

dressing of soot, or, still better, of soot with a little sulphur, turned in to a full spade's depth, would be attended with excellent results, as would the application of weak-brine solutions. A light top-dressing of gas-lime would also prove of value.

Although I have identified root-fungus as *Lycoperdon gemmatum*, further observation may possibly show that mycelial states of other fungi are mixed with it; but this would not affect the mode of treatment.

APPLE.

AMERICAN BLIGHT (*Schizoneura lanigera*).

UNHAPPILY this insect is too generally distributed throughout the colony to need description. Its presence on an infected tree is at once indicated by cottony-looking tufts or patches, which, if neglected, increase in size, the cottony outgrowth often attaining a length of two or three inches. The aphides vary somewhat in colour, but most frequently are black or purplish-black, the young of a faint reddish tinge; the cottony outgrowth is produced from their abdomen; but the process of development has not been fully made out.

From eggs hatched in the spring wingless insects are produced, each of which becomes the mother of a colony, and may be termed the "queen aphis;" she is viviparous, and able to produce several generations of insects without the intervention of the male. The young insects are also viviparous, and, as they are able to commence the work of reproduction when five days old, their rate of increase is enormous. It is no exaggeration to say that a single queen may have many billions of descendants even during her own short lifetime. The sexless insects thus produced resemble the queen, but are of smaller size and more oblong form; they are also of a brown or purplish-brown colour, while the queen is nearly black. Viviparous winged insects are occasionally produced, but they are certainly infrequent in the colony. On the approach of winter perfect-sexed insects are developed, which pair, and in a few days the female deposits her eggs in a crevice of the bark and dies. The eggs remain dormant until the following spring, when new queens are developed.

The sexed individuals have no mouth-apparatus, and are unable to take food, so that their existence is of brief duration. They are of smaller size than their viviparous parent.

In the North Island there appears to be no absolute cessation of the process of viviparous reproduction. Wingless insects are certainly extruded during the winter months, although in reduced numbers.

The woolly aphis is found in crevices of the bark, or at the forks of branches, at the base of suckers, or even in the axils of the leaves. In many cases the roots are attacked and large galls formed, which vary from one to four inches in diameter.

The insect punctures the bark and pumps up the sap, which not only weakens the tree but causes an excessive flow of sap to the affected part, resulting in a diseased warty growth: the bark becomes cracked, and exposes the tissue beneath to further attack, while a new growth forms round the margin of the fissure, thus affording a larger amount of shelter to the insect, and more copious supplies of food to the ever-increasing colony, until at length stem and branches alike are thickly studded with warty excrescences, partially clothed with the white outgrowth so characteristic of American blight.

It has been contended that the aphis attacking the root belongs to another species, which has been described as *Schizoneura pyri*. I have no evidence on this point, and, whatever may be the case in other countries, it has ceased to be of direct practical interest to fruit-growers in this colony, owing to the protective measures adopted of late years. In fact, except in very old orchards, it is not easy to find a tree with the roots attacked by woolly aphis.

Some years ago attention was drawn to the fact that certain varieties of the apple exhibited almost complete immunity from the attacks of woolly aphis, and that their roots were invariably exempt. This blight-resisting power was most strikingly exhibited by the "winter majetin" and "northern spy," which has led to these varieties, with some others, being generally adopted as stocks for other kinds, with the best results. Apples worked on these stocks are never attacked at the roots, and the branches suffer but lightly when compared with trees worked on the crab or on ordinary seedling stocks.

Prevention and Cure.

The bark must be kept clear of moss, lichen, &c., all loose bark should be removed, and the central portion of the head should be kept open by judicious pruning, so as to allow the freest circulation of air, and afford the least amount of cover to the insect.

The most efficient remedy is castor-oil, containing about 2oz. wood-soot to the gallon; this mixture should be applied to the affected parts with a paint-brush. In very bad cases it might be found advisable to make a second application, but I have never known it to fail when properly applied.

Mixtures of caustic potash, sulphur, and oil are excellent. The following has been generally circulated under the instructions of the Hon. the Minister of Lands: "Four pounds of sublimed sulphur in an iron-pot, with enough water to stir conveniently while boiling for twenty minutes; then add 1lb. of caustic potash (Greenbank Company's is the best), previously dissolved, and whilst still hot, and as much colza or other vegetable oil as will make it like a thick paint. Then, when warm, with a large paint-brush, daub it for about the space of a foot round the butt of the stem of the tree. Rain will wash it into the roots, and the oil will tend to preserve its strength for years."