

peradventure, the specific interrelation and identity of the two types. I make this announcement with all the more pleasure, that for three years past, both on vines growing out-doors and in pots in-doors, I had in vain attempted to obtain the same result."

PRACTICAL CONSIDERATIONS.

"THE MORE MANIFEST AND EXTERNAL EFFECTS OF THE PHYLLOXERA DISEASE.

—The result which follows the puncture of the root-louse is an abnormal swelling, different in form, according to the particular part and texture of the root. These swellings, which are generally commenced at the tips of the rootlets, where there is excess of plasmatic and albuminous matter, eventually rot, and the lice forsake them and betake themselves to fresh ones—the living tissue being necessary to the existence of this as of all plant-lice. The decay affects the parts adjacent to the swellings, and on the more fibrous roots cuts off the supply of sap to all parts beyond. As these last decompose, the lice congregate on the larger ones, until at last the root system literally wastes away."

"During the first year of attack there are scarcely any outward manifestations of disease, though the fibrous roots, if examined, will be found covered with nodosities, particularly in the latter part of the growing season. The disease is then in its incipient stage. The second year all these fibrous roots vanish, and the lice not only prevent the formation of new ones, but, as just stated, settle on the larger roots, which they injure by causing hypertrophy of the parts punctured, which also eventually become disorganized and rot. At this stage the outward symptoms of the disease first become manifest, in a sickly, yellowish appearance of the leaf and a reduced growth of cane. As the roots continue to decay, these symptoms become more acute, until by about the third year the vine dies. Such is the course of the malady on vines of the species *vinifera*, when circumstances are favourable to the increase of the pest. When the vine is about dying, it is generally impossible to discover the cause of the death, the lice which had been so numerous the first and second years of invasion, having left for fresh pasturage."

MODE OF SPREADING.—The gall-lice can only spread by travelling, when newly-hatched from one vine to another; and, if this slow mode of progression were the only one which the species is capable of, the disease would be comparatively harmless. The root-lice, however, not only travel under-ground along the interlocking roots of adjacent vines, but crawl actively over the surface of the ground, or wing their way from vine to vine and from vineyard to vineyard. Doubts have been repeatedly expressed by European writers as to the power of such a delicate and frail-winged fly to traverse the air to any great distance. On the 27th of September, 1873, the weather being quite warm and summer-like, with much moisture in the atmosphere, Mr. Riley witnessed the insect's power of flight. Some two hundred winged individuals, that he had confined, became very restless and active, vigorously vibrating their wings and beating about their glass cages. Upon opening the cages, the lice began to dart away and were out of sight in a twinkling. They have been caught in spider-webs in Europe, and captured by Mr. Riley on sheets of paper prepared with bird-lime and suspended in an infested vineyard; it is clear, then, that they can sustain flight for a considerable time under favourable conditions, and with the assistance of the wind, they may be wafted to great distances. These winged females are much more numerous in the fall of the year than has been supposed by Entomologists. Wherever they settle, the few eggs which each carries are sufficient to perpetuate the species, which, in the fullest sense, may be called contagious.

"SUSCEPTIBILITY OF DIFFERENT VINES TO THE DISEASE.—As a means of coping with the Phylloxera disease, a knowledge of the relative susceptibility of different varieties to the attacks and injuries of the insect is of paramount importance. As is so frequently the case with injurious insects, and as we have a notable instance in the common Currant Aphid (*Aphis Ribesii*), which badly affects the leaves of some of the Currants, but never touches the Gooseberry which belongs to the same genus. The Phylloxera shows a preference for and thrives best on certain species, and even discriminates between varieties; or, what amounts to the same thing, practically, some varieties resist its attacks and enjoy a relative immunity from its injuries. It would be useless, and certainly unnecessary here, to attempt to ascertain the reason why certain vines thus enjoy exemption while others so readily succumb; but in a broad way it may be stated that there is a relation between the susceptibility of the vine and the character of its roots—the slow-growing, more tender-wooded and consequently more tender-rooted varieties succumbing most readily; the more vigorous powers resisting best."