

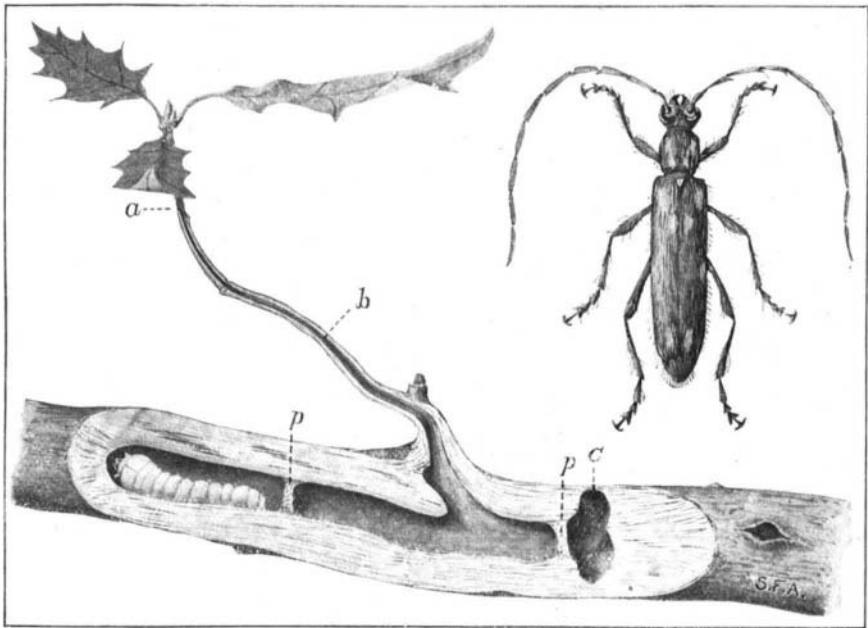
THE PARASITE OF THE OAK PRUNER.

BY S. FRANK AARON.

Woodsmen often observe, beneath red, black, and scarlet oak trees, many branches fallen upon the ground that look healthy enough to have remained upon the parent trees. At first self-pruning, common with many trees, was surmised, but often these branches are very many, and the trees seem to have lost too much thereby. Closer inspection disclosed the butt ends of these branches to have been cut away from within, only the bark and thin outer wood left to have been broken, and a plugged hole, leading into the center of the branch, foretold a clew. When the branch was split open, a little white grub larva was discovered at work in a lengthwise-to-the-branch burrow, or fast asleep perhaps during the months of cold.

Naturalists took charge of the case. Careful observation during many years made known the complete life history of this interesting insect and showed the cause and extent of its destructive work. Early in the spring the female of a beetle known as *Elaphidion villosum*, a long-horned, gray-brown member of the Cerambycidae, lays its eggs in the green and tender leaf twig of the oak, and the tiny larva, hatching soon thereafter, eats its way down the pithy center of the twig, enlarging its burrow as it grows, until it reaches the branch, which of course may vary in size from that of a lead pencil to even the thickness of one's wrist. And here follows an illustration of the development of a remarkable instinct, and its result. Just below where the burrow enters the branch, the larva extends its boring at right angles across the branch, cutting away the heart until the thin outer sapwood is reached,

millimeters) long, with shining black head and thorax, bright red abdomen and smoky wings, probably belonging to the genus *Melanobracon*, is the self-appointed agent for this good work. During the summer the larva of *Elaphidion* is hard at work in its burrow, and the sound of its cutting may be plainly heard within a foot or two. It is at this time that the little ichneumon fly, moving actively about on wings and legs and probably guided by the sound of this cutting, locates the position of the beetle larva. The excitement of the fly is greatly increased as it finds itself upon the severed branch. Constantly moving its antennae, walking as if on springs, it discovers the desired spot, and then, unsheathing its keen and slender ovipositor, it rapidly proceeds to force it through the bark and into the tough wood, standing on rigid legs meanwhile and using the upper portion of the divided sheath to guide, brace, and strengthen the ovipositor. The wood wall of the burrow, perhaps an eighth of an inch or more in thickness, is in time pierced, and the fly goes through added contortions while forcing the egg through the now somewhat constricted organ. Presently, with some difficulty and hard pulling, the ovipositor is withdrawn and the fly takes wing to seek more victims. I think, in the single instance observed, the whole operation, from the insertion to the withdrawal of the ovipositor, must have taken over an hour and a half. I marked the exact spot of the puncture, took the branch home, and split it open carefully. The small larva was there and not an inch away from where the egg had been inserted into the burrow, but the larva may have squirmed forward meanwhile or the ichneumon might have hit it exactly. Who can tell? But try as I could, with a powerful lens, I failed to find the egg of the ichneumon. Carefully replacing the split-off piece, however, I put the branch in a safe place and examined it from time to time. In about five days a little white maggot, the hatched and rapidly growing larva of the ichneumon, had attached itself to the sixth segment of the beetle larva and was sucking the blood of its victim most voraciously. Eight or nine days later this maggot larva, elongated oval and nearly pointed at both ends and of a sickly white color, was about full grown; the beetle larva had perished miserably, and two days later was entirely devoured; I could not find even the hard, wood-masticating mandibles. And then this very unintelligent-looking fly larva proceeded to belie its looks; it did just what the accomplished beetle larva would have done, only did it better. It plugged up one end of the burrow, using silk instead of powder post. Inclosing itself in a snug cell safe from intrusion and adding a filmy transparent silk cocoon that tightly fitted or really lined its retreat, it became, in a few hours, an altogether inactive pupa. In about a week the perfect fly emerged and has since, with a piece of the branch and the burrow and its cocoon exposed to view, graced my collection. And so *Elaphidion*, the pruner, with all its instinctive caution, hedged about with remarkable security, frequently gets its quietus by the intelligent procedure of this insignificant-looking little fly, and instead of further robbing the noble oaks, dies an awful death in its immaturity.



