

way such support came to chemical control methods when the latter proved to be successful.

Having emphasized the need for and the importance of more basic research, it is now pertinent to highlight the fact that in all probability we can do more than we are doing with the basic information we do have. As pointed out in a previous paragraph, a relatively large number of microorganisms pathogenic for insects are known. And while their mass production awaits greater know-how, a great many more plot tests and experimental trials could be taking place. In other words, more effective screening programs could be carried out. The deficiencies are largely those of manpower and opportunities to test the pathogens against the appropriate insects. Moreover, greater variations in the manner of application could be tried, keeping in mind the four major possibilities: Some pathogens may be: (1) introduced and/or colonized; (2) applied as sprays or dusts; (3) used with insecticides, both compatibly and synergistically; and (4) used with parasites and predators.

What of the Future?

What are the potentialities of microbial control methods as they appear to us on the basis of our present knowledge? These questions, asked in a serious and sincere manner, require that we at least make an attempt to appraise the new horizons with the hope that we may discern the true path to microbial control—one of the

applications of insect pathology. The present status and the future outlook for microbial control may be summarized as follows:

Microbial control offers no panacea for the control of destructive insects. It should not be over-sold or advanced as a cure-all. Although in the long run the advantages of microbial control, in certain instances, over other means of control make it a practical and attractive means of reducing harmful populations of insects, in other situations it has definite limitations.

On the other hand, the potentialities of microbial control should not be underestimated. It has already proved itself in a number of instances, and in certain situations and under certain conditions is superior to other methods of control. The ultimate scoring is likely to read to the effect that in some instances microbial control is the method of choice, in other cases it excels at times but not at other times, and in still other instances it offers little or no advantage over other methods.

Considered from the broad viewpoint and for the good of agriculture, microbial control should not be thought of so much as a competitor of other methods of control but rather as a complement or supplement to other methods. To be sure, in some cases the use of microorganisms has replaced and will replace chemical insecticides, but, in general, microbial control methods pose no serious threat to the use of chemicals—contrary to published statements to this effect.

Preparations of entomogenous mi-

croorganisms, when used as sprays or dusts, may be considered as living insecticides. As such, they might logically be produced and marketed by the insecticide industry. Or, they might be produced by those concerns that manufacture antibiotics, fermentation products, vaccines, or other biologicals, and be marketed and distributed by insecticide companies.

The principal bottleneck to the wider use of microbial agents in the control of insects appears to be the unavailability of such products on the market. A number of promising insect pathogens have been tested experimentally but are waiting to be manufactured and to be made available to the grower. In some cases, adequate information is needed regarding their application and use in a commercial sense.

Although the potentialities of microbial control have been considered by scientists for a long time, our fund of basic and applied knowledge is not sufficient at this time to predict safely the extent to which such methods of control will be useful. With an increase in our understanding of how diseases spread and manifest themselves in nature, how their causative agents can be produced easily and in abundance, and how and under which conditions these agents can best be applied and disseminated—with an adequate knowledge of these matters, we may be sure that microbial control will assume its rightful place in the arsenal of weapons with which man is destined to combat his insect enemies.

Liability of Pesticide Manufacturers

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Whether or not a manufacturer is held to strict liability can depend on the adequacy of testing and the adequacy of directions for use

ESSENTIAL to an understanding of the legal liability of the manufacturers of pesticides for injury arising out of pesticide use is some knowledge of their products. In former times the chemical compounds used in pest control were relatively safe, that is their properties were generally known and they were applied in ways which enabled even the inexperienced user to confine their application to definite areas. Such a pesticide is treated by

the law as an ordinary good. This is to say, any injury resulting from the use of it is presumed to arise from the negligence of the user rather than from any dereliction on the part of the manufacturer. But all modern pesticides are not ordinary goods. Some are what the law calls inherently dangerous—goods with respect to which the manufacturers or distributor can reasonably foresee that any failure of duty on his part may operate, with-

out contributory negligence on the part of another person, to work injury. For reasons which are apparent application by airplane increases risk.

Early Rule and Warranty

In general, the common law rule is that the manufacturer of an article is not liable for injury arising from its use, unless the manufacturer has entered into a contract with the user.



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The rule was once applied to all goods. Today it is applied only in cases involving ordinary goods and there is a tendency to apply it to these only when they are sold without a published warranty—a warranty or implied contract given by a manufacturer through advertising to ultimate consumers of its product. Manufacturers of ordinary pesticides owe no duty to those with whom they have no contract or warranty, but those who manufacture pesticides which have been or which may be held to be inherently dangerous may be liable regardless of any contract or warranty.

