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# Insecticides and the Law

By ROBERT VAN DEN BOSCH\*

**T**HE law bears on many aspects of insect control.<sup>1</sup> To the layman, this multiplicity of insecticide regulations probably appears to be an adequate safeguard against the problems arising from pest control and the use of chemical pesticides. But this is not the case. State agricul-

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1. Among others, there are laws that:

(a) Relate to quarantine and inspection procedures devised to prevent the introduction of new pests from foreign countries or their spread within the country. Plant Quarantine Act, 7 U.S.C. §§ 151-67 (1964), and in particular section 164a, which authorizes designated employees of the Department of Agriculture to stop and, without a warrant, to search persons, vehicles, receptacles, boats, ships or vessels entering the United States where probable cause exists to believe that such persons or objects are carrying plants contaminated by diseases or pests.

(b) Require the use of such control measures as suppressive spraying, crop residue disposal, and fumigation and eradication. *See, e.g.*, CAL. AGRIC. CODE § 5552 which provides that any cotton plant that is left from a previous season is presumed to harbor pests and places the burden of proof on the grower to show why it should not be abated as a public nuisance.

(c) Govern the manufacture and sale of insecticides and prevent their adulteration and misbranding. *See, e.g.*, Federal Insecticide, Fungicide and Rodenticide Act, 7 U.S.C. §§ 135-35k (1964), and in particular section 135a, which makes it a crime to sell adulterated or misbranded poisons.

(d) Regulate poison residues by fixing tolerances of pesticides upon produce. *See, e.g.*, CAL. AD. CODE tit. 3, § 2490 (1968), which establishes the legal tolerance for residue on produce for each insecticide presently permitted in the state.

(e) Require manufacturers to provide written instructions as to the proper time of use of the insecticide. *See, e.g.*, CAL. AGRIC. CODE § 12971, which provides that pesticide users must be in possession of written usage guidelines prepared by the manufacturer or dealer stating when the pesticide should be used and on which crops. There are no provisions, however, which impose sanctions for use of the pesticide in violation of the instructions furnished by the manufacturer. Nor are there provisions specifying the degree of hazard which must exist before the insecticide may be applied.

(f) Limit insect contaminants in agricultural produce. *See, e.g.*, CAL. AD. CODE tit. 3, § 1331-G (1970) which provides that a tomato should be considered as unsuitable for canning when more than 25 percent of the tomato shows evidence of insect bites.

(g) Require the examination and licensing of pest control operators and pesticide distributors. *See, e.g.*, CAL. AGRIC. CODE § 11401-09, pertaining to regulation of the agricultural pest control business. Registration and licensing requirements are prescribed in sections 11701-41 (persons hiring themselves out for pest control operations), sections 12001-21 (agents of pesticide dealers) and sections 12101-21 (pesticide deal-

tural codes and federal pesticide regulations are largely concerned with legalistic and technical considerations and essentially ignore the serious inherent ecological shortcomings which characterize modern insecticides and their use patterns.<sup>2</sup> Because of these shortcomings, there is increasing economic loss and environmental injury resulting from insecticide use.

While many areas of the chemical pesticide control problem merit discussion in legal journals, one aspect of the problem merits special attention because of the appalling financial losses and widespread ecological damage it involves. Due to the methods used in their development and marketing, the modern insecticides tend to cause two devastating, interrelated phenomena in the agricultural environment: target pest resurgence and secondary pest outbreaks.<sup>3</sup>

Target pest resurgence occurs when the insecticide initially destroys most members of the insect population which the user wants to eliminate, but destroys even more effectively the predators and parasites which are the natural enemies of the target pest. After a brief period of suppres-

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ers). None of these sections, however, impose significant qualifications standards for sellers and agents of the pesticide dealers, who are free to sell the products of their employers once they have complied with the applicable registration requirements of Agriculture Code sections 11407 and 12106, dealing with the qualifications of applicants on the basis of their good character and familiarity with applicable pest-control laws, although not with the ecological effects of the products they sell.

2. In all fairness to the California Legislature it must be conceded that the recently enacted sections 14101-04 of the Agriculture Code do go somewhat towards correcting this deficiency. In summation, these sections direct the department to work with the University of California, appropriate state agencies and experts from the fields of agricultural science, biology, ecology and medicine to prohibit or regulate the use of environmentally harmful materials. It is clear that this is a policy declaration and not an attempt to enforce specific environmental and ecological practices in the field of pest control. Nevertheless, the statute may be the start of much-needed reform.

