

ENTOMOLOGY

Hundred Years War on Insects

Century-long battle has seen entomologists stop most insect-carried diseases. Yellow fever was one of the biggest victories. Farm loss from insects is \$4,000,000,000 each year.

► FOR 100 years the science of entomology has waged ruthless warfare in this nation against a savage natural enemy. This enemy carries deadly diseases and horrible plagues, destroys crops, undermines homes, ruins clothes and banishes comfort. The enemy's shock troops are a vast array of insects — "bugs" in familiar but inaccurate terminology.

The organized attack on insects began with the appointment of Dr. Asa Fitch as entomologist for New York on May 4, 1854. On June 14 that year, Towend Glover became the first entomologist appointed by the federal government.

After a century of fighting how does the battle stand?

Farm losses to insects are estimated to be \$4,000,000,000 each year. Without the controls developed in the last century, insect losses would be half the total annual farm production of about \$40,000,000,000.

These controls have achieved the almost complete conquest of malaria, yellow fever, bubonic plague, epidemic typhus and other scourges of mankind that are spread by mosquitoes, flies, lice, ticks and fleas.

In 1873, 13,000 persons died in a yellow fever epidemic in the Mississippi Valley. Medical research indicted the mosquito as the carrier of the disease, and entomologists worked out methods for controlling the mosquito. As a result, the last epidemic of yellow fever in the United States was in New Orleans in 1905.

Early Insecticide History

While the most sensational successes of science in this war have been won on the disease front, scientists have pressed for more knowledge and better control methods in every field that man finds himself at a disadvantage with the insect.

DDT captured the public imagination so completely with its successes during World War II that many have forgotten the earlier history of insecticides. None were as effective as DDT, but they marked important gains.

By the time of the Revolutionary War, farmers knew that the nicotine in tobacco would kill soft-bodied insects. With the appearance of the scientists on the field of battle, the old stand-bys of pyrethrum, oils and arsenic compounds were developed. Most of these came on the scene as insect-killers in the 1860's.

One of the most significant of these earlier discoveries came in 1892 when the late Dr. L. O. Howard began making large scale tests with oil spread on water in

mosquito-breeding areas. Recommendations stemming from his research led to the world-wide use of oil as a killer of mosquito larvae, and helped wipe out yellow fever and reduce malaria in this country. In 1894, Dr. Howard became chief entomologist of the U. S. Department of Agriculture, a post he held until 1929.

Insecticides came into their own, though, with the comet-like appearance of DDT. Credited with preventing an outbreak of epidemic typhus during the mass dislocation of people and armies in the war, DDT at first appeared to be a complete and universal weapon against the insects.

Resistant Strains Developed

The devilish response of the insects to this new threat was unfortunately soon apparent. They simply developed strains resistant to DDT and shrugged it off like so much talcum powder. Certain important insects, such as the boll weevil, never were killed by DDT.

In spite of the insects' genetic ingenuity, the scientists knew a good lead when they

saw one. Quickly an insect-man armament race started and, as resistant strains developed, the scientists came out with new offensive weapons.

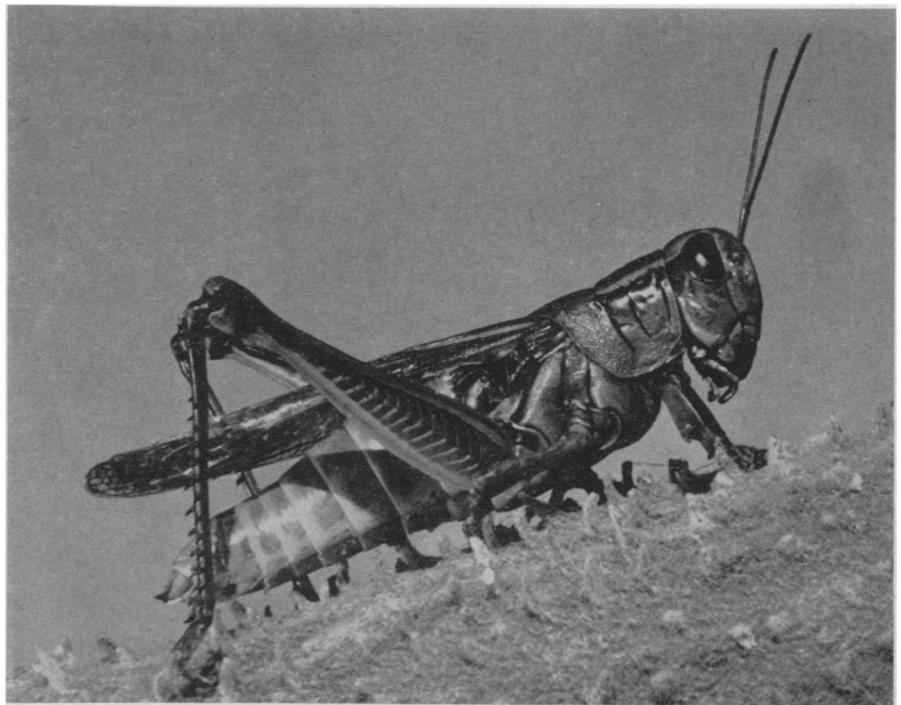
This large and growing arsenal of insecticides, based on the DDT chlorinated hydrocarbon principle, includes methoxychlor, TDE, BHC, lindane, chlordane, aldrin, dieldrin, endrin and heptachlor. Each has a particular group of insects against which it is most effective, but there is no reason to believe the insects will not gradually evolve a resistant strain.