An early case decided contrary to the general rule of the common law was that of *Thomas v. Winchester*. In this case a manufacturing pharmacist labeled a bottle containing belladonna as extract of dandelion—the former being a dangerous drug and the latter a relatively harmless one. The mislabeled bottle passed through the hands of a wholesaler to become part of the stock of a retail druggist. Eventually the retail druggist sold the bottle unopened to the plaintiff who, relying upon the label, took an overdose of belladonna to her great injury. As the cause of her injury was the mislabeling of the bottle, she elected to by-pass the retailer—whom she could have held liable on a contract of warranty—to sue the party ultimately at fault, that is the manufacturer, for negligence. The latter, as was to be expected, in reliance upon *Winterbottom v. Wright*,² moved for nonsuit. *Winterbottom v. Wright* is the case credited with having established the rule that apart from contract a manufacturer is not liable. The judge, however, in *Thomas v. Winchester*, denied the motion for a nonsuit and in doing so carefully ana-

lyzed the situation in *Winterbottom v. Wright*, contrasting it with the situation in the case before him. Since the difference between a relatively harmless drug and a highly dangerous one is closely analogous to the difference between a relatively harmless pesticide and a highly dangerous one, the reasoning back of the court's denial of the defendant's motion for nonsuit in *Thomas v. Winchester* furnishes a key to understanding of the liability of pesticide manufacturers.

In *Winterbottom v. Wright*, the driver of a mail coach, because of some hidden defect in the coach, had been thrown from his seat and lamed. He, like the plaintiff in *Thomas v. Winchester*, had elected to by-pass the person with whom he had contractual relations, to sue the builder of the coach. The court denied him recovery saying in effect that the duty owed by the builder of the coach was to the party to whom he had sold it and not to any remote party who might be injured through its use. The precedent thus established favored the defendant in *Thomas v. Winchester* and was generally accepted. Upon what grounds then did the judge in *Thomas v. Winchester*, in upholding the right of the plaintiff to maintain an action against the manufacturing pharmacist, depart from it? In his own words:

"Misfortune to third persons, not parties to the contract, would not be a natural and necessary consequence of the (coach) builder's negligence and such negligence is not an act imminently dangerous to human life. . . .

"But the case in hand (*Thomas v. Winchester*) stands on different ground. The defendant was a dealer in poisonous drugs. . . . The death or great bodily harm of some person was the natural and almost inevitable consequence of the sale of belladonna by means of the false label."

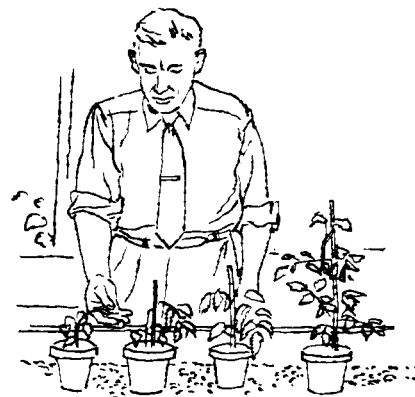
Strict Liability for Inherently Dangerous Goods

In determining whether or not a good is inherently dangerous the courts take all the elements in a situation into account. They in fact distinguish between goods that are merely dangerous and those that are inherently dangerous. This differentiation has real legal significance. The manufacturer of a thing classified as inherently dangerous is strictly liable. This means he is liable for injuries resulting from the use of his product regardless of any fault on the part of others in bringing about the injury. The manufacturer of a thing that is

merely dangerous is not strictly liable. He is liable only when the care exercised by him is not commensurate with the nature of his product. Here, however, we encounter an anomaly. Failure by the manufacturer or distributor to use due care may be the factor that transforms his product from a merely dangerous thing into one that is inherently dangerous. Belladonna as a drug is merely dangerous. Belladonna in a mislabeled bottle is inherently dangerous. As a drug it may do injury, but as a mislabeled drug it is almost certain to do so.

2,4-D in the Courts

In the field of pesticide litigation, the leading cases to date dealing with the noncontractual liability of the manufacturers of pesticides have arisen out of the use of 2,4-D. This chemical, highly efficient for killing broad-leaved plants, is, however, nondiscriminating. Its very efficiency in killing unwanted growths makes its use extremely hazardous to broad-leaved crops such as cotton and sweet potatoes. Recognizing this, the Civil Aeronautics Administration in 1948 prohibited its use in the form of dust by airplanes. Reference to this prohibition is found in the 1949 judgment of the Supreme Court of Arkansas in *Chapman Chemical Co. v. Taylor* in which 2,4-D dust was held to be inherently dangerous. Because of the carrying properties of the powder with which the 2,4-D was mixed it drifted to distant cotton fields where it caused injury. One of these fields was owned by a man named Taylor who joined with others in bringing actions against the user, the distributor, and the manufacturer of the 2,4-D. The trial court held both manufacturer and distributor strictly liable, because it classified 2,4-D, in view of the circumstances, as inherently dangerous. The phrase "in view of the circumstances" is used advisedly in order to emphasize the similarity which exists between



Thomas v. Winchester and Chapman Chemical Co. v. Taylor.

