was terminated, the timber industry would also be injured.²⁵ Many acres of the nation's forests are treated with pesticides.²⁶ Such treatment is essential to healthy forests.²⁷ Considering that these forests produce jobs for approximately three and three-tenths million people and annually add

19. Todd & McGrego, *Insecticides and Bees*, INSECTS: THE YEAR-BOOK OF AGRICULTURE 131 (1952). In contrast, California beekeepers are prospering because pesticides have killed off the wild insects that normally pollinated the fruit and vegetable crops. Domestic beekeepers are paid to bring their bees to the crops for pollination and the beekeepers derive as much income from this service as from the honey the bees produce. *Busy With the Bees*, TIME, March 15, 1968, at 86.

20. It has been suggested that the amount of DDT stored might at some point reach an equilibrium with the amount ingested. Hayes, *Storage of DDT and DDE in People with Different Degrees of Exposure to DDT*, 18 A.M.A. ARCHIVES OF INDUSTRIAL HEALTH 398 (1958).

21. NATIONAL ACADEMY OF SCIENCES, *EVALUATION OF PESTICIDE-WILDLIFE PROBLEMS*, pt. 1, at 4-5 (1962).

22. *Id.*

23. For a comprehensive statement of the general level of agricultural income see NATIONAL ADVISORY COMM. ON FOOD AND FIBER, *FOOD AND FIBER FOR THE FUTURE* (1967).

24. According to projections, world population is likely to double by the year 2000. Even with the present use of pesticides, there is doubt as to whether food production can keep up with this population increase. *Id.* at 1.

25. In spite of the amounts of pesticides now being used, the saw-timber annually lost because of the destructive activity of pests would build one and one-third million American homes. U.S. Dep't of Agriculture Forest Service, *Saving the Forests and Related Wildlife Resources from Insects and Disease*, PA-666, at 7 (1965).

26. In 1962, almost 1.2 million forest acres were sprayed with pesticides. *Operations Committee*, pt. 1, at 17. The forest acres sprayed in 1962 amounted to 0.3% of the total forest acreage. *Id.* The U.S. has 489 million acres of commercial forest land and 175 million acres of noncommercial forest land. U.S. Dept. of Agriculture Forest Service, *supra* note 25, at 2.

27. U.S. Dep't of Agriculture Forest Service, *supra* note 25, at 5.

\$25 billion to the gross national product,²⁸ the use of appropriate pesticide control has considerable effect on the national economy. Also, pest control is necessary to protect the nation from disease, as many diseases deadly to man are carried by pests.²⁹ Twenty-seven of these diseases, including malaria, encephalitis, and yellow fever, have been largely controlled by pesticides.³⁰

Thus, it is obvious that legal efforts must be directed at protecting society from a gradual poisoning of its people and wildlife, while preserving the use of insecticides for needed agricultural and forest products, as well as disease fighting capacities.³¹ This Note will examine the present judicial and legislative responses to the problems caused by the current use of chemical pesticides and suggest adjustments that might be made to deal with them more adequately.

II. JUDICIAL AND LEGISLATIVE RESPONSES

A. THE COMMON LAW

Much of the applicable case law concerns criminal prosecutions brought under the Federal Pesticide, Fungicide, and Rodenticide Act,³² or its predecessor, for mislabeling or misbranding. Prosecutions have been brought where the labeling is deceptive,³³ where the manufacturer's claims on the label would bring a chemical under the Act even though it contains only inert ingredients,³⁴ or where the Secretary considers a product

28. *Id.* at 6.

29. Belval, *Fight for Survival*, 44 TODAY'S HEALTH 48 (1966).

30. At one time malaria, for example, was a dread disease in the southern United States, but now, due to the successful use of pesticides, the disease is virtually nonexistent. See Bishopp & Philip, *Carriers of Human Diseases*, INSECTS: THE YEARBOOK OF AGRICULTURE 147 (1952).

31. However, the use of chemicals is not the only alternative to the above needs. Nonchemical methods have been proposed and used successfully in some areas. In addition, some so-called "short-lived" chemicals have been developed which normally will not result in a residue on foods. Also, chemicals more selective than DDT or other widely used pesticides have been used with some success to avoid killing nontarget organisms. However, the chemical industry as yet has not developed alternative methods sufficiently effective to replace the use of the conventional pesticides. See U.S. DEP'T OF AGRICULTURE, AGRICULTURAL RESEARCH SERVICE, RESEARCH ON CONTROLLING INSECTS WITHOUT CONVENTIONAL INSECTICIDES (1963).

32. 7 U.S.C. § 135 (1964).

