cost of printing, a charge that must be considered merely nominal when it is realized that the cost of an edition of the printed map may be only a small percentage of the cost of surveying the area it represents. The government itself is making a large and increasing use of these topographic maps, but the expenditure of public funds for these surveys is otherwise fully warranted only as the public uses the maps. To promote this use, the survey has recently given more attention to the wider distribution of the maps.

The distribution of a government map is largely a problem of publicity, though the necessity of adopting commercial business methods in handling orders for the maps when once a demand is created must not be overlooked. In informing the public of the existence of authoritative maps published by the federal government a special effort is now made to reach the communities in each area covered by a map, and to this end every map as issued is brought to the attention of the local and state press, as well as of postmasters and school-teachers.

Other methods of promoting wider distribution involve the cooperation of boy-scout masters, schoolboys and hotel managers, as well as of a large number of bookstores as local agents.

Within the last year the most helpful publicity has been gained through the voluntary cooperation of several press services and magazines of large circulation, in connection with their policy of bringing the people into closer touch with the work and publications of the federal government. The publication in one magazine of a brief statement regarding the Geological Survey's maps resulted within a month in orders for 550 maps and thousands of inquiries for the state indexes that show the areas already mapped.

The periods of maximum demand for these governments maps are the beginning of the vacation period and the beginning of the school year. The larger use of topographic maps in 1915–16, both in the open and in the classroom, is a gratifying index of the popular benefit already resulting from the increase in the work of publicity.

A NEW INSECT ENEMY OF THE PEACH

An insect destructive to the peach and kindred fruits, believed to be new in the United States, has been discovered by entomologists of the U. S. Department of Agriculture in the District of Columbia and its environs. This insect, which in its adult form is a brownish moth and in its larval stage a small white and pink caterpillar, attacks both the tender shoots and fruit, causing serious losses.

Because of the habits of the worm, the usual control measures, such as spraying with certain arsenates, will probably not be effective. The smooth young shoots, owing to their rapid growth, are protected by the poison solution for only a very short time after the spray is applied, and hence it is almost impossible to poison them. The entomologists of the department who have been investigating the pest, will continue to study it in the hope of developing control measures.

The insect, known to science as *Laspeyresia molesta,* is believed to have been introduced from Japan. So far as the department's entomologists know, it has not been found in America other than in the District of Columbia and in the adjoining territory in Maryland and Virginia. The specialists are desirous of knowing if the insect has attacked peach, plum or cherry trees elsewhere in the United States.

The presence of the insect can best be determined in most cases by the nature of its injury to peach trees. It bores into practically every tender twig and causes new shoots to push out from lateral buds. These are attacked in turn, the abnormal stimulation of lateral growth producing a much branched and bushy plant. A copious flow of gum from the twig-ends often follows the attacks of the caterpillars.

In attacking fruit the young caterpillars generally eat through the skin at or near the point of attachment of the fruit stem. The larva, as it grows, makes its way to the pit, where it feeds on the flesh, which soon becomes much discolored and more or less slimy. Larvæ entering at the side of the fruit are more likely to eat out pockets or cavities in the flesh. The full-grown caterpillar spins a whit-

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