

ENTOMOLOGY

Gas War on the Farm

Deadly insecticides closely related to German nerve gas has put the farmer into a gas mask. Scientists consider necessary precautions to protect him.

By SAM MATTHEWS

► THE HORRORS of radioactive dusts, bacteriological warfare and "nerve gases" may never become realities in human war. But today in another type of war, these things are being used with deadly effect. The farmer has new weapons to fight insects, and the public gets more food and better food, through peacetime development of these wartime products of science.

Insecticides such as parathion, TEPP and HETP, members of a chemical family called the organic phosphates, are offshoots of German research in World War II into the dreaded "nerve gases."

With extremely potent effect against insect pests, the organic phosphates are among the most promising new weapons in better crop control. At the same time, food contamination due to residue hazards presents little or no danger to the consumer. The organic phosphates decompose rapidly after use on crops.

The danger is to the men who make and handle these new chemicals, the industrial workers, the farmer and the men on the spray rigs or crop dusting planes.

In the past four years, more than a dozen men have been killed by the organic phosphate insecticides. Many others have been made violently ill. Public health authorities blame most of the accidents on disregard by the victims of the need for gas masks and protective clothing. (The organic phosphates can poison the body through the lungs or the skin with almost equal suddenness.)

Bought War Surplus Masks

Many farmers bought war-surplus gas masks for use when they spray with these new organic poisons. In the past year, scientists of the Department of Agriculture have learned these masks will not stop the organic phosphate sprays and dusts.

"War surplus masks are worthless against the phosphates," Dr. Robert A. Fulton said bluntly.

To give farmers better protection, experiments under Dr. Fulton's direction have been going on since November, 1949, at the huge, sprawling U. S. Agricultural Research Center in Beltsville, Md. An Interdepartmental Committee on Pest Control (Agriculture, Public Health Service, Food and Drug Administration, Bureau of Mines, Army Chemical Corps and co-operating industrial groups) initiated the program. The first point of attack was on

parathion, first of the organic phosphates.

Dr. Fulton's job was to find respirators or gas masks able to filter out all but one part per million of the insecticide in the air passing through them. The filters had to grab and hold particles less than one-tenth of a micron in diameter. A micron is 1/1000 of a millimeter, or about 1/25,000 of an inch.

These particles of poison are too small to be detected by ordinary means. To learn whether or not his gas masks were actually catching them, Dr. Fulton used first a spectro-photometer and then live insects to do the detecting.

The spectro-photometer identifies tiny amounts of the insecticides by the effect on light rays passing through the contaminated air.

When this sensitive instrument is not sensitive enough, the chemist works with entomologists and uses specially-bred colonies of tiny aphids and spider mites. He runs sprays or dusts through his test cartridges and filters and passes the purified airstream over insects in a glass-enclosed

chamber. The number of insect deaths in a given length of time gives an accurate measure of the poison still in the air, he explained.

"From the filters we have now for parathion," said Dr. Fulton, "we think that the toughest of the new insecticides has been licked."

Specifications were set up for respirators with an intricate filter to cleanse the air drawn through them, plus chemically-activated carbon to catch any parathion which the filter misses. The government scientists then cooperated with manufacturers of protective equipment to help them meet the new requirements. This summer, the Interdepartmental Committee listed five respirators which met the safety requirements for parathion.

Dr. Fulton's next task is to find filters to handle tetraethyl pyrophosphate (TEPP) and hexaethyl tetraphosphate (HETP). His eventual goal is one canister which will handle all of the new organic insecticides.

Even as toned-down agricultural weapons the organic phosphates are extremely dangerous, Col. John R. Wood, an Army Chemical Corps doctor, reported recently in the JOURNAL of the AMERICAN MEDICAL ASSOCIATION.

In his paper he described the lethal effect



TESTED—Dr. Robert A. Fulton, Agriculture Department scientist, holds a few of the masks he has tested.



FARM WARRIOR—A special gas mask, protective clothing and rubber gloves are necessary when spraying with parathion in a greenhouse. If too much of this insecticide is breathed or absorbed through the skin, it can have the same effect as the war-developed nerve gases.

of these chemicals upon the human body as exactly similar to that of the super-secret "nerve gases."

"It seems unlikely today," Col. Wood wrote, "that chemical agents offer our potential enemies effective weapons for long-range attack . . . with the possible exception of the nerve gases." Nerve gases, he said, might well be used in a future war.

U. S. scientists found the formulas for the nerve gases and also for the organic phosphate insecticides after the Germans surrendered. Since then, official U. S. research on nerve gases and possible protection against them has been screened by an impenetrable shield stamped "Classified," "Confidential" and "Secret" and guarded by "No comment." The same is true for research into ways of protecting people against bacteriological and radiological warfare, the twin bugaboos which stand beside the hydrogen bomb in this atomic age.

The Agriculture Department's program of gas mask research has been entirely independent of military requirements, officials are quick to point out.

But in today's paradoxical world, where the lines between gas warfare and battling insect pests has become very thin, the American farmer needs—and is getting—protection very similar to that of the U. S. soldier on the battlefield.

Science News Letter, December 9, 1950

MEDICINE

Sweet Aspirin Gives Fast Pain Relief

► TESTS showing that a sweet aspirin relieves pain faster than plain aspirin or two other aspirin preparations are reported by Dr. Murray M. Hoffman, oral surgeon, in the ILLINOIS DENTAL JOURNAL, (October.)

Marketed under the trade name, Theryl, the sweet aspirin is a combination of aspirin and benzosulfimide, or saccharin, the synthetic sweetening substance. The new drug comes in tablets which are placed under the tongue instead of being swallowed.

Pain began to be relieved in from one-half to five minutes with the new drug, compared to 14 minutes, the fastest for any of the three others Dr. Hoffman tried. Toothaches and neuralgias (not tic douloureux) and the pain after having teeth pulled and in cases of dry sockets were among the ones Dr. Hoffman reported relieved quickly by the new drug.

Similar good results with the drug in relieving pain after surgical operations have been reported by Dr. Raymond W. McNealy. He points out in a report to the Illinois Medical Society that the results are probably due to the aspirin part of the drug which is absorbed more rapidly as a result of being combined with saccharin.

Because the drug is non-habit forming and can be taken by patients who cannot have fluids by mouth, Dr. McNealy believes it has a wide range of usefulness.

Science News Letter, December 9, 1950

PHYSICS

Atomic Age "Dog Tag" Tells Radiation Dose

► A SELF-DEVELOPING "atomic dog tag" for soldiers and civilians has been developed by the Army Signal Corps.

A small metal case containing photographic film and a packet of developing solution, the radiation indicator can be worn around the neck. It measures very slight to fatal doses of radioactivity from an A-bomb attack by discoloration of the film.

Science News Letter, December 9, 1950

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