33. *United States v. Two Cans of Chloronaptheum Disinfectant*, 217 F. 477 (D. Md. 1914).

34. *United States v. 681 Cases, More or Less, Containing "Kitchen Klenzer"*, 63 F. Supp. 286 (E.D. Mo. 1945). The product involved was not an active pesticide, but simply a scouring agent. The manufac-

to be an "economic poison" although the manufacturer markets it as a disinfectant.³⁵

Aside from these criminal cases, substantial common law concerns the actual use of agricultural pesticides. It has been held that an injunction can be brought under the Food and Drug Act if the government can establish a reasonable possibility, as opposed to a probability, that the food treated with the pesticide will be injurious to health.³⁶ It has further been held that there is a common law duty on the manufacturer to warn of latent dangers in pesticides.³⁷ Although a failure to observe the state and federal labeling requirements constitutes negligence, compliance will not be a sufficient defense against a claim of negligence.³⁸ The manufacturer also has a duty to keep abreast of scientific discoveries so that he can adequately warn the pesticide user of the possible harmful effects of his product.³⁹

However, recovery for injuries caused by labeling defects will oftentimes be unavailable. When the defect in the label has been caused by incorrect tolerance levels set by the government, sovereign immunity and the Federal Tort Claims Act would seemingly operate to deny recovery.⁴⁰ Successful actions by consumers against the manufacturer or the user of the pesticides are unlikely because of an insurmountable proof problem inherent in the physiological nature of pesticides and their effects on man. Small residues building up in human tissues may not immediately cause measurable damage.⁴¹ The con-

turer's label said "antiseption" and the prosecution argued that this implied that the product contained active fungicides, thereby bringing the product within the Act.

35. *United States v. Weinreb*, 99 F. Supp. 763 (S.D.N.Y. 1951).

36. *See, e.g., United States v. International Exterminator Corp.*, 294 F.2d 270 (5th Cir. 1961).

37. *McClanahan v. California Spray-Chem. Corp.*, 194 Va. 842, 75 S.E.2d 712 (1953).

38. *Gonzalez v. Virginia-Carolina Chem. Co.*, 239 F. Supp. 567 (E.D.S.C. 1965).

39. *LaPlant v. E.I. du Pont de Nemours & Co.*, 346 S.W.2d 231 (Mo. Ct. App. 1961).

40. The Federal Tort Claims Act provides immunity from any claim based upon an act or omission of an employee of the Government, exercising due care, in the execution of a statute or regulation, whether or not such statute or regulation be valid, or based upon the exercise or performance or the failure to exercise or perform a discretionary function or duty on the part of a federal agency or an employee of the Government, whether or not the discretion involved be abused.

28 U.S.C. § 2860(a) (1964).

41. According to the FDA only about 19 thousandths of a milligram of pesticide are ingested daily by the American public. *Few Pesticides in Dinner*, 62 SCI. DIG. 29 (1967). In the opinion of the United

sumer, moreover, cannot trace these small deposits to their origin and, should injury or death ultimately result from their accumulation, no single source may be the proximate cause.⁴² The only civil tort recoveries to date have been by persons who are injured by direct contact with the pesticide.⁴³

B. FEDERAL LEGISLATION

For nearly sixty years Congress has recognized a need for some national controls on the production and use of pesticides.⁴⁴ Prior to World War II, use of pesticides on a massive scale was unknown⁴⁵ and federal law dealt primarily with pesticide labeling practices.⁴⁶ Post-war agricultural changes and pesticide development have increased congressional concern for the public safety.

Agricultural poisons are regulated by the Federal Insecticide, Fungicide, and Rodenticide Act of 1947,⁴⁷ which was last amended in 1964. The Act provides that it shall be unlawful to distribute, sell, or offer for sale any "economic poison"⁴⁸ which has not been registered by the Department of Agriculture (USDA), or which differs in composition from the representations made at the time of registration, or which is being

Nation's World Health Organization's Working Party, the minimum biological data that would be necessary to set an "acceptable daily intake" level is not available. *Pesticide Warning*, 92 SCI. NEWS LETTER 495 (1967).

42. See W. PROSSER, *THE LAW OF TORTS* § 51 (3d ed. 1964).

43. *E.g.*, *Gonzalez v. Virginia-Carolina Chem. Co.*, 239 F. Supp. 567 (E.D.S.C. 1965).

44. See Act of April 26, 1910, ch. 191, 36 Stat. 331.

45. See FOOD & DRUG ADMINISTRATION, *FACTS FOR CONSUMERS, PESTICIDE RESIDUES 1* (1963); Note, *Liability for Chemical Damage from Aerial Crop Dusting*, 43 MINN. L. REV. 531 (1959); Chapman, *Crop Dusting—Scope of Liability and a Need for Reform in the Texas Law*, 40 TEXAS L. REV. 527 (1962).