THE OAK PRUNER BEETLE AND ITS LARVA AT WORK IN ITS BURROW.

a. Place where egg is laid and young larva begins to burrow. b. Continuation of burrow from twig to branch. c. Pruning-cut in branch. p. p. Powder post plugs protecting the larva.

sometimes, on the lower side, leaving a little of the heart wood, and no doubt being governed by the final stretching of the fibers as the branch sags. Then it withdraws again into the burrow, plugs with its cuttings and saliva, called "powder post," the hole next the wide cut, so that, when the branch breaks, insect enemies or tongue of woodpecker may not intrude, and then during warmer weather it cuts its way outwardly along the branch, finding in the wood of its snug retreat both food and shelter. Meanwhile the cut and weakened branch cannot withstand the high winds and heavy sleet of winter and breaks off and falls, to be covered with leaves and snow and thus escape the prying search and chisel bills of the tree-loving woodpecker, only the flicker occasionally searching upon the ground.

From the date of its hatching to the time of its transformation into the pupa, the larva lives nearly two years. The first summer is spent in reaching and cutting the branch, and the second winter is spent generally in the inactive pupa form. The following spring the beetle emerges, cutting its way to the outside world through the powder post plugs.

Often these insects are quite destructive, and where there are groves and bunches of the soft-wood oaks, the pin-leaf group that ripen their acorns in two years, the insect exists in countless numbers, endangering and stunting the life of the trees and often killing large limbs by its pruning. It frequently infests, also, the chestnut, but I have rarely found its work on white oaks or their hardwood cousins. It is evident that the insect-eating birds do little to check this species. But yet the pruner has not undisputed sway, and of this it remains for us to add another chapter.

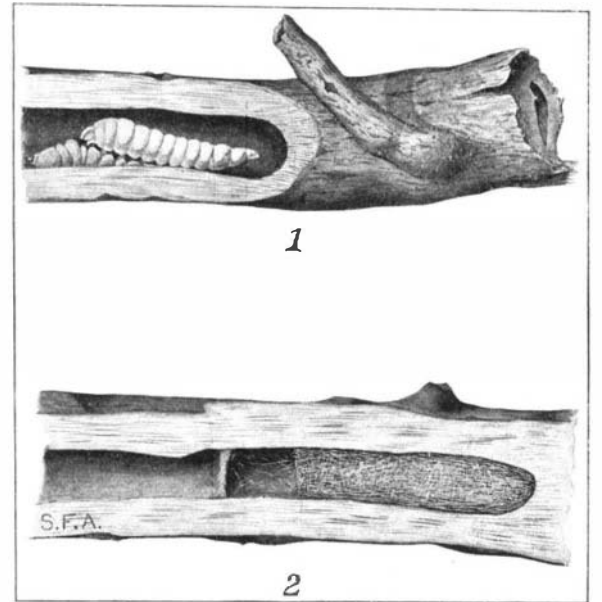
It is to the family Ichneumonidae of the order Hymenoptera that we turn, in this case as in so many others, to find the real enemy of the oak tree pruner. A small fly, hardly over a quarter of an inch (8 or 9

what the accomplished beetle larva would have done, only did it better. It plugged up one end of the burrow, using silk instead of powder post. Inclosing itself in a snug cell safe from intrusion and adding a filmy transparent silk cocoon that tightly fitted or really lined its retreat, it became, in a few hours, an altogether inactive pupa. In about a week the perfect fly emerged and has since, with a piece of the branch and the burrow and its cocoon exposed to view, graced my collection. And so *Elaphidion*, the pruner, with all its instinctive caution, hedged about with remarkable security, frequently gets its quietus by the intelligent procedure of this insignificant-looking little fly, and instead of further robbing the noble oaks, dies an awful death in its immaturity.