Organic Phosphorus Chemicals

An important new development has been schradan, an organic phosphorus compound. Sprayed on the plant or soil, schradan is taken into the plant and transported to the leaves and stem. When the attacking insect starts to suck the plant's vital juices, it gets the poison.

It is called a systemic insecticide. Its possibilities are great. The primary advantage is the obvious absence of continual spraying. Wide use of schradan is held up until the problem of residues in food that might be harmful to man is cleared.

Another early development that is being intensively exploited is biological control. This is the entomologist's way of saying fight an insect with another insect.



TWO-STRIPED GRASSHOPPER — Grasshoppers have caused concern among men since the beginning of recorded history. The one shown here is known to entomologists as *Melanoplus bivittatus*.

All over the world explorers from the Department of Agriculture are looking for insects to send back—insects that eat insects already here. Some of these parasites have already been found.

Since 1888, more than 100 parasites have been successfully established on about 40 different pests in this country. The vedalia beetle from Australia saved the early California fruit industry by devouring the cottony-cushion scale. The other parasites artificially introduced have not been quite so effective, although they have simplified some control problems.

At present entomologists have great hope that parasites of the European corn borer and the pink bollworm can be established to help control these multi-million dollar pests.

The future could get very complicated with a combined insecticide-parasite approach. The problem is how not to kill off your parasites with your pests.

There are still plenty of mosquitoes to whack in summer and pests to bedevil the farmer, but accomplishments so far represent signal victories for man over his ancient enemy. The victories have been won by a very small army.

Bar at Entrance Port

Fewer than 1,000 persons today work full-time in research on insect problems. In its 100 years, the profession of entomology has had less than 6,500 members. What they lacked in numbers, these scientists possessed in ingenuity, scientific ability and determination.

It early became apparent to them that most of the serious insect pests were not natives to this country. In 1865, Glover suggested that all seeds and foreign plants be investigated at the port of entry for harmful insects. With frightening accuracy, he said, "One pair of new noxious insects will do more harm than hundreds of well-known varieties."

Congress did not get around to passing plant quarantine legislation until 1912. Among the harmful insects that entered the country between 1865 and 1912 were the gypsy moth, sweetpotato weevil, California red scale, greenbug, horn fly, boll weevil, European corn borer and Japanese beetle. Their total "take" from the nation today is close to \$1,000,000,000 in an average year.

Not all of these could have been stopped,

since some serious insects have entered in spite of inspection and quarantine. However, there is no doubt that early action on Glover's suggestion would have kept most of them out. In 1949, the corn borer did \$350,000,000 damage; the boll weevil hit a peak in 1950 with damage estimated at \$750,000,000. These are not small items in the nation's economy.

Came Over on Mayflower

Naturally many of our destructive insects came from Europe on the Mayflower and other ships. Lice, fleas, bedbugs, fabric pests such as clothes moths, house flies, ants and cockroaches are among this group of "colonizing" insects.

We owe the Hessian fly indirectly to the Redcoats. It came over with the German mercenary troops the British hoped would help win the Revolutionary War for them. As soldiers, the Hessians were not very successful, but the Hessian fly has made up for this by becoming one of our worst wheat pests.

The insects have been cagey enemies, responding to every new scientific offensive with a strong defensive, but it is not too much to say that the scientific successes in the 100-year war have helped this country become one of the strongest, and its people among the healthiest and best fed anywhere on earth.

