

had been at its destructive work for years, producing injury the true cause of which was never suspected until the publication of the article in my fourth Report. I also showed that some of our native varieties enjoyed relative immunity from the insects' attacks, and urged their use for stocks, as a means of re-establishing the blighted vineyards of Southern France."

"The disease continued to spread in Europe, and became so calamitous in the last-named country that the French Academy of Sciences appointed a standing Phylloxera Committee. It is also attracting some attention in Portugal, Austria and Germany, and even in England, where it affects hot-house grapes."

NATURAL HISTORY OF THE INSECT.

The genus *Phylloxera* is characterized by having three-jointed antennæ, the third or terminal being much the longest, and by carrying its wings overlapping, flat on the back instead of roof-fashion. It belongs to the sub-order of whole-winged bugs (*Homoptera*), and forms a connecting link between two of its great families, the Plant-lice (*Aphididae*) on the one hand, and the Bark-lice (*Coccidae*) on the other. It is generally considered, however, to pertain to the former family, though some naturalists, with the not uncommon love of introducing new names and minute classifications, have desired to found a new family for this special insect.

Not the least interesting feature in the economy of the *Phylloxera* is the different phases or forms under which it presents itself. Among these forms are two constant types which have led many to suppose that we have to do with two species. The one type, which for convenience Mr. Riley terms *gallæcola*, lives in galls on the leaves; the other which he calls *radicicola*, lives on swellings of the roots. They may be tabulated thus:—

- Type 1. *Gallæcola* (see Figure 43, *f, g, h*),
- Type 2. *Radicicola*.
- A, Degraded or wingless form (see Figure 44, *e, f, g*.)
- B, Perfect or winged form (see Figure 45, *g, h*.)

"**TYPE GALLÆCOLA OR GALL-INHABITING.**—The gall or excrescence produced by this insect is simply a fleshy swelling of the under side of the leaf, more or less wrinkled and hairy, with a corresponding depression of the upper side, the margin of the cup being fuzzy, and drawn together so as to form a fimbriated mouth. It is usually cup-shaped, but sometimes greatly elongated or purse-shaped.

Soon after the first vine-leaves that put out in the spring have fully expanded, a few

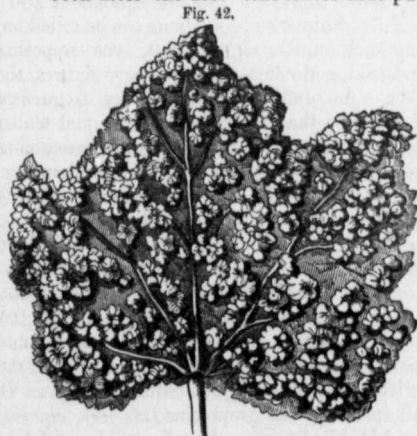


Fig. 42.
Under side of Leaf covered with Galls.

scattering galls may be found, mostly on the lower leaves, nearest the ground. These vernal galls are usually large, (of the size of an ordinary pea), and the normal green is often blushed with rose where exposed to the light of the sun. On carefully opening one of them (Fig. 43, *d*) we shall find the mother-louse diligently at work surrounding herself with pale-yellow eggs of an elongate oval form, scarcely .01 inch long, and not quite half as thick (Fig. 43, *c*). She is about .04 inch long, generally spherical in shape, of a dull orange colour, and looks not unlike an immature seed of the common purslane. At times, by the elongation of the abdomen, the shape assumes, more or less perfectly, the pyriform. Her members are all dusky, and so short compared to her swollen body, that she appears very clumsy, and undoubtedly would be outside of her gall, which she never has occasion

to quit, and which serves her alike as dwelling-house and coffin. More carefully examined, her skin is seen to be shagreened or minutely granulated and furnished with rows of minute hairs. The eggs begin to hatch when six or eight days old into active