46. In 1947 Congress enacted the basic structure of what is now the Federal Insecticide, Fungicide, and Rodenticide Act, 24 U.S.C. §§ 135a-k (1964).

47. 61 Stat. 163 (1947), as amended, 7 U.S.C. § 135 (1964).

48. The Secretary of Agriculture has the power to determine whether a substance is an economic poison. 7 U.S.C. § 135(d) (2) (1964). Under the Act,

the term "economic poison" means (1) any substance or mixture of substance intended for preventing, destroying, repelling, or mitigating any insects, rodents, nematodes, fungi, weeds, and other forms of plant or animal life or viruses, except viruses on or in living man or other animals, which the Secretary shall declare to be a pest, and (2) any substance or mixture of substance intended for use as a plant regulator, defoliant or desiccant.

7 U.S.C. § 135 (1964).

marketed in such a way that the claims made for it or the directions for its use differ in substance from the representations made at registration.⁴⁹ Registered poisons are required to have affixed a specified label⁵⁰ and, if the poison contains a substance highly toxic to man, the label shall bear the skull and crossbones, the word "poison," and a statement of the antidote.⁵¹ It is also unlawful to distribute, sell, or offer for sale any economic poison which is adulterated or misbranded.⁵²

Any party seeking registration of a chemical to be used on food crops must list with the USDA the crops on which the chemical is expected to be used, give the quantity to be used for each crop to which it is to be applied, and describe the exact procedure to be used in the application.⁵³ The applicant is also required to run residue tests to determine the safety of the chemical submitted for registration. The USDA may directly contact the scientists who conducted the tests for the manufacturer. If the Department does not contact the scientists who actually conducted the tests, it will take action on the basis of the report submitted by the applicant. The USDA does not run its own residue tests and, after registration, re-testing is rare.⁵⁴

If the Secretary finds, on the basis of the manufacturer's tests, that the chemical does not achieve the claims made for it, or if the labeling requirements are not met, or if in some other way the application does not comply with the Act, the applicant is notified of the defect. If he does not make the requested corrections the application is refused. The applicant may then request either that the matter be submitted to an advisory committee which will report to the Secretary, or that he be given a hearing.⁵⁵ Judicial review of the decisions has expressly been made available.⁵⁶

Should it appear from an examination of the scientific data submitted by the applicant that the chemical will leave no

49. 7 U.S.C. § 135a(a) (1) (1964).

50. 7 U.S.C. § 135a(a) (2) (1964).

51. 7 U.S.C. § 135a(a) (3) (1964).

52. 7 U.S.C. § 135a(a) (5) (1964).

53. See *Appropriations Hearings* 171. The Secretary may also require the applicant to submit the complete formula for the product sought to be registered. 7 U.S.C. § 135b(b) (1964). The Act protects the applicant by providing criminal penalties for use or revelation of information about the formulas. 7 U.S.C. § 135f(c) (1964).

54. *Appropriations Hearings* 170-71.

55. 7 U.S.C. § 135b(c) (1964). The submission of the dispute to the advisory board does not preclude a later hearing.

56. 7 U.S.C. § 135b(d) (1964).

residue on a specific crop, the chemical is registered for use on that crop on a "no residue" basis.⁵⁷ This means that if any residue is later discovered, whatever the means of detection, there has been a violation under the Act. If the product does leave a detectable residue, no registration will be allowed until a tolerance level has been set; that is, until it has been determined how much of the pesticide, in terms of parts per million by weight, will be allowed to remain on food.

This tolerance level is not set by the USDA but by the Food and Drug Administration (FDA), acting under the Food and Drug Act of 1938.⁵⁸ In order to have a tolerance established, the applicant must submit to the FDA⁵⁹ information regarding the smallest amount of the chemical which will cause adverse effects on test animals, the amount of residue that will remain if the pesticide is correctly applied, the pattern of normal use for each food involved, and a proposed method of analysis to be used to enforce the tolerance level.⁶⁰ When the applicant makes his petition to the FDA, the USDA must certify to the FDA that the pesticide is useful and that the pesticide will or will not leave a residue within the manufacturer's proposed level of tolerance.⁶¹ Where the FDA considers it appropriate to do so, the tolerance level may be set at zero.⁶² If the established tolerance figure is sanctioned by the USDA, it will register the pesticide for use in interstate commerce.⁶³ If new hazards to human health are later discovered, the tolerance level may be lowered even after registration.⁶⁴

57. Over the ten-year period, 1955-1965, 228 active ingredients were registered on a "no residue" basis. *Appropriations Hearings*, pt. 1, at 173.

