

sucking the juices of the plant. The first class of insects have jaws fitted for biting and for masticating the plant tissues, and their work is followed by defoliation or by the destruction of areas of leaf or stem tissue. The mouth parts of sucking insects are not made for biting, so do not admit of the destruction of plant tissue in this way. Such insects have tube-like mouth parts which they insert in the tissue of the plant to suck its juices. It is evident, therefore, the insects of the two classes must be fought from different standpoints and with different insecticides.

We have very troublesome insects belonging to both classes, and they are not difficult to identify. The foliage is eaten in one case and left intact in the other. In the latter case the substance is removed from the leaf; as a result its function is upset, the leaf gradually dies and drops to the ground.

**Eating Insects.**—The class of insects which obtain their nourishment by eating the tissue of the plants can, of course, be poisoned, and this is usually successfully accomplished by the use of Paris Green or arsenate of lead in suspension in water. Paris Green is used at the rate of 1 pound to 50 gallons of water, while the arsenate of lead is used in somewhat greater strength—2 pounds to 50 gallons of water. These poisonous solutions may be applied to the foliage of cabbage, cauliflower, etc., before using without any danger to the household. The vegetables grow from the inside and not from without, hence the poison remaining on the surface is washed off before cooking. In combating these insects it is important to treat in the initial stage, else the foliage may be injured to such an extent that the functions of the plant be upset and the insects allowed to become too numerous and large for quick and effective extermination.

**Sucking Insects.**—Those insects which obtain their nourishment by sucking the juices of plants can be destroyed only by the use of insecticides coming in contact with their bodies. The effectiveness of the remedy with this class of insects depends on covering the openings of their breathing spiracles which are situated in the sides of the abdomen, with a thin film of insecticide. The insects in this way are unable to breathe and quickly succumb. For this purpose volatile oils, or oil and soap mixtures are usually employed. Kerosene emulsion and whale-oil soap are two of the standard remedies for this class of insects.

Kerosene emulsion is made as follows:

Hard soap or whale-oil soap	..... ½ lb.
Water (preferably soft)	..... 1 Gal.
Kerosene	..... 2 Gal.

Dissolve the soap in soft water by boiling, add the kerosene and churn with a pump or by hand for 15 minutes. Dilute 5 to 25 times before applying.

Use the stronger emulsion for all scale insects. In using the strong solution care should be taken or the foliage of the plants may be seriously injured. For such insects as plant lice, red spider, mealy bugs, and thrips, the weaker preparations will prove effective. Cabbage worms, currant worms, and all insects which have soft bodies can be successfully treated by the use of contact