Chemicals and Pests

Man's use, misuse, and abuse of the products of science determine whether these valuable assets are also harmful.

I. L. Baldwin

Human society, since the time of recorded history, has encountered many difficulties in adapting itself to changes brought on by the advancement of technology. Although we usually think of the Industrial Revolution as the starting point of modern technology, the invention of the wheel must have brought about one of the greatest changes in human society the world has seen. In recent years there has been a rapid expansion of scientific endeavors and a consequent rapid increase in the rate of accumulation of knowledge. Technology has quicky translated this new knowledge into materials and procedures for use by society.

The discovery of methods of harnessing nuclear energy, some two decades ago, has so captured public attention that few have given serious attention to the chemical revolution which has occurred during the same period. It is the chemical revolution, however, that has most intimately affected every aspect of our daily life. The development of new fibers, new plastics, new medicinals, and new agricultural chemicals has produced profound changes in our lives. Public health has been improved; the span of life has been greatly extended; our clothes are composed of fibers unknown 20 years ago; our machinery and household utensils are made of new and strange materials; and our rate of productivity in agriculture has been greatly expanded.

Benefits, however, have not been achieved without cost. Many of the new materials have been used without adequate testing, or they have been used under improper conditions. Sometimes lives have been lost or health has been destroyed. At other times our economy has suffered when shoddy materials have been used in clothing, equipment, and structures. Often men have lost their means of livelihood. Rachel Carson's *Silent Spring* (Houghton Mifflin, Boston, 1962. 368 pp., $5) dramatizes in an effective fashion the losses that society has suffered from the use of new pesticides. Her emphasis is upon the danger to human health and the possible irreparable damage to various forms of wildlife.

Silent Spring is superbly written and beautifully illustrated with line drawings. The author has made an exhaustive study of the facts bearing on the problem. It is not, however, a judicial review or a balancing of the gains and losses; rather, it is the prosecuting attorney's impassioned plea for action against the use of these new materials which have received such widespread acceptance, acceptance accorded because of the obvious benefits that their use has conferred. The author has reviewed many of the instances in which unfortunate accidents have occurred. In some cases the accidents were the result of carelessness; in others they were caused by widespread use of materials prior to adequate small-scale testing; in some instances the unfortunate effect on wildlife was a result of the failure of those who used the new pesticide to consider wildlife values.

The author's mode of approach to the use of pesticides will undoubtedly result in wider recognition of the fact that these chemicals are poisons and in a more careful and rigorous control of every step in the pathway that pesticide must travel, from the research laboratory, through the process of obtaining government approval, to use in the field. Perhaps the tremendous improvements in public health and welfare that have resulted from the use of these materials have caused us to become careless in our control and use of them. There are serious hazards involved in the use of pesticides. It has frequently been said: "There are no harmless chemicals, only harmless use of chemicals." The recent case in which the death of several infants in a hospital was caused by the inadvertent use of salt instead of sugar in their food comes to mind.

A Matter of Perspective

The possible indirect harmful effects of pesticides on humans and wildlife are stressed in *Silent Spring*. It is noted that certain of the pesticides may serve as carcinogens and that some may serve as mutagens. How often all the necessary conditions are met, so that the pesticides do actually serve as carcinogens or mutagens, is unknown. The author feels that such dangers are very great. Most scientists who are familiar with the field, including government workers charged with the responsibility of safeguarding the public health, feel that the danger of damage is slight. The author gives no figures for deaths known to be due to pesticides, but her description of certain cases may leave the impression with the uninformed reader that such cases of death due to the direct effects of pesticides are numerous. Actually human deaths in the United States known to be caused by pesticides are less than 100 annually. To place this in proper perspective, consider that almost twice that many deaths are known to be caused by aspirin and that almost one-half as many deaths are known to be caused by bee stings. Another example, in which the author's choice of language may lead to false impressions, is her reference to the "fall of chemical death rain." Many may be led to believe that, just as rain falls on all of our land, so is all of our land sprayed with pesticides. Actually less than 5 percent of all the area of the United States is annually treated with insecticides.

I can understand that the author felt it necessary to portray as "bad guys" all those who recommend the use of pesticides and as "good guys" all those who oppose the use of such insecti-

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cides. I cannot condone, however, the sarcastic and unjustified attack on the ethics and integrity of many scientific workers. The following quotation is only one of such attacks.

> The major chemical companies are pouring money into the universities to support research on insecticides. This creates attractive fellowships for graduate students and attractive staff positions. Biological-control studies, on the other hand, are never so endowed—for the simple reason that they do not promise anyone the fortunes that are to be made in the chemical industry. These are left to state and federal agencies, where the salaries paid are far less.
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> This situation also explains the otherwise mystifying fact that certain outstanding entomologists are among the leading advocates of chemical control. Inquiry into the background of some of these men reveals that their entire research program is supported by the chemical industry. Their professional prestige, sometimes their very jobs depend on the perpetuation of chemical methods. Can we then expect them to bite the hand that literally feeds them? But knowing their bias, how much credence can we give to their protests that insecticides are harmless?