58. 21 U.S.C. § 346 (1964).

59. The Act gives responsibility for the setting of tolerance levels to the Department of Health, Education, and Welfare. However, the actual administration of the Act is carried out by the Food and Drug Administration. See 21 C.F.R. § 121.1 (1967).

60. Both a notice of how to petition and a notice of the proposed method of analysis are published in the *Federal Register*. 21 C.F.R. § 121.51 (1967).

61. 21 U.S.C. § 346a(a)(1) (1964).

62. 21 U.S.C. § 346a(b) (1964). When setting tolerances, the FDA presumes that no substance not commonly added to food will be considered safe until its safety has been proven. 21 C.F.R. § 121.3(a) (1967).

63. In establishing regulations regarding tolerances, the Secretary of HEW must give consideration to the necessity for a wholesome food supply, to other ways in which the chemical might be absorbed by the human body, and to the opinion of the Secretary of Agriculture. 21 U.S.C. § 346a(b) (1964).

64. The FDA has decreased an established tolerance to zero for aramite, DDT, and heptachlor. *Appropriations Hearings*, pt. 1, at 172.

An applicant is allowed to petition for exemption from the tolerance requirements, and may obtain a hearing and judicial review.⁶⁵ Criminal prosecution is available under the statute for violations of agency tolerance regulations. To prosecute, a danger to public health need not be proven, but only that there has been a violation of the regulations.⁶⁶

Several problems in the federal procedures have been suggested. First, the responsibility for pesticide control is so splintered that in practice the federal programs are not efficiently administered and, as a result, both the public health and the producers and users of pesticides have been unnecessarily victimized.⁶⁷ For example, in 1958,⁶⁸ the USDA registered the herbicide aminotriazole on a no residue basis because the proposed method of use would not, according to the manufacturer's tests, result in a residue. Learning that aminotriazole was being used improperly on cranberries and that a residue did exist, the Department of Health, Education, and Welfare (HEW) issued a press release calling attention to the public health hazard, while seizing some 300,000 pounds of cranberries. The USDA opposed the publicity because it unnecessarily alarmed the public and the public was fully protected if the cranberries were tested and those found to be contaminated were taken off the market. Ten days after the release of the press notice, the Secretary of HEW agreed to a plan for testing and labeling cranberries, destroying those found contaminated.⁶⁹ The lack of

65. 21 U.S.C. § 346a(i) (1964).

66. It has been held that the statutory opportunity for a hearing on the validity of the regulation gives the defendant adequate protection. *United States v. Bodine Produce Co.*, 206 F. Supp. 201 (D. Ariz. 1962).

One who violates the tolerance levels

shall be guilty of a misdemeanor and shall on conviction thereof be subject to imprisonment for not more than one year, or a fine of not more than \$1,000, or both such imprisonment and fine; but if the violation is committed after a conviction of such person under this section has become final such person shall be subject to imprisonment for not more than three years, or a fine of not more than \$10,000, or both such imprisonment and fine.

21 U.S.C. § 333 (1964).

67. See *Operations Committee*, pt. 1, at 206 (statement of Rachael Carson).

68. The 1964 amendment to the Federal Insecticide, Fungicide, and Rodenticide Act dealt largely with the elimination of protest registrations and would not affect the problem herein discussed. 7 U.S.C. § 135 (1964).

69. To the extent that the cranberries violated established tolerance levels they were contaminated. However, there is serious question as to whether they were any real hazard to public health. Although it was claimed that the cranberries could produce cancer, a person would

coordination between HEW and the USDA cost cranberry growers approximately eight and one-half million dollars, which was eventually the cost to the Treasury when the growers were reimbursed.⁷⁰

There has also been a lack of coordination between the FDA and USDA. For example, the USDA registered endrin for use on cauliflower and Brussels sprouts on a "no residue" basis. At that time, 1956, the sensitivity of the method used to test tolerance levels was accurate only to 0.1 parts per million. In 1963, the FDA, using new detection devices, seized cauliflower based on a testing level of 0.03 parts per million of endrin. The USDA was not advised of this action until it had already taken place. According to one official, if the USDA had been advised of the new and more sensitive testing methods the whole problem could have been averted by requiring a change in the instructions for use.⁷¹

