

tention it merits from every one who owns a farm or village home.

Gov. Hogg was a man of wide experience, a close observer of cause and effect and he doubtless saw in the future of nut growing much to interest him and much of prospective good to his state. We like monuments of this kind, that help others to better lives and more profitable and pleasant surroundings.

The statement is generally made that the Pecan will succeed wherever the large species of hickory are found in the State, and this is doubtless true, as the Pecan belongs to the same family of trees.

Our experience in a small way in grafting some of the choice varieties of Pecan on young Hickory has been very satisfactory, as to the growth, and we trust in

a few years to be able to make a good report as to our success in getting them to bear fruit.

In working the pecan on hickory we find it an advantage to graft under ground and for this reason advise selecting the small trees in the forest where a grove may be desired on account of the hickory being plentiful.

There is no doubt that the Pecan is extremely hard to work, and only when the budding or grafting is done by an experienced hand is it likely that good results will be obtained.

The Pecan will grow on any soil except springy boggy land where the water stands near the surface or where the soil is underlaid with ledge rock at a slight depth.

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## AN ENTOMOLOGICAL CALENDAR FOR THE PECAN.

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BY H. A. GOSSARD.

*Mr. President, Ladies and Gentlemen:*

The following calendar is approximately accurate but must be admitted to be in a measure conjectural, because observations on pecan insects have not yet been sufficiently thorough to make possible an absolutely authoritative schedule. We hope that this imperfect one will stimulate observation and thereby contribute to the making of a perfect one in the near future.

### JANUARY.

The twig girdler is at this time, a larva tunneling in the fallen twigs which were severed in the preceding fall. These

infested twigs may be gathered and burned.

Other fallen limbs may contain larvae and pupae of the oak pruner, hence, should be collected and burned.

The larvae and pupae of various borers are in their tunnels in the heart-wood of the trunks. The burrows may be located by the particles of sawdust on the ground and clinging to the bark beneath the external openings; also by the discolored bark below the orifices, caused by the oozing of the sap. By means of a spring bottom can or in some similar manner, inject bisulphide of carbon or chloroform into the furrows and at once stop the openings

with grafting wax or with a wad of clay mud.

The larvae and pupae of the hickory shuck worm are in the fallen and decaying hulls beneath the trees, which may be raked up and burned. The larvae and pupae of this insect, are known to be found in the fallen hulls in December and therefore presume they remain here until early in the summer when new hulls are forming.

Two or three budworms and case-worms are hibernating in small brownish, blister-like cocoons and saber-shaped cases on and about the bud scales and on the bark of branches. Reasoning from analogy, spraying with the lime-sulphur wash would probably be useful against them. Grafts may be cleansed of the cocoons and cases by means of a knife point, before being used.

The cottony scale is in the larval form on the branches at this season. The dormant winter period is the time to treat it; spray with kerosene emulsion, one part of emulsion to five or six parts of water. Pruning can also be effectively used against this pest at this season, the infested twigs being cut out and burned.

#### FEBRUARY.

Calendar and practice ditto as for January.

#### MARCH.

Practically the same as for February.

#### APRIL.

Simultaneously with the bursting of the buds in late March and early April, the different species of bud worms and case-worms commence a most destructive attack. They burrow into the buds and also into the tender twigs. Two of these insects are caseworms, one of them being

commonly observed and of considerable size, the other being much smaller and finally maturing a case resembling a miniature cigar. The third species, after quitting the buds, becomes a leaf-roller and lives in a tube made by folding over itself the border of a leaf. Later it gathers a cluster of leaves to the original one, making a conspicuous nest. The larger caseworm also clusters leaves together into a nest and several caterpillars may be found in the same cluster. If these insects can be successfully treated in the same way as the better known budworms and caseworms, a spraying with arsenicals should be made while the leaf-buds are swollen, just before they burst. A second spraying should be made about a week later than the first, just where the leaf-buds begin to show green at the tips. A third application should be made as soon as the leaves are expanded. Owing to its adhesive qualities, arsenate of lead will doubtless prove more satisfactory for spraying pecans than Paris green. It will be wise to make one of the first two and the third of these sprayings a combination of an arsenite with bordeaux mixture.

The large, leathery skinned caterpillars of the Catocala moths, sometimes known as "alligator" worms, begin their depredations this month. They feed at night and by day lie concealed in crevices of the bark, or under trash on the ground. This protective coloration makes their discovery difficult. Spraying with the arsenites ought to check them. The budworm spraying will catch these insects also. Right after a rain when the bark is discolored by wetting, the lighter color of the worms renders their detection more easy and it is possible to collect and destroy many by hand. If the trunks are

kept wrapped with burlap bands, many caterpillars will retreat beneath these for hiding and the next morning they can be collected and crushed or thrown into a pail containing kerosene and water. If a sticky band of some kind, such a "tree tangle foot," made by the O. and W. Thum Co. Grand Rapids, Michigan, be put around the trunk below the band to prevent any of the worms passing to the ground, it would seem possible to catch nearly all of them in a very few nights. Thus far, we have heard of no complaint that "tree tangle foot" injures the tree.

