ENTOMOLOGY

# Insects Eat, But Starve

**Two new chemicals that will check metabolism of vitamins and amino acids when eaten by the insect have been developed to replace insecticides.**

➤ A "STARVATION DIET" has been developed for moths and beetles.

The diet is a new means to control the insects by starving them to death with non-toxic materials rather than poisoning them with insecticides. The diet, developed by entomologist Roy J. Pence, University of California, Los Angeles, consists of chemicals that closely resemble the nutrients the insects find when they bite into a rug or other fabric.

These chemicals, known as antimetabolites, are sprayed on the fabrics. When the insects begin to eat a fiber, they ingest the antimetabolites which prevent the digestive system from getting nourishment from food. As a consequence, the insects starve to death.

Two antimetabolites, those that cancel out vitamins and those that inhibit amino acids, have been developed.

When used together in a double-barreled combination to treat fabrics, the chemicals have important advantages over conventional insecticides. They are non-toxic to man, have a permanent protective effect and are cheap and easy to apply.

The contaminants most relished by moths and beetles contain the B-vitamin nutrients needed for their survival. Wool, in addition, contains three amino acids which are essential to carpet beetles and clothes moths.

To the insect, the anti-vitamins appear the same as the vitamin B they are seeking. The insect may eat a small portion of the fiber before starving to death but damage to the fiber is miscroscopic. The anti-amino acids work the same way and are even more effective than the anti-vitamins.

The chemicals can be applied when the fabric is manufactured or can be sprayed on in the home.

They have kept their potency after six consecutive dry cleanings in pure carbon tetrachloride or in pure benzene.

• Science News Letter, 87:53 January 23, 1965

ENTOMOLOGY

## Spider's Victims Retaliate By Escaping Sticky Web

➤ THAT MASTER WEAVER, the spider, catches his daily meals with a carefully designed and sticky web. But his intended insect victims are sometimes endowed with readily removable devices such as scales and hairs that coat the sticky thread, saving their lives for another day.

For the first time, the strength with which spider silk sticks firmly to some insect wings and not so firmly to others has been measured by an intricate apparatus designed at Cornell University.

A spider's web typically consists of a spiral of sticky silk, superimposed on a framework of nonsticky supporting threads, reported Drs. Thomas Eisner, Rosalind Alsop and George Ettershank in Science 46:1058, 1964.

The viscid thread gets its stickiness from tiny droplets of an adhesive fluid, spaced at regular intervals along the length of the thread. When an insect comes in contact with this thread, part of its body sticks, and it is held fast until the spider pounces on it, envelopes it in silk thread and eventually feeds upon it.

Some insects, however, such as moths and butterflies, sometimes have the fortunate ability to escape the sticky trap because the scales that ordinarily cover their wings and bodies can be detached with ease. The torn off scales coat the thread, which therefore loses its adhesive ability, giving the insect a chance to escape.

Not all moths escape, the scientists pointed out. Smaller moths are more likely to escape than larger ones because they can slip through the meshes of the web.

Insects such as the caddis fly have detachable hairs that act in the same way as scales. The wings and body of the tiny so-called white fly are covered with a flaky or powdery wax-like substance which keeps the insect from becoming stuck.

Other insects, such as dragonflies, grasshoppers, flies and wasps, do not have these scales, hairs or waxy substance on their wings and are often trapped.

Using a sensitive balancing apparatus, the scientists determined the strength with which the spider thread stuck to the wing samples before accumulative weights pulled it away.

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U.S. Geological Survey

*OLD BONES—Charles A. Repenning assembles the bones of the first paleoparadoxia found in the United States at Palo Alto, California. Mr. Repenning is a paleontologist with the Menlo Park Geological Survey Office.*

PALEONTOLOGY

## 14-Million-Year-Old Mammal Being Prepared

**See Front Cover**

➤ THE BONES of a "paleoparadoxia"—a 14-million-year old, one-ton, nine-foot-long aquatic mammal similar in appearance to a sea lion—are being prepared for study in a laboratory at the Geological Survey's Menlo Park, Calif., field center.

Seen on the front cover is an artist's concept of the fossil animal.

Discovered on October 2, 1964, in an excavation site at Stanford University, Palo Alto, California, the rare specimen is the first of its kind discovered in North America, and only the second one identified anywhere in the world, the Department of Interior reported.

Charles A. Repenning, a specialist in vertebrate paleontology with the Geological Survey, and now responsible for the collection and preparation of the specimen, said that the specimen may well be one of the more significant fossil discoveries on the North American Continent.

"Approximately 175 of the 200 bones in the body of the paleoparadoxia were found," said Mr. Repenning. This is an extremely valuable find.

Until this discovery, Mr. Repenning stated, North American paleontologists have had only fragmental remains of paleoparadoxia, an extinct mammal that lived nearly 14 million years ago. "Thus, this nearly complete skelton will afford a valuable tool for dating and comparing rocks which contain only single-bone fragments of this animal. Such rocks are common around the border of the north Pacific Ocean," he said.

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