3. See Bartlett, *Integration of Chemical and Biological Control*, in *BIOLOGICAL CONTROL OF INSECT PESTS AND WEEDS* 489-99 (P. DeBach ed. 1964); R. CARSON, *SILENT SPRING* 220-28 (1962); LAWSON, *The Relation of Insect Control to Increased Food Production*, in *PROCEEDINGS OF TALL TIMBERS CONFERENCE ON ECOLOGICAL ANIMAL CONTROL BY HABITAT MANAGEMENT* No. 1, at 145-52 (1969); Smith & van den Bosch, *Integrated Control*, in *PEST CONTROL: BIOLOGICAL, PHYSICAL AND SELECTED CHEMICAL METHODS* 297-99 (W. Kilgore & R. Douth eds. 1967); Falcon, van den Bosch, Ferris, Stromberg, Etzel, Stinner & Leigh, *A Comparison of Season-Long Cotton Pest Control Programs in California During 1966*, 61 *J. ECONOMIC ENTOMOLOGY* 633, 638-42 (1968); Falcon, van den Bosch, Gallagher & Davidson, *Investigation of the Pest Status of Lygus Hesperus in Cotton in Central California*, 63 *J. ECONOMIC ENTOMOLOGY* (in press 1970); van den Bosch, Gonzales, Falcon, Leigh, Hagen, Stinner & Etzel, *Biological Control of the Bollworm*, in *COTTON INSECT CONTROL 1966* at 9, 10-14 (U. of Cal., Div. of Agric. Sciences mimeograph 1967); *BIOLOGICAL CONTROL* (C. Huffaker ed., to be published 1971), in which there are many references to these problems.

sion and regrouping, the target pest often resurges to greater abundance, causing even greater damage.<sup>4</sup>

Secondary pest outbreaks occur when insecticides applied against given target pests eliminate the natural enemies of previously innocuous species, which then erupt to damaging abundance due to their release from biotic repression.<sup>5</sup>

The resurgence-secondary outbreak problem is not a natural phenomenon, and its solution is not a matter to be left to the ecologists and entomologists to whom victimized agriculturalists often turn for assistance. The problem exists because the law, in failing to adequately regulate the manufacture, labeling and sale of modern insecticides, permits it to exist. Only the law can eliminate it.

### I. The Modern Insecticide

The modern insecticide is a synthetic organic chemical, usually an organochlorine, organophosphate or a carbamate. Typically it is designed to kill a broad spectrum of insect and insect-like species. There are two principal reasons for this: (1) it is technologically easier to develop broad spectrum poisons than those of narrow specificity; (2) consequently, their development is less expensive, and their sale more remunerative.

Insecticide development is a costly affair, and when a new pesticide is in the planning stage a primary consideration is its market potential. For a new compound to be given the green light it must have a reasonably good chance of recouping the cost of its development, often in excess of 4 million dollars,<sup>6</sup> and subsequently earning a profit. When developing a new product, therefore, the thoughts of the chemical industry planners turn to insecticides with broad toxicity spectra, the products which stand to capture the broadest markets.

Since, in the planning and development of modern insecticides, economics and toxicological technology are the predominant considerations, ecology is largely ignored. Yet chemical pest control is a serious matter ecologically since its function is to eliminate a substantial portion of the insect population indigenous to the treated environment. From laboratory inception, therefore, the modern insecticide is programmed

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4. See note 3 *supra*. One example of this phenomenon, well known to the public, occurred in Ontario, where the number of blackflies increased 17 times over what it had been before spraying. R. CARSON, *SILENT SPRING* 252 (1962).

5. See note 3 *supra*.

6. See von Rumker, Guest, & Upholt, *The Search for Safer More Selective and Less Persistent Pesticides*, 20 *BioScience* 1004 (1970).

to cause problems in the environment.

Broad spectrum toxicity is at the very root of the pest resurgence and secondary pest outbreak problems. When the broadly toxic materials are applied, they kill too many species of insects in the treated environment.<sup>7</sup> Many of these insects are predators and parasites which prey on noxious species. Consequently, where broad spectrum insecticides are used the natural enemies of some species are often virtually eliminated. This creates a dangerous biotic vacuum in which either the target species can resurge explosively or the unleashed non-target species can erupt abundantly. The resurgent or unleashed insect populations frequently produce greater damage than that caused by the original target infestation. A retreatment of the area is then deemed necessary, and the farmer soon finds himself on an insecticidal treadmill.

The resurgence-secondary pest outbreak problem is universal. Such insect outbreaks have been reported from literally every place on earth where the modern synthetic organic insecticides have been used.<sup>8</sup> In California these infestations substantially aggravate problems in many major crops such as cotton, citrus and grape.<sup>9</sup> In cotton, for example, there are clear indications that the lepidopterous pest (caterpillar) problem is greatly aggravated by early- and mid-season insecticide treatments for control of Lygus bug (*Lygus hesperus* Knight).<sup>10</sup> In other words, there is more than passing evidence that much of the overall loss caused by insects in one of California's most important agricultural crops is largely the product of the very insecticides that are intended to bring effective control.

## II. Legal Consideration

The resurgence-secondary pest outbreak problem has placed a serious economic burden on California's agriculture and, of course,

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7. See note 3 *supra*.

8. See, e.g., BIOLOGICAL CONTROL (C. Huffaker ed., to be published 1971), in which there are many references to the cited problems.