The New English Lead Glaze Rule.

Lord James of Hereford has signed his final award as umpire in the arbitration on the use of lead glaze in the making of pottery in England. The question was raised by the issue from the English Home Office of special rules for the manufacture and decoration of earthenware and china, and Lord James made a first award upon these on December 30, 1901. The final award, dated November 28 last, establishes a new rule 2, under which it is generally provided that after February 1, 1904, no glaze shall be used which yields to a dilute solution of hydrochloric acid more than 5 per cent of its dry weight of a soluble lead compound calculated as lead monoxide, when determined in a manner prescribed by the

rule. The use of a glaze which does not conform to the above-mentioned conditions is, however, to be permitted after due notice to the inspector for the district, subject to the adoption by the manufacturer of a new schedule of compensation to employes, who may

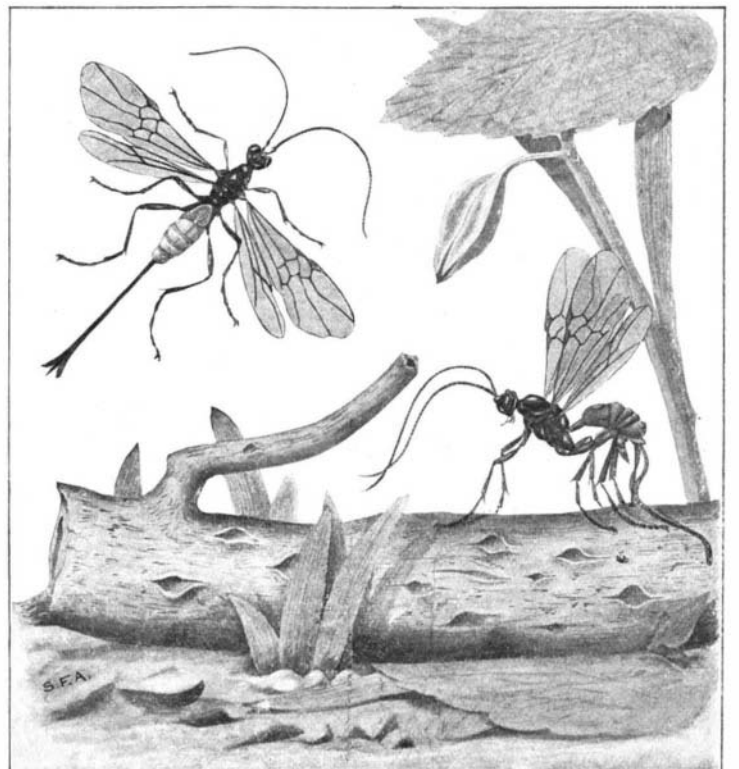


PARASITE OF OAK PRUNER.

1. Larva of ichneumon fly feeding on beetle larva. Branch shows broken pruning-cut of beetle larva. 2. Silken plug and cocoon of parasite in end of burrow of beetle larva.

be suspended on being certified as suffering from plumbism (or lead poisoning) and subject also to periodical examination of the employes by the certifying surgeon. China scouring is excluded from the processes dealt with by these regulations. The prescribed method of testing the glaze is as follows: A weighed quantity of dried material is to be continuously shaken for one hour at the common temperature with one thousand times its weight of an aqueous solution of hydrochloric acid containing 0.25 per cent of HCl. This solution is thereafter to be allowed to stand one hour and to be passed through a filter. The lead contained in an aliquot portion of the clear filtrate is then to be precipitated as lead sulphide, and weighed as lead sulphates.

River and harbor pilots will be put out of business entirely if the invention of Prof. R. B. Owens should come into general use. Prof. Owens is now professor of electrical engineering at McGill University at Montreal, and the device referred to above is an electrical apparatus by which a boat may be taken through a narrow channel, without the least danger of grounding, by an officer of the boat entirely unacquainted with the water through which he may be passing. A properly insulated and protected cable is laid in the channel to be followed by the craft. An alternating current is passed through the cable, and two telephones on board the vessel are acted upon by the magnetic influences of the cable, so that it is possible to detect the deflections of the boat with regard to the position of the cable by listening at the receivers of the instruments.



ICHNEUMON FLY PARASITE OF OAK PRUNER BEETLE. DORSAL VIEW SHOWS IT LAYING AN EGG WITHIN A BRANCH OF AN OAK. BRANCH SHOWS PRUNING-CUT OF BEETLE LARVA.