THE OTTAWA NATURALIST

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IPS BALSAMEUS Lec. Development of larval gallery: 1, egg-niche; 2, egg-packing; 3, excrement of larva; e. t., egg-tunnel.



IPS CAELATUS Eichk. Under side of Dark, showing the eggs in the pockets.

bark, forming irregular cavaties extending laterally from the primary-tunnel.

When the eggs are laid in niches the larvæ burrow separately through the bark or between the bark and the wood, at right angles to the primarv-tunnels; these side tunnels, larval galleries, or mines, thus formed increase in size as the larvæ grow, and are left completely filled with wood or bark fragments which have passed through the body of the larvæ. The latter feed entirely upon bark or wood.

If the direction first assumed by the larvæ is not parallel with the wood-fibres, the larval-mines are usually found to turn, tending to follow the direction of the fibres. The larvæ at and near the ends of the primary-tunnel swing around almost immediately, while those nearer the middle do so as rapidly as is possible without encroaching upon the mines of their neighbours. Usually the larvæ keep carefully to their own preserves, only crossing a neighbour's gallery when necessity compels them to do so. When the larval mines are entirely in the bark their direction has no definite relation to that of the wood fibres.

After the larval development has been passed, varying in length with the species, the ends of the larval mines are enlarged and sometimes driven down into the wood to form the pupal chamber. In some species the pupal period lasts but a week, or ten days, in others the winter is passed in this condition. After transformation is completed, the young adults cut their way out through the bark, forming the openings known as "shct-holes".

While the primary-tunnel and also the egg-niches are usually engraved in the wood, the larval-mines are often entirely in the bark, or only cut the wood at the pupal-chambers. On ash trunks, where the bark is thick, the larval-mines of *Hylesinus aculeatus* but slightly engrave the wood surface, while on small branches, where the bark is thin, the mines often cut the wood as deeply as they do the bark.