The Tax We Pay to Insects

by F. C. BISHOPP

MAN IS engaged in a constant battle against insects. Doubts about the outcome have been expressed many times. Maurice Maeterlinck said insects are our rivals here on earth—and perhaps our successors. W. J. Holland prophesied that the last living thing on the globe will be some active insect sitting on a dead lichen, which will represent the last of plant life. During the years of severe insect visitations from Biblical times down to this very day the destruction wrought gives point to such dismal expressions. But, on the other hand, the results forthcoming from research lend hope that man will overcome his insect foes and reduce the extent to which he provides food for the insect hordes.

We must not forget, however, that the battle is still on and that insects have the advantage because they can multiply with incredible speed and adapt themselves to almost any condition and an endless variety of foods. Furthermore, the number of distinct kinds of insects on earth probably exceeds a million, and the number of individual insects is so great that it is impossible for us to set down the figure.

In 1931, L. O. Howard, that venerable scientist who, as chief of the unit that is now the Bureau of Entomology and Plant Quarantine, led the insect fighters of the Department of Agriculture for half a century, vividly brought to attention in his *Insect Menace* the bitterness of this struggle and the need for man to sharpen his wits and weapons if he is to survive.

The previous year Dr. Howard pointed out to a group of Maryland scientists that many forms of life have been tried, have been found wanting, and have disappeared in the course of the ages, but the insect has persisted: "The human type may be one of nature's experiments that will fail," he said. "It has not been in existence long enough to have been

thoroughly tried out. Prophets of evil tell us that human overpopulation of the world is approaching, and approaching rapidly; that mass starvation is sure to come . . . if greater production of plant food cannot be stimulated or if new foods cannot be invented. There is a third way of postponing the coming of the starvation era, and that is by the stopping of all waste. Probably the greatest of these wastes is the tremendous but unnecessary tribute that we pay to insects. In the United States alone, the labor of one million men each year is lost through their damage to crops and to our other vital interests."

The loss occasioned by some of the more important mites, ticks, and insects in the United States was estimated by J. A. Hyslop in 1938 to be more than $1,600,000,000 annually. Although our insect enemies assess this burdensome tax on our people, on the other side of the ledger we have a number of insects that contribute millions to our food resources through the pollination of our seed and fruit crops. Confronted with this situation, there is every reason for the entomologists to put forth Herculean efforts to control our insect enemies and to protect our insect friends. There is also every reason for our people to become familiar with these foes and friends and with the weapons scientists are developing to combat the former and means they are evolving to husband the latter.

Some of these discoveries and developments were war-born, others had their inception before the war, and still others were hastened because of war needs, partly because of opportunities for testing them on a large scale in many parts of the world. The simple and effective ways developed to combat lice on humans kept our armies free from the scourge of typhus and avoided heavy loss of life among civil populations.

Typhus was kept from our own country by the disinfesting of prisoners and others before they entered the United States. Methyl bromide fumigation for ridding clothing and equipment of vermin plus the MYL and DDT powders developed by the Bureau of Entomology and Plant Quarantine were largely responsible for these results.

The contribution of the Department entomologists who devised means of combating mosquito carriers of malaria, dengue fever, and filariasis, scrub typhus mites, and dysentery-carrying flies was of great value in our military operations. Their research gave rise to such notable contributions as the aerosol bomb, mosquito repellents, dimethyl phthalate as a typhus mite killer, a benzyl benzoate-DDT formula for the control of lice and scabies, and DDT as a killer of mosquito wrigglers and adults.

Although rapid advancement was made through research in the insecticide field during the war period, sight should not be lost of the sound information gathered through preceding years upon which such advances must be based. The full answers to complete biological problems come slowly, and in the case of DDT and other insecticides developed during the war much still remains to be learned.

Insecticides are only one phase of our armament in the war against insects. True, their use is the most direct and spectacular. Their promiscuous and improper use, however, may lead to other serious problems. There is especial danger of destroying the beneficial forms of life, including insect predators, fish, frogs, or even birds by the use of a material such as DDT. The killing of honeybees and other insect pollinators by insecticides must be prevented if we are to produce abundant yields of legume seed and of many fruits and other crops. There is also danger of plant injury from the use of insecticides, either directly from improperly compounded or diluted material or through soil contamination. Research has not only found some effective insect killers but it has indicated the precautions that must be taken in their use to safeguard the crops, wildlife, and health of our domestic animals and ourselves.

A successful campaign against the multitude of insect species with their diverse and often subtle methods of attack requires every type of weapon and carefully planned strategy. Modification of agricultural and other practices is of great importance in combating insects. These include time and method of planting and cultivation, choice of varieties, fertilization, methods of harvesting, disposal of waste, rotation of crops, water-table control, use of traps, methods o f constructing buildings, silvicultural practices, breeding of insect-resistant varieties, use of natural enemies, and proper wrapping, packing, and storing of commodities.

All these problems have received attention from our research workers and some of the interesting and important discoveries and developments are set forth in the articles that follow.

THE AUTHOR

F. C. Bishopp is assistant chief in charge of research in the Bureau of Entomology and Plant Quarantine. He has been engaged in research on various entomological problems for some 40 years. In his early work he dealt with insects affecting cotton and later for many years studied the relation of insects to man and animals and how these pests can be controlled. Dr. Bishopp was born and reared on a ranch in Colorado and educated at Colorado State College and Ohio State University.

ALSO, IN THIS BOOK

New Insect Repellents, by Bernard V. Travis, page 628.
Pests That Attack Man, by E. F. Knipling, page 632.
DDT in the Home, by L. S. Henderson, page 643.
Control of Forage Pests, by W. A. Baker, page 651.
Insecticides for Cotton, by R. W. Harned, page 655.
Insecticides for Vegetables, by W. H. White, page 663.
Controlling Pests of Stock, by E. W. Laake and W. G. Bruce, page 670.
News About Bee Diseases, by A. P. Sturtevant, page 674.
Air War Against Pests, by H. H. Stage and Frank Irons, page 835.