been produced, a number of individuals about the middle of summer acquire wings. These also are all females, and they issue from the ground, and, rising in the air, fly, or are carried with the wind, to neighboring vineyards, where they deposit eggs on the under side of the leaves among their downy hairs, beneath the loosened bark of the branches and trunk, or in crevices of the ground about the base of the vine. Occasionally individual root-lice abandon their underground habits and form galls on the leaves.

The complete life-history of this insect is extremely interesting and curious, and those desiring

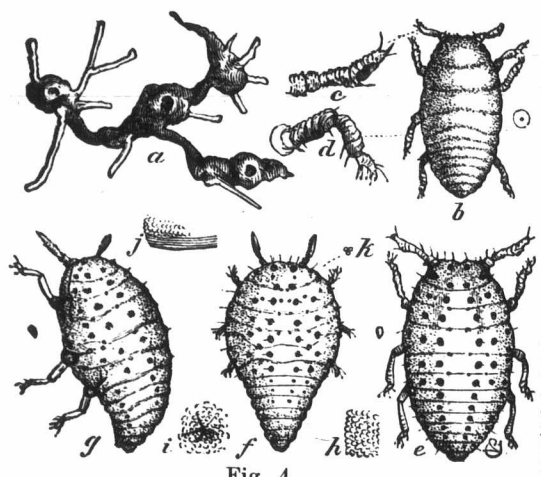

Fig. 4.

further information as to the different modifications of form assumed by the insect in the course of its development, will find it given with much minuteness of detail in the fifth, sixth, seventh and eighth "Reports on the Insects of Missouri," by C. V. Riley.

Remedies.—This is an extremely difficult insect to subdue, and various means for the purpose have been suggested, none of which appear to be entirely satisfactory. Flooding ths vineyards, where practicable, seems to be more successful than any other measure, but the submergence must be total and prolonged to the extent of from twenty-five to thirty days; it should be undertaken in September or October, when it is said that the root lice will be drowned and the vines come out uninjured.

Bisulphide of carbon is stated by some to be an efficient remedy; it is introduced into the soil by means of an auger with a hollow shank, into which the liquid is poured; several holes are made about each vine, and two or three ounces are poured into each hole. Being extremely offensive in odor and very volatile, its vapor permeates the soil in every direction, and is said to kill the lice without injuring the vines. This substance should be handled with caution, as its vapor is very inflammable and explosive. Alkaline sulpho-carbonates are also recommended; these are gradually decomposed in the soil and give off sulphuretted hydrogen and bisulphide of carbon. Carbolic acid mixed with water, in the proportion of one part of the acid to fifty or one hundred parts of water, has

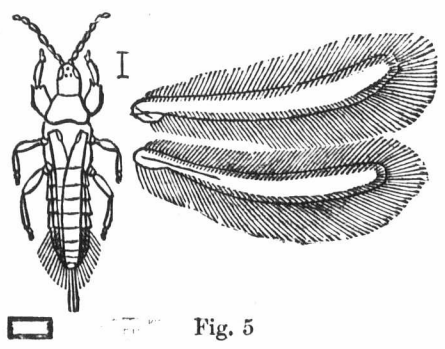

Fig. 5

also been used with advantage, poured into two or three holes made around the base of each vine with an iron bar to the depth of a foot or more. Soot is also recommended to be strewed around the vines.

It is stated that the insect is less injurious to vines grown on sandy soil, also to those grown on lands impregnated with salt.

Since large numbers of these insects, both winged and wingless, are known to crawl over the surface of the ground in August and September, it has been suggested to sprinkle the ground about the vines at this period with quicklime, ashes, sulphur, salt, or other substances destructive to insect life. The application of fertilizers rich in potash and ammonia, such as ashes mixed with stable-manure or sal ammoniac, has been found useful. A simple remedy for the gall-inhabiting type is to pluck the leaves as soon as the galls appear and destroy them.

Several species of predaceous insects prey on this louse. A black species of Thrips with white-fringed wings (*Thrips phylloxeræ* Riley, see Fig. 5) deposits its eggs within the gall, which when hatched produced larvæ of a blood-red color, which play sad havoc among the lice. The larva of a Syrphus fly, *Pipiza radicum*, which feeds on the root-louse of the apple, has also been found attacking the Phylloxera. Another useful friend is a small mite (*Tyroglyphus phylloxeræ* P. & R., see Fig. 6), which devour the lice; and associated with this is sometimes found another species (*Hoplophora arctata*, Riley) of a very curious form, reminding one of a mussel. Fig. 7 represents this insect in different attitudes, highly magnified.

The gall-inhabiting type is very subject to the attacks of a small two-winged fly, *Diplossis grassator* Fyles, which deposits its eggs either in the gall or at its entrance, from which the larva is soon produced. This, although destitute of legs, is very active, and, groping about in the interior of the gall, seizes on the young lice soon after they are hatched and sucks them dry. It does not appear at first to attack the parent lice; the tender progeny are more to its liking, and these are produced in sufficient numbers to furnish it with a constant supply of fresh food. In some instances one larva, in others two are found in a single gall, and as they increase in size they devour the lice very rapidly, and before changing to the chrysalis state clear the gall entirely of its contents. The larva (Fig. 8, *a*) is about one-tenth of an inch long, of a pale pinkish-yellow color, glossy and semi-transparent, with a dark line down the back on the two anterior and some of the posterior segments. On the terminal segment there are two short, fleshy horns united

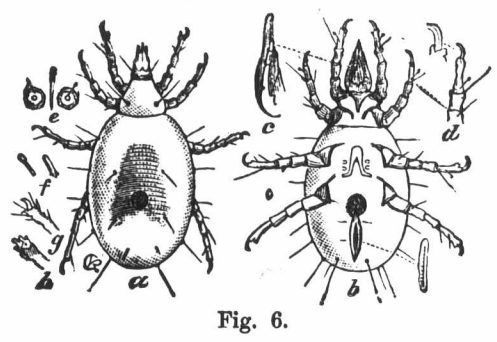

Fig. 6.

by a slight ridge; the horns are tipped with brownish black, and have a minute cluster of spines at their summit.