A corollary problem relates to the "no residue" and "no tolerance" registrations. The terms themselves have been a source of much difficulty. Conceptually, neither the term "no" nor the term "zero" means an absolute absence of any residue. Rather, they can be technically defined as parts per million below the infinitesimal. Thus, scientifically, the statutory terms are not absolute, but theoretical amounts.⁷² However, when enforced these terms take on an absolute character and, in effect, mean the smallest amount the FDA is able to measure. For example, until 1963, since detection devices were not useful below 0.1 parts per million, the "zero" tolerance registration actually meant a 0.1 parts per million tolerance. When detection devices were improved the statutory terms became considerably more restrictive.⁷³ This procedure, which leaves no room for

have to consume, throughout his entire life span, 15,000 pounds of "contaminated" cranberries per day in order to be in any danger of actually contracting the disease. Address by H. Thomas Austen, Second Annual Charles Wesley Dunn Food and Drug Lecture, delivered at the Harvard Law School, March 22, 1960.

70. *Appropriations Hearings*, pt. 1, at 175-79. The report given by the subcommittee's Surveys and Investigations Staff gives eight major instances in which damage was caused by lack of governmental coordination.

71. The cost to the growers of this governmental failure was over \$40,000. *Appropriations Hearings*, pt. 1, at 181-83.

72. In 1963, the President's Advisory Committee recommended that the National Academy of Science—National Research Council be requested to make a study of this problem. Subsequently, the Secretaries of both the USDA and HEW requested such a study. *Appropriations Hearings*, pt. 1, at 172.

73. Between 1955-1962 residues could be measured only to the

scientific interpretation or judgment and which is unrelated to the purposes of the statute,⁷⁴ is difficult to justify.

Moreover, in several cases there has been criminal prosecution, not because the chemicals were thought potent or dangerous, but because detection devices were improved.⁷⁵ Thus, in the endrin case, the growers were taken completely and unnecessarily by surprise.⁷⁶ In another case, the person prosecuted for violation of tolerance limits testified that he could have reduced the residue amounts if given notification that the amounts of authorized residue had, in effect, been changed.⁷⁷ Thus, the present system can, and does, have a very basic unfairness. It would seem to be more rational, and certainly fairer, to relate tolerance levels to public safety rather than to the ability of scientists to detect smaller and smaller particles of matter.⁷⁸

Enforcement is another weakness in the federal pesticide control procedures. Presently, the FDA has eighteen laboratories located throughout the country,⁷⁹ with the power to seize any food products having residue in excess of the established tolerances. Moreover, it has the authority to seize food products on which "no residue" tolerance levels have been set when any residue is found.⁸⁰ The federal government, however, inspects only about one-third of one per cent of the two and one-half million interstate food shipments.⁸¹ By the FDA's own admission, its present enforcement level is inadequate to protect the American public.⁸²

level of about 0.1 p.p.m. Presently, if a large enough sample is used, residues as minute as 0.001 p.p.m. can be measured. *Appropriations Hearings*, pt. 1, at 173.

74. 21 U.S.C. § 346a (1964).

75. *Appropriations Hearings*, pt. 1, at 165.

76. See note 70 *supra*.

77. The individual had even sent samples to a private laboratory to determine whether his product contained any illegal residue. He was advised that it did not. *Appropriations Hearings*, pt. 1, at 183-84.

78. See J. WHITTEN, *THAT WE MAY LIVE* (1966).

79. *Appropriations Hearings*, pt. 1, at 171.

80. 21 U.S.C. § 334 (1964).

81. *Operations Hearings*, pt. 1, app. III, at 740. Of the samples taken by the FDA about half contain some type of pesticide chemicals and about 3% contain residue in excess of permissible tolerance levels. Duggan & Weatherwax, *Dietary Intake of Pesticide Chemicals*, 157 *SCIENCE* 1006 (1967).

82. *Operations Committee*, pt. 1, app. III, at 741. For example, although the tolerance on milk is now zero, most authorities agree that all milk now being sold in the United States contains some measurable pesticide residue. *Appropriations Hearings*, pt. 1, at 174. DDT alone was found in almost 1/3 of the milk tested in one study. See B. MOONEY, *THE HIDDEN ASSASSINS* 12 (1966); J. RODALE, *OUR POISONED EARTH AND SKY* 178 (1964).

Somewhat akin to the enforcement problem is the problem created by FDA changes in tolerance levels. From 1954 to 1965, the levels were changed eighteen different times. In fourteen cases the tolerances were increased, thus allowing greater amounts of residue, but in the other four cases the tolerances were decreased. To the extent that these levels could have been more accurately set earlier, the consumer is needlessly exposed to toxic dangers. The farmer may also suffer needlessly when tolerance levels are changed, particularly when crops are seized.⁸³ The farmer might be financially damaged when he has applied the chemical to a product which the new tolerance levels render unmarketable, or where he must change the equipment used to apply the pesticides, or where he must cease using chemicals already on hand. Such losses may occur although he believes that he is conducting his business within the law and has no prior notice that he is engaging in any unlawful conduct.

