

ish silk cocoon in which to pupate. Moths emerge in the spring for egg-laying by the time the shoots are well out.

The Bureau of Entomology, U. S. Department of Agriculture, especially requests owners of peach or other fruit trees to report the presence of this new pest in their orchards. Specimens of twigs may be mailed wrapped in paper or, preferably, in a suitable box.

SPECIAL ARTICLES

THE HABIT OF LEAF-OVIPOSITION AMONG THE PARASITIC HYMENOPTERA

ENTOMOLOGISTS have for several years been more or less familiar with the strange habit of leaf-oviposition among the parasitic Diptera. Up to the present time, however, no such startling deviation from the normal has been observed in parasitic Hymenoptera.

A few years ago the writer, while engaged in the study of the hymenopterous parasites of the gipsy moth for the United States Bureau of Entomology, carried on an investigation of the life-history and habits of *Perilampus hyalinus*, a hyperparasite of the fall webworm. The first stage larva, a very curious being heavily armored with chitinous plates and provided with numerous hooks and curved spines, was found crawling about on the outside of the caterpillar. Later these first-stage larvæ or planidia were found to bore their way into the body cavity of the caterpillar, there swimming about freely until the primary parasite larva, either hymenopterous or dipterous, was found and into which they gained entrance. The *Perilampus* larva then remained quiescent until the primary parasite became full-fed and made its exit from the caterpillar to spin its cocoon or form its puparium. At the time of ecdysis the planidium found its way to the exterior of the host, after which it fed as an ectophagous parasite in the normal way. The egg-laying habit of this strange parasite has, however, remained a riddle to entomologists and has been the subject of considerable speculation. For several years the writer has been looking for a solution of this problem, but the opportunity did not present itself until about two weeks ago.

During the previous summer specimens of *Perilampus* were occasionally bred from *Chrysopa* cocoons. Recently the writer was successful in capturing several adult female *Perilampus* of this species hovering about oleanders infested with *Aphis nerii* and fed upon by *Chrysopa*. These were taken into the laboratory and placed in vials, each with an oleander leaf which bore egg-clusters of *Chrysopa*. The insects were then watched and were observed frequently to touch the tip of the abdomen to the leaf. On placing the leaf under the binocular microscope the minute transparent eggs of the *Perilampus* were seen, one end of the egg being slightly attached to the leaf. This observation established beyond doubt the habit of leaf-oviposition among the parasitic Hymenoptera. The eggs are numerous, one female depositing fifty-two in a single day. They hatch in seven to ten days and the first stage larva is of the planidium type. The planidium is active at first, crawling rapidly about, but later it attaches itself to the leaf by the caudal end, standing out at right angles to the surface, where it awaits the approach of the *Chrysopa* larva and to which it attaches itself by means of the numerous hooks with which it is provided.

It is difficult to understand just what is gained, from the standpoint of *Perilampus* infesting *Chrysopa*, by this extraordinary habit, since the *Chrysopa* larva is easily accessible to the normal method of oviposition and is in fact parasitized in the larval state by a number of parasites which oviposit directly into the host. In the case of *Perilampus hyalinus*, however, and other species having similar habits, the advantage is obvious, since by no other method could access be had to the larvæ of the primary parasites. In the case, too, of those species of *Perilampus* infesting wood-boring Coleoptera and gall-making and stem-infesting Lepidoptera (the correctness of which records the writer is frank to confess he previously looked upon with doubt), the usefulness of this method of oviposition taken with the active planidium stage is readily seen, since in this way access is easily gained to the endophagous host through the wanderings of

the planidium. Needless to say this type of reproduction forms one of the most extraordinary adaptations to environment in the entire annals of entomology.

HARRY SCOTT SMITH

CALIFORNIA STATE INSECTARY,
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SOCIETIES AND ACADEMIES

NEW ORLEANS ACADEMY OF SCIENCES

ON Tuesday, November 22, 1916, the academy held a special public meeting to arouse the citizens of New Orleans to the danger threatening vegetation by the presence in the city in vast quantities of the Cottony Cushion Scale. More than two hundred people were present. Mr. T. E. Holloway, of the U. S. Bureau of Entomology, read a telegram from Mr. L. O. Howard regretting his absence, and then read a paper on the life history of the scale. Mr. E. Foster, assistant state entomologist, read a paper upon the different ways in which the scale was being disseminated. Mr. E. R. Barber, of the Bureau of Entomology, read a paper upon the relation to the scale of the Argentine ant, and showed how the presence of the ant complicated the situation. Professor R. S. Cocks, professor of botany, Tulane University, called attention to the very large number of host plants, over seventy, already being attacked, and the probability that the number would be greatly increased. Mr. J. B. Garrett, state entomologist, emphasized the importance of importing from California or Florida sufficient numbers of the *vidalia* beetle as the only way to control the pest.

After some discussion, a committee was appointed with Mr. Clarence F. Low, chairman, to call upon the mayor and request that the city supply the requisite funds to carry on the fight.

It is gratifying to be able to relate that the city authorities were properly impressed by the committee, and, together with the state, have agreed to furnish the requisite funds for obtaining and propagating the beetles.

R. S. COCKS,
Secretary

NEW ORLEANS ACADEMY OF SCIENCES
December 4, 1916

THE BOTANICAL SOCIETY OF WASHINGTON

THE 115th regular meeting of the Botanical Society of Washington was held in the Assembly Hall of the Cosmos Club at 8 P.M., Tuesday, November 7, 1916.

Michael Shapovalov, Dr. Howard G. MacMillan, Dr. Joseph Rosenbaum and F. E. Miller were elected to membership in the society.

Under Brief Notes and Reviews of Literature, Mr. W. T. Swingle called the attention of the society to a recent edition of an ancient Chinese work on botany, "The Cheng lei pen ts'ao," originally published in A.D. 1108. Dr. A. T. Tenaka reviewed briefly a recently issued "Handbook of Plant Diseases of Japan," by Jinzo Matsumura.

Dr. R. H. True presented a paper on notes on the life of John Bradbury. Information concerning the life of this early naturalist and explorer of the Missouri Valley is very meager. A considerable addition has been gained from the correspondence carried on between Bradbury and Thomas Jefferson who greatly influenced the course of Bradbury's life and work in this country. Bradbury's life, gathered from this and other available sources, was sketched in outline.

Pathological problems in the distribution of perishable plant products were discussed by Dr. C. L. Shear and Dr. W. A. Orton. The enormous losses in recent years caused by the deterioration and decay of fruits and vegetables between the field and the consumer have led to a more active interest in this subject and a desire on the part of those most directly affected to have the causes and means of prevention determined.

In most cases fungi are the active agents in causing the destruction of such products, and the problem is primarily pathological. In order to devise means of avoiding these losses, a thorough knowledge of all the factors and conditions involved must be obtained. Each fruit and vegetable has its own peculiarities and its own parasites. In some cases the cause of loss may be traced to the field, and in others to conditions of transportation and handling. In any specific case the cause and responsibility for the loss can only be determined by careful investigation of all the facts.

Specific cases of losses to strawberries, peaches, cranberries, watermelons, tomatoes and potatoes were cited to show the complexity of the problems and the danger of drawing any general conclusions from insufficient data. It was shown that the means of preventing such losses will depend upon the nature of the cause or causes, as determined by a knowledge of all the factors in any particular case.

The scientific program was followed by a social hour, with refreshments.

H. L. SHANTZ,
Corresponding Secretary