Just as the court in Thomas v. Winchester, in applying the strict liability rule, held belladonna when mislabeled to be an inherently dangerous thing, so the court in Chapman Chemical v. Taylor held that 2,4-D is inherently dangerous when put on the market in the form of dust without its properties in this form being definitely determined and consequently without information concerning these properties being included in the directions given for its use.

While the trial court in Chapman Chemical v. Taylor held both the manufacturer and distributor strictly liable, the appeal court ruled directly with respect to the liability of the distributor only. The fact that the manufacturer did not appeal does not affect the validity of the ruling for us. In this case the distributor marketed the 2,4-D as his own product. Hence, he was subject to the rule "that one who puts out as his own product, a chattel manufactured by another, is subject to the same liability as though he were its manufacturer." A few excerpts from the judgment may help to clarify the position of the appeal court with respect to the liability of the manufacturer:

"It was the duty of the defendant Chapman Chemical Company before putting an inherently dangerous product on the market to make tests to determine whether or not it would damage crops of others. . . .

"Now a test was made but its purpose was to ascertain whether or not 2,4-D could be distributed by airplanes as other dusts could be. It was found that it could be, but no test was made as to the floating quality of the dust, and it is this characteristic or quality of 2,4-D which makes its use extra hazardous. . . .

"That peril attended the use of



the dust is undisputed. . . . With this knowledge the chemical company sold the dust, knowing that it would in its ordinary use be distributed from an airplane and it did this without making any test to determine what the effect thereof would be. Its literature referred to the dust as a proved weed killer and recommended the application of it by means of an airplane. . . .

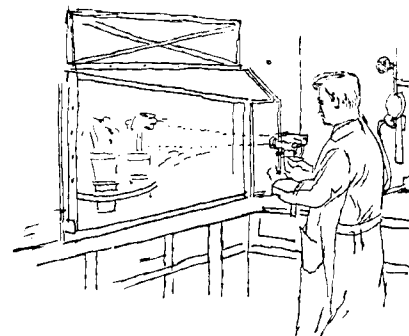
"The undisputed testimony is that the Elms Company (i.e., the user) bought the dust from the Chemical Company and applied it in the manner directed for the known purpose for which it was sold and that this use resulted in serious damages to the cross appellants. . . .

"We do not think the chemical company excused itself from liability by the mere showing that it was unaware of the peculiar carrying quality of the dust it was selling. Ordinary care required that it should know in view of the dangerous nature of the product it was selling, and it was charged with the knowledge which tests would have revealed. The case is therefore one in which the rule of strict liability should be applied."

Confirmation of these findings and implications with respect to the non-contractual liability of the manufacturers of pesticides appears in the judgment of the United States Court of Appeals, Eighth District, rendered in *Walton et al v. Sherwin-Williams Co. et al.* In this case nine cotton farmers whose crops were injured when Weed-No-More, a 2,4-D product of Sherwin-Williams Co., was used to spray a rice crop in their vicinity brought action against two wholesalers and two retailers along with Sherwin-Williams as defendants. The trial court dismissed these actions, and the plaintiffs in the case of Sherwin-Williams Co. asked for reversal on appeal. Reversal was denied. This is in apparent conflict with the outcome in *Chapman Chemical Co. v. Taylor.*

In the Chapman Chemical case, 2,4-D had been used in the form of dust without adequate testing. In *Walton v. Sherwin-Williams*, on the other hand, 2,4-D was used in an oil solution after adequate tests had been made and by people to whom adequate directions had been given. The appeals court decision said:

"The plaintiffs adduced the testimony of three expert witnesses and sought to prove that 2,4-D is an inherently dangerous product without regard to the form of the mixture or solution it is put in. Examination and cross-examination of these witnesses . . . , however,



brought out the facts as to the differences between 2,4-D in dust form and spray form. All these experts testified to the dangers of using the dust form because of the great distance the 2,4-D dust would drift. All testified that the liquid form could be controlled if the various safety factors (wind velocity, particle size of spray, height of airplane, etc.) were carefully observed. . . .

"If a substance can be used safely by observing certain precautions in the use, and those precautions are known to the persons using the substance, then the manufacturer of it cannot be held to 'strict liability' for damages resulting from negligent use of it. The substance is not inherently dangerous. There was substantial evidence, if believed, to support a finding by the jury that 2,4-D can be, and is, safely applied. Further, there was evidence from which it was a fair inference that the precautions necessary for safe application of 2,4-D were known to the pilot in the present case. The jury so found. There is equally solid foundation for the finding that 2,4-D in an oil solution is not an inherently dangerous product."

Adequate Testing and Directions

The last excerpt reveals that the court in *Walton v. Sherwin-Williams*, in determining whether or not 2,4-D in an oil solution is an inherently dangerous thing, took more than the nature of the mixture into consideration. It refers to precautions which must be taken and which, therefore, must be made known to the user. To determine what precautions are necessary adequate tests must be made, and to inform prospective users with respect to these precautions, adequate directions must be given. What constitutes adequate tests and what is to be construed as adequate directions are matters of fact to be determined in view of the circumstances in each case.