The author pleads for a return to the balance of nature as the method of controlling our pests. Greater use of biological control of pests would be desirable, but, if it is to be effective enough to meet human needs, it must result in upsetting the balance of nature. Mankind has been engaged in the process of upsetting the balance of nature since the dawn of civilization. Certain species of plant and animal life that serve the economic or esthetic needs of mankind have been nurtured with great care; other species that have interfered with the health, comfort, or welfare of mankind have been attacked with great vigor; the large majority of the species have been ignored by all but a small portion of the population. Fortunately there is a growing concern, coupled with positive action, for the preservation of all forms of plant and animal life. This effort to preserve our wildlife is too late to save some species and too little to save others, but an encouraging start is being made. Undoubtedly mankind's own self-interests have suffered in the past and are still suffering because of his callous disregard of the damage he does to other species of plant and animal life. But it is equally certain that modern agriculture and modern public health, indeed, modern civilization, could not exist without an unrelenting war against a return of a true balance of nature.

Valuable but Dangerous

Just as it is important for us to be reminded of the dangers inherent in the use of the new pesticides, so must our people also be made aware of the tremendous values to human welfare conferred by the new pesticides. No attempt is made by the author to portray the many positive benefits that society derives from the use of pesticides. No estimates are made of the countless lives that have been saved because of the destruction of insect vectors of disease. No mention is made of the fact that the average length of human life has steadily increased over the last several years. No consideration is given to the important role played by modern pesticides in the production of food and fiber. The author does suggest that, with a surplus of food in the United States, we might well curtail the use of pesticides. Although the United States has a surplus of food, over one half of the people of the world go to bed hungry each night. The greater use of pesticides in most sections of the world would increase food production, alleviate hunger, and improve the health of the people.

Modern agriculture, with its high-quality foods and fibers, could not exist without the use of pesticides. Weeds, disease, and insect pests would take an extremely heavy toll if these chemicals were not used. The yields per acre, the yields per man hour, and the quality of the product would all suffer materially if these chemicals were withdrawn from use. One cannot do more than guess about the changes that would be necessary in American society if pesticides were banned. An immediate back-to-the-farm movement would be necessary, and this would involve many millions of people. It is hoped that someone with Rachel Carson's ability will write a companion volume dramatizing the improvements in human health and welfare derived from the use of pesticides. Such a story would be far more dramatic than the one told by Miss Carson in *Silent Spring*, which deals with the losses society has sustained or may suffer in the future because of the use of these materials.

The problem which Rachel Carson so effectively dramatizes is not a new one. It has long been recognized by workers in government and industrial laboratories and by chemists and biologists wherever they may work. Several years ago the National Academy of Sciences established a committee of outstanding scientists to study the problem of food protection and the influence of pesticides and other chemicals on human health and welfare. Some three years ago a companion committee was established to deal with pesticides and wildlife relationships. These committees and their subcommittees have members from all of the scientific disciplines that might be able to contribute to the problem, including physicians, wildlife specialists, toxicologists entomologists, agriculturists, biologists, chemists, and economists. Both the Food Protection Committee and the Pesticides and Wildlife Relationships Committee have made a careful and judicial review of all the evidence available, and they have published a series of reports making appropriate recommendations. These reports are not dramatically written, and they were not intended to be best sellers. They are, however, the result of careful study by a wide group of scientists, and they represent balanced judgments in areas in which emotional appeals tend to over-balance sound judgment based on facts.

I suggest that those who read *Silent Spring* include as companion reading the following publications of the National Academy of Sciences (Washington, D.C.). Publications 920-A and 920-B: *Pest Control and Wildlife Relationships*, part 1, *Evaluation of Pesticide-Wildlife Problems*; part 2, *Policy and Procedures for Pest Control* (1962. $1.25 each); Publication 887: *Use of Chemicals in Food Production, Processing, Storage, and Distribution* (1961. $0.50); Publication 470: *Safe Use of Pesticides in Food Production* (1956. $0.50).

The story of *Silent Spring*, so well told by Rachel Carson, even though it presents only one side of a very complex problem, will serve a useful purpose, if research on better methods of pest control is stimulated and if all concerned with the production, control, and use of pesticides are stimulated to exercise greater care in the protection of the public welfare. In the meantime it is my hope that some equally gifted writer will be willing to do the necessary research and to write the even more dramatic story of the values conferred on mankind by the chemical revolution of the last two decades.