9. See, e.g., van den Bosch, Leigh, Falcon, Stern, Gonzales & Hagen, *The Developing Program of Integrated Control of Cotton Pests in California*, in BIOLOGICAL CONTROL 377 (C. Huffaker ed., to be published 1971); Doult & Smith, *The Pesticide Syndrome—Diagnosis and Suggested Prophylaxis*, in BIOLOGICAL CONTROL, *supra*, at 3, 11-14; DeBach, *The Necessity for an Ecological Approach to Pest Control on Citrus in California*, 44 J. ECONOMIC ENTOMOLOGY 443 (1951).

10. See, e.g., Falcon, van den Bosch, Ferris, Stromberg, Etzel, Stinner & Leigh, *A Comparison of Season-Long Cotton Pest Control Programs in California During 1966*, 61 J. ECONOMIC ENTOMOLOGY 633, 638-42 (1968); Falcon, van den Bosch, Gallagher & Davidson, *Investigation of the Pest Status of Lygus Hesperus in Cotton in Central California*, 63 J. ECONOMIC ENTOMOLOGY (in press 1970). In every *Lygus*

contributes significantly to environmental pollution.<sup>11</sup> This in itself is cause for concern. What is even more disturbing is that much of the insecticidal treatment that triggers these outbreaks is unnecessary. Vast acreages of our croplands are annually treated with insecticides even when the crops are not threatened by economically injurious pest populations.<sup>12</sup> This situation reflects one of the most serious loopholes in our laws pertaining to insecticides and their use: inadequate statewide control of insecticide prescription and application.

### A. The Deficiencies of Insecticide Legislation

Under prevailing regulations, a farmer may use an insecticide on his crop whenever he chooses<sup>13</sup> as long as he adheres to the applicable

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control experiment in which the writer has been involved over the past 5 years, where infestations of lepidopterous larvae (caterpillars) were monitored (4 large scale experiments involving 240, 2,560, 640 and 640 acres respectively), the control chemicals (toxaphene-DDT, Cygon®, Bidrin®, and malathion) induced increases in caterpillar abundance. The four experiments involved a total of 13 chemical programs and without exception caterpillar infestations in these 13 programs were higher than those in the untreated controls.

11. Pollution as here considered entails, among other things, the excessive introduction of toxic materials into the environment. The types of problems that these materials engender are cited in previous footnotes. See notes 4 & 10 *supra*. Specific problems associated with use of insecticides in cotton, for example, are loss of honeybee colonies, *see, e.g.,* Smith, *Pesticides: Their Uses and Limitations in Pest Management*, in CONCEPTS OF PEST MANAGEMENT 103, 107 (R. Rabb & F. Guthrie eds., N.C. State U. 1970); and injury to wildlife, Cal. Dep't of Fish & Game, Pesticides Investigation Project, *Azodrin Wildlife Investigations in California* (Federal Aid Project FWIR mimeograph, Dec. 1967).

12. This statement is in part an extrapolation from the author's own experimental studies and those of colleagues. *See, e.g.,* van den Bosch, *A Comprehensive Analysis of the University of California Cotton Insect Research Program*, PROCEEDINGS COTTON SYMPOSIUM ON INSECT AND MITE CONTROL PROBLEMS AND RESEARCH IN CALIFORNIA (U. of Cal., Div. of Agric. Sciences mimeograph 1969); van den Bosch, Leigh, Stern, Gonzales & Hagen, *The Developing Program of Integrated Control of Cotton Pests in California*, in BIOLOGICAL CONTROL 377 (C. Huffaker ed., to be published 1971). In personal communications two consulting entomologists, Charles H. Musgrove of Riverside, California, and James R. Stewart of Exeter, California, have reported greatly reduced insecticide usage in approximately 6,400 acres of citrus under their supervision. Two other consulting entomologists, John W. Nickelsen of Shafter, California, and Louis A. Ruud, Jr. of Kerman, California, likewise in personal communications, have reported greatly reduced insecticide usage in tomatoes. Mr. Nickelsen reports similar reductions in potato. In all of these cases both satisfactory yields and crop quality were attained under the reduced spray programs.

13. Currently, the use of injurious herbicides and some chlorinated organic pesticides is restricted in hazardous areas to terms of permits issued for 1-week and 1-year periods, respectively. 3 CAL. AD. CODE tit. 3, §§ 2541, 2463 (1970). A recent amendment to the Agriculture Code gives the director the power to place appropriate restrictions on economic poisons "including, but not limited to, limitations on quantity, area and manner of application." Cal. Stat. 1970, ch. 1092, § 6 (*amending*

state and federal regulations and follows the instructions on the container label concerning its use. But there is nothing in the regulations or on the label which restricts the use of insecticides to situations of real need, and much insecticide application occurs where there are in reality no threatening pest populations. The use of the insecticide therefore creates a threat which did not exist prior to application of the chemical agent. In addition, the irresponsible user is more than a threat to himself; the ever-present possibility of drift creates a recurrent threat to properties bordering on and, in some instances, remote from the treated sites. Thus, any use of these materials entails an implicit threat to the community-at-large which places a considerable moral responsibility on the shoulders of the user.