Science News Letter, May 29, 1954

BIOCHEMISTRY

Clumped Blood Cells Show TB in New Test

► A SUCCESSFUL blood test for diagnosing tuberculosis was announced by Dr. James F. Morris of Fort Douglas Veterans Administration Hospital, Salt Lake City, at the meeting of the National Tuberculosis Association in Atlantic City.

The test depends on the clumping of red blood cells suspended in diluted serum from the patient's blood. When tried on 54 patients, only one false positive and one false negative resulted.

This test is a modification of the Middlebrook-Dubos test developed several years ago. In this first version, red blood cells from sheep sensitized to tuberculin were suspended in patient's diluted blood serum. If the cells clumped, it was believed to show the presence of the disease.

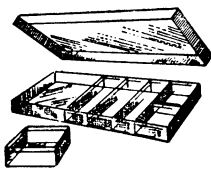
When the red cells from the patient were substituted for the sheep cells, the test gave "reliable results as a diagnostic procedure," Dr. Morris reported. The use of sheep cells did not give a valid test for active tuberculosis.

The new test is most reliable, Dr. Morris found, in patients with early active lung infiltration, miliary tuberculosis and tuberculous meningitis.

Dr. Morris began his studies of a TB blood test at the Trudeau Sanatorium, Trudeau, N. Y., and continued it at the University of Rochester, N. Y.

Science News Letter, May 29, 1954

TRANSPARENT PLASTIC BOXES



Write for Data TPB-SNL

R. P. CARGILLE LABORATORIES, INC.
117 Liberty Street, New York, N. Y.

SAVE UP TO 85% ON GOV'T SURPLUS

100 - 200 - 300 POWER REVOLVING TURRET MICROSCOPE

AN UNSURPASSED VALUE ! The three revolving objective lenses allow a selection of 100, 200 or 300 POWER magnification. Rack and pinion focusing—right and left hand. Adjustable sub-stage mirror. All metal body built to incline through 90°. Complete in a sturdy, dove-tailed hardwood case. Your satisfaction guaranteed. **Only 9.49**



BINOCULAR DISSECTING STEREOSCOPIC MICROSCOPE

Only \$49.95

SATISFACTION GUARANTEED !

A top quality, imported Prismatic Binocular Head and Microscope. Micro-engineered and designed for finest stereoscopic performance. Has fine gear tooth adjustment to insure an even micro-focus. Ground, polished, micromatic 5X objectives, plus 10X eyepieces gives full 50 power magnification. Sturdy, solid base—all-metal construction. Side arm rests included for delicate and long work. Complete in hardwood case. Ideal for Biology, Botany, Zoology, Embryology, Bacteriology, Dermatology, Entomology, etc.

M-X490 EXTRA EYEPIECE SET

For Stereoscopic Microscope above. Has 4 paired eyepieces (8 pieces) of 4X, 8X, 12X & 15X. Complete in hardwood case. **16.95**



ONLY A SAMPLE—Microscopes shown here are only a part of our stock. Others range up to 2000 power. Send for our Catalog TODAY!



NAVIGATOR'S MAGNETIC COMPASS

Type P-11. Designed for use in British Navy. Has a rotating verge ring, calibrated in 1° increments, from 0 to 360°. Two luminous grid wires for N-S and two for E-W alignment. Three foot mounts. Ideal for use on small boats. Another Amazing **9.95**

PALLEY SURPLUS BARGAIN. Like New.

Order from this Ad. Pay by M.O. or Check. P.O.'s acceptd. from D&B firms. 1/2 dep. with C.O.D.'s. All prices F.O.B. Los Angeles, California.

WORLD'S MOST AMAZING BARGAIN CATALOG

SAVE UP TO 85% ON WAR SURPLUS 1954 EDITION—OVER 320 PAGES

Packed with SENSATIONAL VALUES in WAR SURPLUS, FACTORY CLOSE-OUTS and GENERAL MERCHANDISE! Fully Illustrated. Thousands of items in Hand & Power Tools, Outdoor & Sporting Equipment, Hardware, Photo Supplies, Foam Rubber, Industrial Tools, Aircraft Parts, Metals, Plastics, Gadgets, Hydraulic Supplies & many, many more.



Only 50¢ To cover Handling & Mailing. Refunded with first order.

PALLEY SUPPLY CO.

2263 E. Vernon Ave.,
Rm. 14E
Los Angeles 58, Calif