C. STATE LEGISLATION

Forty-seven states now have insecticide, fungicide, and rodenticide laws.⁸⁴ In general, these laws provide that economic poisons used to destroy or repel insects, rodents, fungi, and other plant and animal pests shall be registered with an appropriate state official; that adulterating and misbranding are prohibited; and that the product must bear a label showing its active ingredients with a warning statement as to the poisonous effects of the compound, the skull and crossbones, and the antidote, if known.⁸⁵

In addition to the registration of pesticides, some state statutes control the method of pesticide application.⁸⁶ In Minnesota, for example, those applying chemical compounds to crops for hire must obtain a license from the Commissioner of the State Department of Agriculture. Before issuing the license, the Commissioner may test the applicant to determine whether or not he is knowledgeable in the use of pesticides.⁸⁷ Each licensed

83. *Appropriations Hearings*, pt. 1, at 173.

84. *Operations Committee*, pt. 1, app. I, at 59.

85. For a brief synopsis of some of the state laws see VARIETY STORES ASS'N, *RETAILER'S MANUAL OF TAXES AND REGULATIONS* (17th ed. 1966).

86. As of June 26, 1963, twenty-nine states regulated aerial applicators and twenty-six regulated ground applicators. *Operations Committee*, pt. 1, at 331. This type of statute is as useful in preventing occupational disease caused by pesticides as it is in protecting public health from indiscriminate application. *Operations Committee*, pt. 3, at 603.

87. MINN. STAT. § 18.032(1) (1965).

person must keep complete records of the date of application, the type of chemical and the dosage used, the amount of area treated, and other relevant data.⁸⁸ The license is subject to revocation after notice and hearing if the licensee does not comply with the Act. In any event, the license must be annually reviewed.⁸⁹

Moreover, the person registered is expressly made "responsible" for seeing that the chemical is properly applied and that materials, dosages, and chemicals used are registered and administered within the limits of the federal regulations.⁹⁰ Since federal regulations limit the dosage and use of pesticides in accordance with federal tolerance levels, the federal tolerance levels are incorporated into the state system by such a statute.⁹¹ This incorporation is significant in that most states have no independent tolerance levels⁹² and the federal levels are not directly applicable to intrastate shipments.⁹³

The state acts, however, do not provide complete control. The Minnesota law, for example, does not apply to individual home owners, farmers who apply pesticides on their own land, or farmers who do service or exchange work for their neighbors.⁹⁴ Moreover, the person applying the chemicals is expressly exempted from liability if he applies the chemicals in accordance with the recommendation of the Commissioner of Agriculture or follows the instructions given by the manufacturer.⁹⁵

Because of the level of state enforcement, it is questionable whether the enactment of additional control measures would be useful. In 1963 a House Subcommittee, having sent questionnaires to states, received expenditure data revealing that in

88. MINN. STAT. § 18.032(3) (1965).

89. MINN. STAT. § 18.032(5) (1965).

90. MINN. STAT. § 18.032(2) (1965). The Act uses the term "responsible" but fails to indicate any criminal or civil penalties for non-compliance. However, the statute arguably opens the door for civil tort liability.

91. Enforcement of the Act is made the responsibility of the Commissioner of Agriculture. MINN. STAT. § 18.036 (1965).

92. Separate state research facilities would be costly in view of FDA expenditures to reach the same goal. Moreover, with the availability of federal tolerance levels, the states have little motivation to duplicate this established procedure. See H.R. REP. NO. 921, 88th Cong., 1st Sess. (1963). However, North Dakota and Texas provide for state tolerance levels. See N.D. CENT. CODE ch. 19-02, § 1-12 (1967); VERNON'S TEX. CIV. STAT. art. 4476-5, § 13 (1961). See also *Appropriation Hearings*, pt. 1, at 206.

93. 21 U.S.C. § 334 (1964).

