

ere is now no young fruit for them to resort to. And the question arises—What do they now do, and what becomes of them from this time young fruit again appears the following year? Where do they secrete themselves to pass the winter, and in what stage of their lives are they at that time?

Our best authorities at this day give us as their opinion on this subject that some of the larvæ which are retarded in completing their growth, that they do not leave the fruit and enter the ground till the latter part of July or later, remain in the ground in the pupa state through autumn and winter, to produce the beetles which appear the following spring. There are many improbabilities connected with this view of the case, that I am surprised that an author intelligent on these subjects as was the late Harris gives countenance to this as his opinion. Let us briefly look at this hypothesis. The temperature of the earth through the month of August is greater, the ground is then warmer, than it is in July. There is no probability, therefore, that an insect whose transformation in the ground is completed in three weeks in July can remain in the earth a longer period in the month of August. Least of all is it to be supposed that it can remain there unbatched through the warm weather of that month and autumn.

Again, we know that nearly the whole generation of these insects that is nurtured in the young fruit reaches maturity and comes abroad in the latter part of July. Now, is this vast army of these creatures merely an abortion—brought forth only to perish? Is the existence of these insects left to the mere accident of a few individuals happening to be retarded beyond the usual time in entering the ground, and therefore remaining in it till the following spring? This would be an anomaly, wholly unlike anything that we meet with elsewhere in this department of nature's works.

Without stopping to notice other views that have been advanced on this subject, it may be observed that the fact that these insects come abroad in the spring in full force, some three weeks before the young fruit is adapted to their use and that after the young fruit is gone, they still abroad as numerous as before, the presumption becomes very strong, that they must find other places for cradling their young, in addition to the fruit. And the enquiry thus arises, whether the Curculio is known to breed elsewhere than in young fruit. To this comes the reply, that there is one other situation in which it is well ascertained they do breed with facility. To wit, in those singular excrescences on plum and cherry trees, called black-knot. As the Curculio has so often been said to be the cause of these excrescences, and the opinion is still maintained by many persons that they are produced by some other insect, if not by this, I may turn aside to give some account of this remarkable disease, since, to ascertain whether it was caused by an insect or not, I have

examined it more closely, perhaps, than had ever been done by any other person.

The black-knot excrescence is a disease peculiar to the plum and cherry trees in this country. It is a large, irregular, black, wart-like excrescence, which grows upon the limbs, causing the death of all the limb above it, and extending down the limb farther and farther every year till the whole branch is destroyed, other limbs at the same time becoming affected in the same manner, and also the limbs of other trees in the vicinity. If it is neglected, it in a few years kills the tree.

This disease commences upon the small limbs, the wood of which is but a year or two old. It is recognised at first by a slight swelling of the bark at a particular point, on the upper side of the limb, which begins in autumn and remains stationary through the winter. When the sap begins to circulate in the spring this swelling increases, rupturing the cuticle or thin outer skin of the bark, and continuing to grow and puff out till in June some inches in length of the limb at the place affected is three or four times its diameter elsewhere. The bark and portion of the wood under the bark are the tissues involved in this disease, both the bark and woody fibres being changed into a spongy substance, but not at all juicy like the fruit of a tree. This spongy substance is of a pale yellow color when growing, changing to coal black when it is mature; and then a minute black fungus plant, resembling the head of a pin, grows upon its surface. You will see, on looking at these black knots, that their whole surface is covered and crowded with little smooth black granules, which are the fungus plant alluded to. They are a species of the genus *Sphæria*, and are described by that profound botanist, the late Rev. L. de Schweinitz, under the name *Sphæria morbosa*. It is a curious fact that the surface of these excrescences, when mature, are always covered with this plant, which never grows, or at least has never been found, in any other situation.

There has been much speculation as to the cause and the true nature of these excrescences, they are so unlike anything else with which we are acquainted. Most persons suppose them to be of insect origin. The larvæ of the Curculio are almost always found in them, and these larvæ consume nearly all of the spongy matter of the warts, but do not touch the little fungus growing on their surface, which remains, forming a kind of shell, after the whole inside is devoured. But as these excrescences are sometimes found wholly free from the Curculio larvæ and all other worms, it is obvious they are not the cause of their growth. Others have supposed they were analogous to the galls or swellings which we see on the limbs of oaks and other trees, and have even reported that a gall-fly is to be seen at times on these excrescences. But always in galls, one or more seed-like bodies are found in the centre, in which the young of