The chrysalis, shown at *b* in the figure, is a little less than one-tenth of an inch in length, of a reddish-brown color, with a few short hairs scattered over its surface, and two blackish horns united by a ridge near the hinder extremity. Both the chrysalis and the larva are magnified.

The perfect insect escapes in about a fortnight after the chrysalis is formed. It is a very pretty little two-winged fly, shown much magnified at *c* in the figure, and of its natural size at *d*.

The Phylloxera is also preyed on by the larva of a dull-colored lady-bird, a species of Scymnus, by several other species of the lady-bird family, and by the larvæ of the lace-wing flies.

To guard against its introduction into new vineyards, the roots of young vines should be carefully examined before being planted, and if knots and lice are found upon them these latter may be destroyed by immersing the roots in hot soap-suds or tobacco-water.

Our native American vines are found to withstand the attacks of this insect much better than do those of European origin; hence by grafting the more susceptible varieties on these hardier sorts, the ill effects produced by the lice may in some measure be counteracted. The roots recommended to be used as stocks are those of Concord, Clinton, Herbemont, Cunningham, Norton's Virginia, Rentz, Cynthiana and Taylor. The Clinton, one of the varieties recommended, is particularly liable to attacks of gall-producing type of Phylloxera, but the lice are seldom found to any great extent on its roots, and the vine is so vigorous a grower that a slight attack would not produce any perceptible injury.

Summer Flowering Bulbs.

The Gladiolus has become one of the most popular of summer flowers. It has many commendable qualities, and requires but little of what may be called skill in its management. The bulbs may be planted as soon as the frost leaves the ground in spring, and if a succession of flowers is desired, planting may be made weekly until the middle or end of June. The bulbs for late planting must be kept in a very cool cellar to prevent them from growing prematurely. Like most other bulbs, Gladiolus thrive best in sandy, or at least light soil, and if the finest flowers are to be obtained, the soil must be well enriched. In dry seasons the blooms will be short lived, but this can be materially counteracted by mulching around the stems. This is preferable to watering, which sometimes

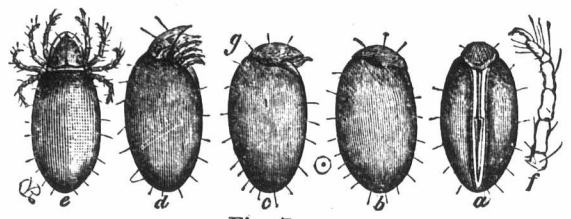

Fig. 7.

injures the bulbs. They ripen seed very freely, but it is at the expense of the young bulbs, and where it is not proposed to save seed, the future flowering bulbs will be greatly helped in growth by removing the flower stem as soon as the flowers fade. Each bulb will form two bulbs for future planting, and in addition to these, numerous small bulblets will be found clustering at the base of the larger bulbs. These small bulbs will vary in size from a marble to a pea. These should be carefully gathered and sown in rows like peas, when they will soon reach the size of flowering bulbs. The bulbs should be lifted in the fall, and after being well dried in the sun, stored in a dry place where no frost can enter. In dry soils even in the middle States they can be planted deep enough to escape injury from freezing, but it is the safer plan to lift the bulbs after the stems decay, and keep them dry during winter.

The *Trigridia*, or Tiger flower, is a Mexican bulb which produces tulip-shaped flowers of a scarlet color, spotted with yellow. The flowers are very beautiful, but of short duration, lasting only one day; but it continues flowering some time, several flowers being produced from the same stalk. The bulbs are small and appear almost worthless, but if they are planted in a deep, light, rich soil, they will flower satisfactorily. They are very tender, and will not stand any frost, consequently they should be lifted and kept in a dry place where there is no frost. They should not be planted until the ground becoms warmed in spring, otherwise the bulbs will be apt to decay.
—*National Tribune.*

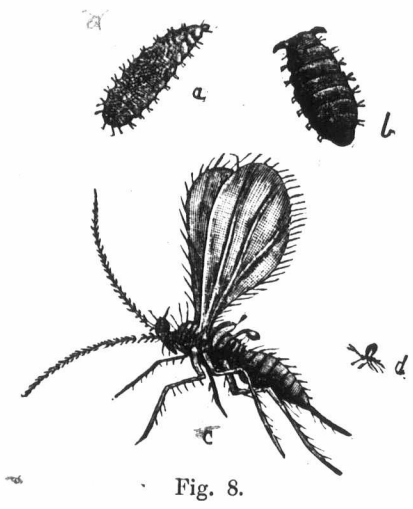

Fig. 8.

The green covering or so-called moss which accumulates on plant pots is always injurious to the plant. "A bright pot makes a healthy plant," is the gardener's rule. This green covering is an alga, a plant closely related to the sea-weeds. It acts in much the same way as glazing would act in stopping the pores of the pot and allowing no circulation of air. It should be scrubbed off as often as it appears with sand and water.