It seems only reasonable that the use of insecticides should, as a matter of course, be restricted to situations of real need to minimize the hazards to the environment.<sup>14</sup> Such a rational pattern of use presupposes the availability of expert diagnosticians who would recommend the use of a particular insecticide only when its need is readily manifest. In insect control, unfortunately, this is not the case. Under prevailing conditions many of the recommendations to farmers on insecticide use come from chemical company field men who are primarily salesmen. These persons may or may not be competent entomologists, and they may or may not be men of integrity; but they share one thing in common: none, under existing law, is subject to examination to demonstrate his competence. Nor is any licensed to practice his profession.<sup>15</sup> In other words, there is no professional standard to be met by the men who prescribe much of the use of today's often highly toxic and ecologically disruptive pest control chemicals. Attempts to establish such standards through legislation have thus far been frustrated,<sup>16</sup> largely because of the opposition of the groups and agencies which feel that such

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CAL. AGRIC. CODE § 12824), in DEERING'S ADVANCED LEGISLATIVE SERV., No. 5, at 482 (1970). Whether any of these provisions actually limit the use of insecticides to need is not determined. See note 1(e) *supra*.

14. Although not specifically regulating use to need, both Maine and Wisconsin have authority to limit the use of pesticides. In Maine the Board of Pesticides Control "shall regulate and control . . . all application of pesticides. . . ." ME. REV. STAT. ANN. tit. 22, § 1456 (Supp. 1970). Wisconsin's Department of Natural Resources "may adopt rules governing the use of any pesticide which it finds is a serious hazard to wild animals. . . ." WIS. STAT. ANN. § 29.29(4) (Supp. 1970).

15. See note 1(g) *supra*.

16. A bill which originally sought to require a license for the application of economic poisons was amended before passage to require only that the substance must be evaluated before it can be registered. S.B. 1375, enacted as Cal. Stat. 1970, ch. 1092, § 6 (amending CAL. AGRIC. CODE § 12824), in DEERING'S ADVANCED SERV., No. 5, at 482 (1970).

legislation would be against their interests. The latest attempt to develop such legislation in California, sponsored by Senator Anthony A. Beilenson, was killed in the Senate Finance Committee in 1970.<sup>17</sup>

Fortunately, there has been some progressive legislation and regulatory action concerning the registration and use of insecticides themselves, particularly the hard organochlorines.<sup>18</sup> For one thing, increasing evidence of the ecological threat posed by DDT and its siblings has caused a considerable clamp-down on these materials in many countries.<sup>19</sup> In California many uses of the hard organochlorines have been abolished by order of the State Department of Agriculture<sup>20</sup> which has announced its intention to ban essentially all uses of these materials by 1971. In addition, legislation passed by the California Legislature in 1969 permits the designation of materials as environmentally injurious,

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17. Senate Bill 1376. The bill was reported back to the senate from the Committee on Finance "without further action." SENATE DAILY J. 6004, Aug. 21, 1970.

18. The Federal Government has been especially active in regulating economic poisons during the past year. Most of the regulations are set under provisions of the Federal Insecticide, Fungicide and Rodenticide Act, 7 U.S.C. §§ 135-135k (1964), and the Federal Food, Drug, and Cosmetic Act, 21 U.S.C. § 346a (1964). The first move was made by the Pesticides Regulation Division of USDA which cancelled registration of DDT for home use on November 24, 1969. Rogers, *The Persistent Problem of the Persistent Pesticides: A Lesson in Environmental Law*, 70 COLUM. L. REV. 567, 581 (1970). Since the USDA has cancelled registration for 60 pesticides used on food crops, 1 ENV. REP. *Current Developments* 39 (May 8, 1970), cancelled registration of 48 mercury compounds used to control slime and algae, *id.* 453 (Aug. 21, 1970), and announced review of the registrations for seven other hard pesticides. *Id.* at 401 (Aug. 7, 1970). The FDA has proposed zero tolerances of DDT residue on raw agricultural commodities as a result of a court order on a suit brought by the Environmental Defense Fund. *See id.* at 263 (July 10, 1970). It should be noted that the functions of USDA under the Federal Insecticide, Fungicide, and Rodenticide Act and the Food, Drug, and Cosmetic Act have now been transferred to the administration of the Environmental Protection Agency (EPA). Reorganization Plan No. 3 of 1970, § 2(8), U.S. CODE CONG. & AD. NEWS 2996 (1970).

In the states, the Maine Board of Pesticide Control has banned all outdoor use of DDT, DDD, Dieldrin, Endrin, Heptachlor and Toxaphene. 1 ENV. REP. *Current Developments* 456 (Aug. 21, 1970). Wisconsin has declared DDT to be an environmental pollutant subject to control within the meaning of state statutes. *Id.* at 178. In California, see Senate Bills 1375 (1970) and 1140 (1969), which were enacted as sections 14001-02, 14006-06, 14012 and 14101-04 of the California Agriculture Code.

19. DDT production was ordered banned in USSR by the Ministry of Agriculture. N.Y. Times, May 14, 1970, at 6, col. 1. A government council in Britain has urged strengthening controls on use of pesticides. *Id.*, May 29, 1970, p. 32, col. 4. Sweden has banned the use of DDT. Address by F. Fredrick Fisher, Co-chairman, Legal Committee, Sierra Club, at the National Conference on Environmental Law, Nov. 7, 1970.