94. MINN. STAT. § 18.034 (1965).

95. MINN. STAT. § 18.032(2) (1965).

the thirty-six states volunteering information, only \$785,149 and 161.6 man-years of work were spent annually on pesticide regulation.⁹⁶ These national figures appear inadequate when compared with those of regulating California where \$27,423 and 45.4 man-years were spent. This indicates that present consumer protection is largely in the hands of the federal government, whose authority extends only to interstate commerce, and which inspects only about one-third of one per cent of the interstate food shipments.⁹⁷

III. SOLUTIONS

Several methods of dealing with the inadequacies of the legislative responses to the pesticide problem are available. First, some program must be developed whereby the activities of the various governmental agencies can be better coordinated. In 1964 the Federal Pest Control Review Board was reorganized, the name being changed to the Federal Committee on Pest Control. The committee now has the responsibility of reviewing the federal pest control programs and determining whether the pesticide risk involved in each particular program is so great as to outweigh any possible benefits that might accrue from the pesticide's use. Also, in 1964, the agencies involved in the control of pesticides entered into an "Interdepartmental Agreement on Coordination of Activities Relating to Pesticides." This agreement is intended to bring the agencies closer together and to provide a mutual exchange of information so that problems caused by the issuance of press releases will be averted.

However, increasing coordination between the agencies cannot solve the entire problem. A problem exists when a pesticide has been registered by the USDA on a "no residue" basis and the FDA, as it improves its detection devices, moves to prosecute those who reasonably believe they are operating lawfully.⁹⁸

Part of this difficulty stems from the difference in standards used by the USDA and FDA. Technically, there is a difference between a "no residue" registration issued by the USDA, and a "zero tolerance" prohibition established by the FDA. The "no residue" registration is merely issued when the USDA finds, on the basis of tests conducted by the manufacturer, that no detectable residue will remain on food, irrespective of toxicity.⁹⁹ The zero tolerance is established by the FDA when

96. H.R. REP. NO. 921, 88th Cong., 1st Sess. 5 (1963).

97. *Operations Committee*, pt. 1, app. III, at 740.

98. See text accompanying note 71 *supra*.

99. 21 U.S.C. § 346a(b) (1964).

the pesticide is too toxic to permit *any* residue.¹⁰⁰ While the manufacturer is required by statute to submit analysis methods to the FDA for tolerance level determination,¹⁰¹ none need be submitted when a registration is achieved on a "no residue" basis. Yet, in both instances no residue can be allowed and in both instances the FDA is charged with enforcement.¹⁰² In order to help avert the problem created when the FDA discovers improved detection methods, each manufacturer should be required to submit, along with his initial application for registration, a proposed method of analysis that can be used to detect the presence of residue on products being sold on the market. If this information is required, before the pesticide is registered, the users and manufacturers of the chemical would likely not be prejudiced at the time the FDA discovers improved detection devices.¹⁰³ Moreover, the public would not be subjected to previously undetectable, but nonetheless toxic, chemicals.

Also, the "no residue" and "zero tolerance" concepts should be revised. At present, an infinitesimal and toxicologically insignificant amount of residue can be the subject of criminal prosecution; manufacturers and users of chemicals can be unnecessarily subjected to sanctions for violation of regulations having no relation to the protection of public health.¹⁰⁴ Indeed, in many instances the residue amounts may be due to uncontrollable factors such as wind, soil contamination, or lingering residues from other crops.¹⁰⁵ Rather than submit an individual to prosecution for such unintended and insignificant amounts of residue, it has been suggested that negligible residue and permissible residue provisions be enacted so that scientists and administrators have a more meaningful standard with which to work and so that prosecutions will relate to the reasons for enacting the legislation rather than to an arbitrary and technically unusable value.¹⁰⁶

Next, and probably most obvious, the enforcement activities

100. 21 U.S.C. § 346a(b) (1964).

101. 21 U.S.C. § 346a(d) (1) (1964).

102. 21 U.S.C. § 341, Historical Note (1964).

103. It might be objected that prejudice could still exist, even if the manufacturer were required to submit a testing method, since the FDA would be free to develop a more refined method and thus time and money invested in reliance on the prior testing level would be lost. However, this prejudice is less likely to exist and is less likely to be extensive when a test merely needs to be refined than when an entire testing method must be developed.

104. See text accompanying note 69 *supra*.

105. J. WHITTEN, *THAT WE MAY LIVE* 153 (1966).

106. *Id.*

of the FDA must be greatly expanded. By its own admission, the present FDA enforcement level is unable to maintain adequate protection for the American public.¹⁰⁷ More inspectors, more money, and constantly improving detection devices are critically needed.¹⁰⁸ Without such improvements it is axiomatic that all other reforms will be of minor value.

