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"When needed for use, the butter will mix readily with any proportion of water, if first thinned with a small quantity of the liquid." In using the emulsion for killing plant lice, or other insects, care should be taken to dilute it at least twelve or sixteen times with water and then try the effect on a small portion of the infested plant; if it is found to injure the foliage, then dilute still further. One pint of the butter will usually suffice for two gallons of water. Dilute only as needed for immediate use. The cost of this article, which is very effective, is exceedingly trifling.

Another emulsion is made with coal oil and soap instead of milk. When a moderate quantity is required, take two gallons of coal oil, half a pound of common bar soap, soft soap, or whale-oil soap, and one gallon of water. Dissolve the soap in the water, and add it boiling hot to the coal oil. Churn the mixture, as before, by means of force-pump and spray nozzle, for five or ten minutes. The emulsion, if perfect, forms a cream, which thickens on cooling, and should adhere without oiliness to the surface of glass. Dilute before using, one part of the emulsion to nine parts of cold water. The three gallons of emulsion thus made produce, when diluted, thirty gallons of wash at a cost of about one cent per gallon.

These emulsions have been found thoroughly effective remedies, not only for plant lice, but also for many other insects. They can be used in the field, hop-yard or orchard on a large scale, and in the garden with equal efficiency. In England, similar washes have been applied to hop-yards for the destruction of the Aphis by the aid of steam power.

APPLE TREE BORERS.

There are two beetles whose larvæ are especially injurious to young apple trees; they are familiarly known as the flat-headed and round-headed borers, from the shape of the grubs. The former belongs to the family Buprestidæ, and is a common insect all over North America. Its scientific name is *Chrysobothris femorata*, Fabr; the annexed wood-cut represents the grub and the perfect insect. It does but little noticeable harm to healthy full-grown trees, but is often very destructive to young, freshly transplanted, or sickly trees. The presence of the borer within the trees may often be detected by the discoloration of the bark over the spot where it is at work, the cavity beneath causing a dried and flattened appearance, and also by the presence of its sawdust-like castings, or the exudation of sap. In such cases, the simplest remedy is to cut out the grub with a knife, or destroy it by means of the insertion of a stiff wire.

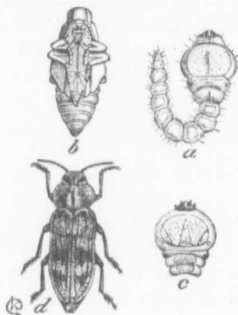


FIG. 30.

The best preventive remedy for this insect, so far as known at present, is a wash made of soft-soap and carbolic acid. Soft-soap and lime, with a little dissolved glue added to cause adherence, is also recommended; or soft-soap reduced to the consistency of a thick paint by the addition of a strong solution of washing soda in water. Any of these washes, to be effective, must be applied to the branches and twigs as far as practicable, as well as to the trunks of the trees, for this borer does not confine its work to any particular part. The application of the wash should be made in May, and again in early July and late August, in order to prevent the deposit of eggs by the female beetle. A gentleman (quoted by Professor Riley), who has had much experience with this beetle in the West, states that he has taken as many as a hundred borers from one small tree, and advises that "those having trees subject to attacks should look over them every week if possible, or every two weeks at least, from the first of June to the fall, for exudation of sap from the bark, which is a sure indication of their presence. When noticed, the borer may be destroyed by cleanly cutting out a small slice of the bark." This method involves great labour, but it is worth doing in the case of a young orchard that is found to be infested by this creature. The writer just referred to states that "carelessness in this respect the past season has cost me more than three hundred trees, all young."

The round-headed apple tree borer (*Saperda Candida*, Fabr., Fig. 31c) is not nearly so common as the species just referred to. It is found in the Niagara district and other parts of