

ENTOMOLOGY

Wasp Poisons Caterpillar To Insure Food for Young

► RUTHLESS CHEMICAL warfare, using a poison so virulent that one part of it to 200,000,000 parts of the enemy's blood causes permanent living-death, is a daily part of the struggle for survival in the insect world.

To discover how these poisons work, Dr. Raimon L. Beard, entomologist at the Connecticut Agricultural Experiment Station in New Haven has studied the venom of a tiny wasp, *Habrobracon juglandis*, and how it affects the wasp's prey of helpless, fat caterpillars.

The female *Habrobracon* injects venom into its host, causing complete paralysis, and feeds at leisure on the blood that oozes from the wound. Then the female lays her eggs on or near the paralyzed caterpillar, so her young will have abundant food when they hatch.

The entomologist reported in the Experiment Station bulletin that the wasp discharges about 0.00000065 milliliters of venom at one time. (A milliliter is slightly more than 1/1000 of a quart.) Yet this almost infinitesimally small amount of poison is more than enough for the job.

By weighing the experimental caterpillar, *Galleria*, and calculating its blood volume, Dr. Beard estimated that the presence of one part of venom in 200,000,000 parts of the caterpillar's blood is plenty to cause complete paralysis.

Paralysis in the caterpillar results from impairment of the excitatory processes of the body wall muscles, Dr. Beard said, and so the venom probably works on the connections between the muscles and nerves.

Galleria caterpillars undergoing violent tremors after exposure to DDT are readily quieted with *Habrobracon* venom, Dr. Beard said.

Science News Letter, July 18, 1953

INVENTION

Patent Given to Mustard Gas Deactivator

► THE GOVERNMENT has officially revealed that it has ways of neutralizing deadly mustard gas. Patented by Harold P. Averill, Aberdeen, Md., and Robert Pfanstiel, Cleveland Heights, Ohio, the mustard gas neutralizer is a mixture of kerosene and sodium bicarbonate, carried in an emulsifier. The emulsifier can be made of horse oil mixed in various proportions with water and with magnesium carbonate, magnesium hydroxide or magnesium oxide.

Contaminated areas are treated with the neutralizer. The solution immediately breaks down the mustard gas into harmless components. Soon soldiers can pass through the area without fear of being blistered by the vicious vesicant. The patent, No. 2,644,796, is assigned to the government.

Science News Letter, July 18, 1953

Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N. W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

THE BUREAU OF HUMAN NUTRITION AND HOME ECONOMICS: What It Is . . . What It Does — Agricultural Research Administration — U.S. Dept. of Agriculture, rev. ed., 24 p., illus., paper, free upon request direct to publisher, Washington 25, D. C. Answers questions about the Bureau and describes present research.

THE CHILD WITH A CLEFT PALATE — Children's Bureau, Social Security Administration — Govt. Printing Office, 13 p., illus., paper, 10 cents. Outlines different ways of treating cleft palate, underlines the importance of early speech training and tells where parents can go for help in their own communities.

CIVIL AIR REGULATIONS AND REFERENCE GUIDE FOR PILOTS — Associated Aeronautical Staff — Aero Publishers, 1953 ed., 144 p., illus., paper, \$1.75. Contains all of the CAA regulations and requirements for pilot certificates.

FIFTY YEARS OF FLIGHT: A Chronicle of the Aviation Industry in America, 1903-1953 — Welman A. Shrader — Eaton Manufacturing Co., 178 p., illus., \$5.00. A chronological history of American aviation, recording the dates and highlights of the major achievements and outstanding events in aeronautics.

GENERAL BIOCHEMISTRY — William H. Peterson and Frank M. Strong — Prentice-Hall, 469 p., illus., \$6.50. Considers the chemical activities of animals, plants and micro-organisms.

HOME SHELTERS FOR FAMILY PROTECTION IN AN ATOMIC ATTACK — Federal Civil Defense Administration — Govt. Printing Office, TM 5-5, 86 p., illus., paper, 30 cents. Helps the householder select the type of shelter best suited to his needs, and gives him step-by-step building instructions.

INVENTION

Mustard Gas on Water

► A VICIOUS mixture of mustard gas and oils that can be floated on water as a defense against invaders has just been patented after lying in secret Patent Office files for 28 years.

It clings to ships and blisters men and animals moving through the water days afterward.

Invented by James Edward Mills of Edgewood, Md., the patent, No. 2,643,966, was assigned to the Army. It had been kept secret by repeated requests of the Secretary of War acting under the authority of the patent laws.

Informed sources said a similar weapon had been described in 1937 by a German author. Army officials conceded the invention was no longer secret and permitted the patent to go through.

Although the Army Chemical Corps would not comment on the invention, the Department of Defense reported that the United States never has used poison gas and

A LABORATORY MANUAL OF EXPERIMENTS IN PHYSICS — Leonard Rose Ingersoll, Miles Jay Martin and Theodore Alton Rouse — McGraw-Hill, 6th ed., 286 p., illus., \$4.00. Containing 77 experiments in introductory physics, this differs from previous editions by the omission of 13 outmoded experiments and the inclusion of 7 new ones.

THE METAMORPHOSIS OF A FLY'S HEAD — R. E. Snodgrass — Smithsonian Institution, Pub. 4133, 25 p., illus., paper, 30 cents. Reviews the scientific knowledge related to fly metamorphosis, or change from larva to adult. (See SNL, July 11, p. 29.)

MOST-OFTEN-NEEDED SERVICING INFORMATION 1953 UHF CONVERTERS & TUNERS — M. N. Beitman — Supreme Publications, 95 p., illus., paper, \$1.50. This manual of factory data explains the methods used by various manufacturers to produce good reception of UHF stations and tells the mechanic how to test and service these units.

REVIEW OF CURRENT RESEARCH AND DIRECTORY OF MEMBER INSTITUTIONS, 1953 — V. E. Neilly, Ed. — Engineering College Research Council, 330 p., paper, \$2.50. Gives a picture of approximately 7,500 research projects being carried on in engineering at 103 member colleges.

SELECTED SCIENCE TEACHING IDEAS OF 1952 — R. Will Burnett, Ed. — Natl. Science Teachers Assoc., 57 p., illus., paper, \$1.50. A selection of reports from 57 teachers on their own best practices and most effective techniques for improving the quality of the science instruction. Emphasis is on project-type work.

Science News Letter, July 18, 1953

does not intend to use it except "in a retaliatory way." This means the enemy must use it first. The Geneva conference outlawed the use of poison gas in warfare.

The patent describes a mixture of mustard gas and oils that can be poured in harbors, rivers and streams. When mixed with castor oil, the mustard gas spreads evenly over the water and remains potent for several days.

Six tons of mustard gas used as a ten percent solution in castor oil can be dumped by airplane into water. The vesicant will spread out over a square mile.

Although castor oil is described as being "ideal," other oils can be used to float the mustard gas. Mineral oils work satisfactorily where the air and water are warm. Animal oils help keep the mustard gas from being decomposed by the water. "Certain vegetable oils" also can be used.

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