In late March and early April, the eggs of the fall webworm are laid on the leaves in clusters of 400 to 500. In a week or ten days, these eggs hatch into very hairy, large-headed caterpillars, which always live in webs that are enlarged according to need, where spraying with arsenicals is regularly practiced they are not apt to become numerous, but where no spraying is done, the young nests should be pruned out and burned; or a torch of fat pine, attached to a pole, may be held beneath the nest until the worms are destroyed.

The eggs of the Pecan tree borer, *Sesia scitula*, are probably laid in April and early May. Since the young borers usually enter the sapwood through some wound in the bark, such as a graft union, all such scars should be well covered at this time with grafting wax with which white arsenic or Paris green has been mixed. Coat over the wax protection with whale oil soap which has been diluted with enough water to give it the consistency of thick paint. Pour into this soap paint enough crude carbolic acid to give it a strong odor, and apply with a brush at the beginning of a bright, sunny day. Before night a tough, sticky film should form which is not readily dis-

solved by rain. Any wounds inflicted during the course of cultivation should be at once covered with some such mixture as this.

#### MAY.

All of the species, hatching in April, will extend their damage over into May, spraying with arsenicals may be continued against caseworms and caterpillars if the previous treatments were insufficient. Many of the measures already suggested for April work against other insects will need to be continued into May. The moths of the caseworms, budworms, etc., begin to appear in numbers this month and may be started up from their resting places on the leaves, on the trunks, in the mulch at the bases of the trees, etc.

The different species of heartwood and bark borers are apt to commence egg-laying this month, hence it will be wise to keep the trunks and larger limbs covered with white-wash which may be applied with a spray pump. Some portland cement added to the whitewash will doubtless add to its efficiency, since our object is to fill the interstices of the bark and make a covering over the whole trunk which the young borers cannot penetrate when they emerge from the egg. Possibly a further addition of one pound of Paris green or white arsenic to every fifty gallons of the white-wash would be good.

During the first half of May, the eggs for the walnut caterpillar are laid on the tender surfaces of the leaves, usually those of the lower branches. These are found in clusters of several hundred and before hatching become of a glistening white color. The young caterpillars feed gregariously and when first observed, the few leaves on which they are found may

be plucked and the whole colony destroyed. At a later stage, spray with arsenicals.

#### JUNE.

The young caterpillars of the budworms and caseworms are hatching from the eggs and would seem to be amenable to treatment with arsenical sprays. Though some of them must extend their bodies out of their encasing tubes to feed, and others have in a measure the habits of leaf miners, all consume more or less of the epidermis, hence can possibly be killed with poisons. Continue the work of May against webworms and the walnut caterpillars collect in masses on the trunks of the trees to moult, kill them by means of a burning torch or by crushing. A ring of "tree tangle foot" put around the trunk above the mass before beginning the slaughter will prevent any escaping worms from reascending the tree, though they may seek other neighboring trees and here continue their development. If necessary repeat the whitewashing against the borers so as to keep the coating intact.

#### JULY.

Young caseworms and budworms working on leaves and can likely be checked by spraying with poisons. Because of copious rains in spring it may be found more advantageous to spray for these insects during the drier months of summer and fall. The second brood of webworms may be expected to put in their

appearance about this time. It is probably that a second brood of catocalas or "alligator worms" also appear at about this time, since the moths of at least one species issue in June and early July. Examine the white-wash coating on the trunks and renew if necessary.

#### AUGUST, SEPTEMBER AND OCTOBER.

Budworms and caseworms continue feeding during August and part of September, but usually ensconce themselves in winter quarters before October. The whitewash may need renewing in August but this is unlikely if cement was used the preceding application. The second brood of webworms become conspicuous during this period, so also does the second brood of walnut caterpillars. The twig girdler is busy in September and October laying their eggs and girdling the twigs in which the eggs are laid.

#### NOVEMBER AND DECEMBER.

Insects and practice about ditto as given for January and February.

Inspect the roots carefully to ascertain if root borers are present. If any are found, treat with carbon bisulphide. Fill up all cavities in the trunk with cement, first cutting out all rotten wood and singeing the cut surface with a blast lamp to destroy the spores of any rot fungi that may be present. This will do away with a favorite hiding place for hibernating forms, such as the pupae of the fall webworm.