20. The use of the herbicide Propanil® is banned in certain designated counties. 3 CAL. AD. CODE tit. 3, § 2452.1 (1969). With the termination of the use of DDD and DDT in cotton in October 1970, the greatest single use of those materials has been eliminated. *See id.* §§ 2408 (1969), 2409 (1970).

where justified, so that they may be quickly withdrawn from registration or restrictions placed on their use.<sup>21</sup> To date, such action has been applied against the methylmercury compounds and certain organophosphates.

In most of the discussion of the problem of insecticide use in California, emphasis is on the claims of damage to the state ecology as a whole or to the public at large. In reality the greatest damage from the use of insecticides within the state is economic, and the impact can be easily demonstrated in terms of dollars wasted. Agriculture is one of California's most important industries<sup>22</sup> and, considering the number of victims and the magnitude of their economic losses, our agriculturists are unquestionably the greatest direct losers among those who suffer adversely from the current insecticide use system.<sup>23</sup> Their losses possibly amount to millions of dollars annually,<sup>24</sup> and ironically, the growers are largely unaware of their victimization. For example, data obtained by the writer and colleagues during intensive experimentation in cotton over the past 5 years indicate that chemically induced insect infestations (particularly those of caterpillars) may account for losses of several

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21. CAL. AGRIC. CODE §§ 14101-04. Section 14101 gives a broad definition to "environment." Section 14102 provides: "The director shall prohibit or regulate the use of environmentally harmful materials . . . and shall take whatever steps he deems necessary to protect the environment." See note 2 *supra*.

22. Agriculture was California's second largest industry in terms of new capital expenditures as of 1963. CALIFORNIA STATISTICAL ABSTRACT 130, table H-3 (1969).

23. There is another, as yet not widely recognized force asserting itself against the current, rather lax insecticide use pattern in California. This is the effort by Caesar Chavez and his United Farm Workers Organizing Committee to minimize the exposure of farm workers to hazardous materials either through court injunction against the use of certain materials or by stipulations on insecticide use in union contracts drawn with growers. *E.g.*, *Bravo v. Althouse Groves*, Civil No. 69754 (Tulare County Super. Ct., filed June 10, 1970).

Chavez's concern over the protection of his workers from the pesticide hazard is genuine, and as unionization of farm workers spreads through California's massive agricultural industry, his insistence on safeguards will inevitably force a significant change in patterns of insecticide usage. See, *e.g.*, *Oakes v. E.I. DuPont de Nemours & Co.*, 272 Cal. App. 2d 645, 77 Cal. Rptr. 709 (1969), in which the plaintiff, suffering from a severe systemic skin condition, was denied recovery on a strict liability theory for failure to allege that defendant knew or should have known of this possible effect of the use of its product upon allergic people; *Cliff v. California Spray Chem. Co.*, 83 Cal. App. 434, 257 P. 99 (1927), where the plaintiff was denied recovery for loss of his eye because there was no privity between the plaintiff purchaser and the defendant manufacturer; 1 ENV. REP. *Current Developments* 115 (June 5, 1970), which reports a settlement in which a farmhand who allegedly suffered incurable liver damage from association with DDT settled his suit out of court for \$30,000.

24. See note 12 *supra*. Apart from the damages caused by target pest resurgence and secondary pest outbreaks, the amount of money annually expended for unnecessary crop treatment by insecticides is considerable.

million dollars annually in that crop alone, and yet the cotton grower fights his caterpillar infestations essentially innocent of the knowledge that they are largely a product of his own doing.<sup>25</sup> And even where a grower is aware of this he has very little chance of obtaining financial restitution for his losses.<sup>26</sup>

For one thing, in the pesticide registration and labeling process there is no legal requirement that the impact of the materials on natural enemies of the target pest be considered.<sup>27</sup> When a company sells an insecticide it is not required to warn the potential user, either verbally or in the label, that the material will not only kill the pest, but will also destroy the natural enemies of that species and of other pest species cohabiting the treated area. Because the pesticide's effects on predators and natural enemies are not considered in the registration and labeling process, it is only natural for the seller or manufacturer to deny the importance of such effects if and when their role is cited in legal suits involving alleged losses resulting from pest resurgences or secondary pest outbreaks.

## B. Judicial Remedies

The writer has personal knowledge of two lawsuits bearing on this matter. The first of these, *Banducci v. FMC Corporation*,<sup>28</sup> was heard in the Superior Court of Kern County, California, in September of 1968. In the *Banducci* case the plaintiff alleged that an organophosphate, Bidrin,<sup>®</sup> used to control Lygus Bug (*Lygus hesperus* Knight) in his cotton, induced an outbreak of bollworm (*Heliothis zea* (Boddie)) which severely reduced the yield. The key point of con-

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25. See van den Bosch, Leigh, Falcon, Stern, Gonzales & Hagen, *The Developing Program of Integrated Control of Cotton Pests in California*, in BIOLOGICAL CONTROL 377 (C. Huffaker ed., to be published 1971); Falcon, van den Bosch, Ferris, Stromberg, Etzel, Stinner & Leigh, *A Comparison of Season-Long Cotton Pest Control Programs in California During 1966*, 61 J. ECONOMIC ENTOMOLOGY 633, 638-42 (1968); Falcon, van den Bosch, Gallagher & Davidson, *Investigation of the Pest Status of Lygus Hesperus in Cotton in Central California*, 63 J. ECONOMIC ENTOMOLOGY (in press 1970).

