

all, it is usually by the primary or entrance galleries, which could cause only the slightest detriment to the vitality of the tree. The most vital part of a tree (the healthy living cambium) is seldom if ever touched by these insects, since they make their entrance through the dead bark or wood. If they did penetrate the healthy cambium, it would be no more than a pin-hole, which, even in great numbers, could scarcely do harm, since in healthy, growing trees such wounds would rapidly heal.

This and other insects with like habits may, however, hasten or even insure the death of unhealthy trees, since their entrance galleries may contribute to the attack of harmful micro-organisms (bacteria and fungi) which are ever ready to attack exposed plant tissue, and especially if the vitality of the growing parts becomes in the slightest degree impaired. This, it would seem, is the only way in which *X. xylographus* could affect the vitality of the trees infested by it, but to what extent it may do so is a problem for future investigation. It may, however, as suggested by Hubbard, be the cause of serious defects in lumber manufactured from trees or logs containing its pin-hole galleries and broad, leaf-like brood-chambers.

#### *Preventives and Remedies.*

From what is known of the habits of the insect, it would appear that the best methods of preventing its attack is to keep all fruit trees in nurseries and orchards in a vigorous, healthy condition, and during the winter, or previous to the first of April each year, destroy by fire all the unhealthy or dying or dead branches on trees, thus destroying the colonies before they emerge in the spring. Wounds or dead places on valuable trees may possibly be protected from the attack by the removal of the dead bark and painting the dead surface, especially the edges, with a strong solution of soap and water, undiluted kerosene emulsion, melted grafting wax, or like substances.

#### *Different Stages Briefly Described.*

(See Plate 2.)

*Egg* (fig. 1): Length, .52-.55 mm.; width, .24-.26 mm.; yellowish to pearly white; shining; ovate.

*Larva*, first stage (fig. 2.): Length, .60-.66 mm.; width, .20-.22 mm.; white; head broader than thoracic segments, and yellowish, with pale brown mandibles; body slender, narrowing to last abdominal segment; head and each segment clothed with long, fine white hairs, longest on the last three abdominal segments. Intermediate stage: Length, 1.5-1.8