Related to the need for better enforcement is the need for an improved program of testing. The Council of Europe, a group consisting of representatives from seven Western European countries,¹⁰⁹ has suggested that feeding tests to determine the effects the more toxic pesticides will have on man, be conducted on large animals, such as dogs and pigs, for at least six to twelve months.¹¹⁰ By making similar testing requirements statutorily required, the public can better be assured that the chemicals being used are safe and the necessity of reducing previously accepted tolerances can be avoided.¹¹¹ However, the fact that insects tend to build up an immunity to specific pesticides,¹¹² and the fact that there are great costs involved in developing a new pesticide make it desirable that registration not be unduly delayed. To remedy this problem, the present registration procedure could be retained to the extent that a provisional registration be given according to the present methods of testing. The labeling requirements could specify that the date of initial acceptance be written on the container and further require that the label explain that the registration is provisional. Then, after a prescribed period of governmental testing, preferably from twelve to eighteen months, if no new hazards are discovered, the registration could become permanent. The advantage in this proposal is that both producers and users would automatically be on notice that their registration is only provisional and thus mitigate the injury when a previously accepted tolerance is reduced. This system would have the added advantage of allaying public concern that the levels set by the agency are toxicologically unsafe. Of course, for the exceptional case where a public hazard is revealed after extensive government tests have been completed, the FDA should still have the power to

107. *Operations Committee*, pt. 1, app. III, at 741.

108. See MOONEY, *supra* note 82; J. RODALE, *supra* note 82.

109. Belgium, Federal Republic of Germany, France, Italy, Luxembourg, the Netherlands, and the United Kingdom.

110. COUNCIL OF EUROPE, *AGRICULTURAL PESTICIDES* 13 (1959).

111. See text accompanying note 77 *supra*.

112. Porter, *Insects Are Harder to Kill*, *INSECTS: THE YEARBOOK OF AGRICULTURE* (1952).

modify or revoke the registration.¹¹³

More states should consider the example of Minnesota and require not only the licensing of all persons who apply chemical pesticides, but also compliance with the federally approved manufacturer's instructions for application.¹¹⁴ With this type of state control the federal regulations are made more effective since the federal standards will be more widely applied and there is less chance for accidental applications of dangerous amounts of toxic chemicals if the applications are held to a uniform standard.

Ultimately, however, the final solution must be in moving toward the use of less toxic pest control methods. Only in this way can the toxic buildup in the human body be adequately curtailed and the interests of the pesticide users and manufacturers be accommodated at the same time. To further such an objective, the federal government should provide some incentive for the development of effective biological controls. Presently, when a chemical pesticide is developed, the product can be patented and the maker is presented with a fair opportunity to achieve a profit. However, when a natural predator is brought into an infested area and allowed to eliminate the destructive pest there is no way in which a patent can be obtained or a profit gained.¹¹⁵ In addition, the government must commit its own research facilities and scientists to further the needed research to the development of effective biological controls.

Until biological methods of pest control are more fully developed, chemical pesticides will be necessary. However, this does not mean that the dangers to human health cannot be reduced. A second, and supplemental program could be carried out where a "soft" pesticide—one not leaving a residue—is developed to replace the "hard" chemicals.¹¹⁶ Such replacement

113. See text accompanying note 64 *supra*.

114. See text accompanying notes 87-93 *supra*.

115. See note 31 *supra*. The use of predator insects is not the only type of biological control that has been developed. Parasites, disease, traps, and sterility techniques have all been used with varying degrees of success. See, e.g., U.S. DEP'T OF AGRICULTURE, *INSECTS: THE YEARBOOK OF AGRICULTURE* 373-440 (1952); Fantel, *Birth Control for Bugs*, 126 *POP. MECH.* 116 (Aug. 1966); Jones, *Sex Attractant of the Pink Bollworm Moth: Isolation, Identification, and Systasis*, 152 *SCIENCE* 1516 (1966); *Yellowjackets Trapped*, 90 *SCI. NEWS LETTER* 214 (1966). Traps and sterility devices could probably be patented but, unlike chemicals, they would not have to be repurchased for every growing season, and the profit motive would, therefore, probably not be as great as for the development of chemicals. See generally Tufty, *Pest Control Progresses*, 89 *SCI. NEWS LETTER* 119 (1966).

116. This program would be analogous to the recent revolution in

can be accomplished by federal laws removing from the market a toxic chemical which has a less toxic substitute.¹¹⁷ This kind of system would provide both an incentive for development and an increased safety margin for the public health, progressively reducing the problem of toxic pesticides.

detergent chemistry. It was discovered that hard detergents caused problems in the water and sewage systems of all major cities. Since the development of a soft detergent, all commercial detergents are biodegradable. This changeover, completed in 1965, was encouraged by the threat of congressional action. Abelson, *Water Pollution*, 152 *SCIENCE* 1015 (1966).

117. It might be objected that the procedure would be unfair and would cause economic dislocation and unnecessary public concern. However, if adequate notice and public education campaigns are carried out, the desired result could be accomplished with a minimum of such difficulties.