26. See text accompanying notes 28-30 *infra*.

27. The existing legislation does not provide effective labeling controls to warn agriculture users of the possible ecological consequences. CAL. AGRIC. CODE § 12851 provides: "The registrant of any economic poison shall attach to each separate lot, and each separate, finished, sealed, or closed container or package of economic poison which he intends to sell within this state, a plainly printed label, that states all of the following:

"(a) The name, brand, or trademark, if any, under which the economic poison is sold.

"(b) The name and address of the registered manufacturer, importer, or vendor." See note 1(c), (e) *supra*.

28. Civil No. 92144 (Kern County Super. Ct., Jan. 23, 1969).

tion was that the prescribed insecticide had destroyed the bollworm's natural enemies, thus permitting the pest population to increase explosively. The court entered judgment for the defendant, whose counsel apparently was convincing in his argument that the severe bollworm infestation was simply a natural occurrence and that poor farming practice by the plaintiff had been a major factor in the reduced yield.

The second case, *Hobe Ranches v. Collier Carbon Co.*,<sup>29</sup> was heard in the Fresno County Superior Court in September of 1970. This was a jury trial which again involved bollworm in cotton. The plaintiff alleged that an organophosphate insecticide, Azodrin,<sup>®</sup> applied as a single treatment for season-long control of several pests, induced a devastating outbreak of bollworms which severely reduced his crop yield. As in the *Banducci* case, the destruction of natural enemies was cited as the key contributing factor to the bollworm outbreak. Judgment was again entered for the defendant, the defense having argued that the bollworm outbreak was a natural event, that some adverse agricultural practice (*i.e.*, poor farming) could have contributed to the reduced yield, and that the responsibility for using Azodrin<sup>®</sup> fell entirely on the plaintiff.

To an insect ecologist experienced in cotton insect control, the decisions against plaintiffs in the *Banducci* and *Hobe Ranches* cases, and the arguments offered as a defense in those actions, point up glaring inadequacies in the laws and regulations designed to protect insecticide users from economic loss resulting from such use. In effect, the user is under constant pressure by a variety of factors, agencies and agents to utilize chemical insecticides to protect his crops. Yet these materials have the inherent capacity to do both him and the environment more harm than good. When he suffers injury or loss and attempts to gain compensation through the courts, however, the defense depicts him as an inept farmer, a victim of nature's whim or simply at fault for not knowing better. Recovery is accordingly denied.<sup>30</sup> It is of utmost urgency that this inequity be altered through legislation or judicial decision so that the user of insecticides is protected from losses occasioned by adverse and unanticipated ecological effects of the materials, or at least is sufficiently warned of his risk in using them.

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29. Civil No. 137793 (Fresno County Super. Ct., Sept. 29, 1970).

30. See *Burr v. Sherwin-Williams Co.*, 42 Cal. 2d 682, 268 P.2d 1041 (1954), which held that the manufacturer could not be held liable for damage to plaintiff's cotton crop on the basis of breach of warranty because a disclaimer of warranty in labels which were placed on the drums of insecticide was a denial of any warranty that the product sold was an effective or safe insecticide. In *Pruett v. Burr*, 118 Cal. App. 2d 188, 257 P.2d 690 (1953), the fact situation was substantially duplicated. See also *Kramer v. Carbolineum Wood Preserving Co.*, 105 Wash. 401, 177 P. 771 (1919).

Courts have not been reluctant to hold insecticide manufacturers liable when application of the insecticide directly damaged the crop it was intended to protect,<sup>31</sup> but relief has not been granted in the resurgence-secondary outbreak situation. The developer's field agent in these latter cases has usually recommended the use of a particular insecticide to control a pest which may or may not be seriously damaging the farmer's crops, however, and the farmer will normally rely on the expertise of the field agent as greater than his own. When the recommendations of the agent are carefully followed and the farmer's crop is damaged by pest resurgence or secondary pest outbreak, the insecticide manufacturer should be liable for the damage either on the basis of negligence<sup>32</sup> or strict liability.<sup>33</sup> There should be no difficulty in find-

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31. See *Kolberg v. Sherwin-Williams Co.*, 93 Cal. App. 609, 269 P. 975 (1928); *accord*, *Pruett v. Burr*, 118 Cal. App. 2d 188, 257 P.2d 690 (1953) in which judgment for plaintiff was reversed on appeal only due to the insufficiency of his evidence to show the exclusive control necessary for a plea of *res ipsa loquitur*. These cases involve damage to the crop due to direct contact with the insecticide. The issue of legal causation—whether directly by physical contact or indirectly, through target-pest resurgence or secondary pest outbreak—is for the trier of fact. W. PROSSER, *HANDBOOK OF THE LAW OF TORTS* 329 (3d ed. 1964). When there is evidence of causation sufficient to go to the jury, the instruction as to the liability of a manufacturer in a case involving either pest resurgence or secondary pest outbreak should be the same as in the case of damage to the crop through direct contact with the insecticide, once the duty of the defendant to the plaintiff is found to exist by the court. See *id.*

32. *E.g.*, CAL. CIV. CODE § 2319, which provides that an agent has the authority "[t]o do everything necessary or proper and usual, in the ordinary course of business, for effecting the purpose of [the] agency." Section 2323 of the Civil Code states that the authority to sell personal property includes the authority to warrant the quality of the goods. Recommendations of the field agent concerning use of the insecticide would necessarily come within his scope of authority. The chemical company would be liable for these representations. See *Start v. Shell Oil Co.*, 202 Ore. 99, 273 P.2d 225 (1954), which held that if the manufacturer has reason to know that the grower will inquire as to such information, then the manufacturer will be liable for an agent's representations. The company would clearly be liable for any misrepresentations or false claims of its agent. *Miller v. Wood*, 188 Cal. App. 2d 711, 10 Cal. Rptr. 770 (1961).

The company would also be negligent if it failed to give an adequate warning of the dangers involved in using the insecticide. Cf. *McClanahan v. California Spray-Chem. Corp.*, 194 Va. 842, 75 S.E.2d 712 (1953), which found negligence as a matter of law in violation of a labeling statute. The manufacturer would also be negligent if it failed to thoroughly test the insecticide to determine the likely dangers involved in its use. See *Reasor-Hill Corp. v. Kennedy*, 224 Ark. 248, 255, 272 S.W.2d 685, 690 (1954). In *La Plant v. E.I. Du Pont de Nemours & Co.*, 346 S.W.2d 231, 240 (Mo. Ct. App. 1961), the court found that a pesticide manufacturer had a duty to keep abreast of new developments in the industry in order to adequately warn users of the possible harmful effects.

33. *Simpson v. American Oil Co.*, 217 N.C. 542, 8 S.E.2d 813 (1940) (strict liability for breach of warranty); *Wise v. Hayes*, 58 Wash. 2d 106, 361 P.2d 171 (1961) (same). In *Taylor v. Carborundum Co.*, 107 Ill. App. 2d 12, 246 N.E.2d 898 (1969),

ing: (1) that the agent knows what he is doing; (2) that the full extent of possible ecological ramifications has been fully explained by the field agent; or (3) that he has made a warranty extending beyond the one printed on the container label.<sup>34</sup> Liability of this nature would encourage the manufacturer to be sure that his agents are well trained and that the customer is fully informed of dangers inherent in the use of the insecticide.

### C. Compulsory Research, Labeling and Disclosure

There is also a need for legislation requiring analysis of the impact of chemical compounds on a spectrum of natural enemies and directing that the resulting data be considered in the procedures leading to the registration and labeling of the insecticides.<sup>35</sup> In order for an insecti-

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the court held that strict liability applied even though the seller had exercised all possible care in the preparation of his product and that a failure to warn was of no consequence (a grinding wheel manufactured by defendant had shattered and injured the plaintiff). Under the doctrine of *Greenman v. Yuba Power Prod., Inc.*, 59 Cal. 2d 57, 377 P.2d 897, 27 Cal. Rptr. 697 (1962), a seller is strictly liable to a purchaser for a product sold in a defective condition which results during normal use in personal injury or property damage to the purchaser. A product is defective if there is an inherent defect in design or it is sold without proper instructions or warning. An insecticide that results in a resurgence or secondary outbreak is either defectively manufactured or improperly used. Where it is administered under the direction of the company through their agent, there should be no difficulty in holding the company strictly liable for the damage to the grower's crops.

34. *E.g.*, CAL. COMM. CODE § 2315, which provides for an implied warranty of fitness where the seller has reason to know of the particular purpose for which the goods are required and the buyer is relying on the seller's skill or judgment to furnish a suitable product. *See Schied v. Bodinson Mfg. Co.*, 79 Cal. App. 2d 134, 141, 179 P.2d 380, 384-85 (1947). In *Mosesian v. Bagdasarian*, 260 Cal. App. 2d 361, 67 Cal. Rptr. 369 (1968), a distributor's agent advised a customer as to the amount and method of application of an insecticide. The customer's plants were damaged. Although the trial court had found that the advice was mere opinion and hence not binding on the distributor, the appellate court stated that if the jury had found that the agent had made firm representations, then the distributor would have been liable for the damage regardless of disclaimers on the label of the container. *Id.* at 366-68, 67 Cal. Rptr. at 372-73.

In *Hercules Powder Co. v. Rich*, 3 F.2d 12 (8th Cir. 1924), *cert. denied*, 268 U.S. 692 (1925), the plaintiff alleged injuries caused by an improper dynamite fuse sold to him by defendant's agent. The court found that the agent was fully acquainted with plaintiff's work and purpose of the fuse and that the plaintiff had a right to trust the agent's judgment. The plaintiff was allowed recovery on the basis of an implied warranty that the fuse was reasonably fit for his purpose since he had communicated that purpose to the defendant's agent and the agent had recommended the improper fuse. *Id.* at 18.

Warranties given by an agent must be within his scope of authority to be binding on the seller, but if it is a warranty the seller should realize his agent would give, then the seller will be liable. *See note 32 supra.*

35. *E.g.*, 7 U.S.C. § 135(z)(2)(d), which provides that an economic poison is

cide to be registered, its impact on natural enemies should be determined and, where substantial adverse effects are found, should be clearly indicated on the label along with a statement warning the user of the danger of pest resurgence and secondary pest outbreaks. All advertisements of such materials should also contain a similar statement. Anyone recommending the use of such ecologically disruptive materials (as indicated by the label) should be required to specifically declare to the potential buyer that the material has the capacity to induce target pest resurgence and secondary pest outbreaks.<sup>36</sup> The statute should further provide a tort remedy where the manufacturer fails to insure that the prospective user is given adequate warning.

Under this system the user would at least be forewarned of the risks he is taking when he uses insecticides on his own initiative, and he would have verbal and written warning where the use of such materials is proposed by a salesman, pest control adviser, or pest control operator (*e.g.*, aircraft applicator). This would give him the option to choose another material, decide against the use of any chemical or to continue the planned use of the hazardous material at his own risk. Where a salesman or adviser ignored the requirement to give the requisite warning, both he and his principal would be accountable in the event that losses occurred subsequent to use.<sup>37</sup>

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misbranded "if the label does not contain a warning or caution statement which may be necessary . . . to prevent injury to living man and other vertebrate animals, vegetation, and useful invertebrate animals. . . ." Section 135f(b) provides criminal punishment for misbranding. A statute of this nature, however, falls short of the legislation required to afford adequate protection in the registration and labeling of pesticides. See generally Rogers, *The Persistent Problem of the Persistent Pesticides: A Lesson in Environmental Law*, 70 COLUM. L. REV. 567, 606-09 (1970).

36. An analogous requirement has been imposed upon the drug industry. See, *e.g.*, CAL. HEALTH & SAFETY CODE, § 26288. In *Parke-Davis & Co. v. Stromsodt*, 411 F.2d 1390 (8th Cir. 1969), the plaintiff had allegedly "contracted" brain damage from using a drug manufactured by the defendant. The court found that the warning accompanying the drug was too general in its terminology to warn general practitioners of its specific dangers: "The incidence is usually no greater than is normally experienced with [another drug]." *Id.* at 1400. Instructions for products of a much less complex nature than drugs have been held inadequate. *E.g.*, *Reddick v. White Consol. Indus.*, 295 F. Supp. 243 (S.D. Ga. 1969) (inadequate instructions concerning the installation of a gas heater held as a basis for manufacturer's liability for carbon monoxide poisoning—under a duty to inform of facts which make the product likely to become dangerous); *Johnson v. Standard Brands Paint Co.*, 274 Cal. App. 2d 331, 79 Cal. Rptr. 195 (1969) (a ladder).

37. Three possible theories of liability are readily apparent: negligence, negligence per se and strict liability in tort. Under the negligence theory, the duty to disclose the possible dangers of the insecticide would be analogous to the vendor's duty to disclose to the vendee any known concealed dangerous conditions on property that is conveyed. See, *e.g.*, *Merrill v. Buck*, 58 Cal. 2d 552, 375 P.2d 304, 25 Cal. Rptr. 456

### III. Conclusion

What has been proposed here might seem an unnecessary compounding of an already legally complex matter. Society, however, cannot permit the continued victimization of certain of its members because of a correctable legal loophole. If a complicated legal edifice is needed to protect society and the environment from pesticide injury, this merely points up the ecological complexity of pest control and demonstrates that it is not simply a matter of killing noxious little animals. In the opinion of the writer, an appropriate acknowledgement of this fact is long overdue.

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(1962) (lessor liable for negligent failure to disclose a concealed, dangerous condition in the basement stairs); *Herzog v. Capital Co.*, 27 Cal. 2d 349, 164 P.2d 8 (1945) (agent and vendor jointly liable to vendee where agent concealed defects in the house by having it refinished); *Crawford v. Nastos*, 182 Cal. App. 2d 659, 6 Cal. Rptr. 425 (1960) (agent and vendor jointly liable to vendee where agent misrepresented capacity of a well on the property sold to the vendee). Negligence per se could arise as the result of the violation of a statutory standard designed to protect farmers from damages caused by target pest resurgence or secondary pest outbreaks. See generally *Satterlee v. Orange Glenn School Dist.*, 29 Cal. 2d 581, 177 P.2d 279 (1947). Strict liability could also be imposed under the criteria established by RESTATEMENT (SECOND) OF TORTS § 402A (1965). For a discussion of strict liability predicated on the failure to provide adequate warning, see *id.*, comment j at 33.