rarely produces the gall. Yet the historic evidence is conclusive as to the introduction from America of Phylloxera vastatrix, and almost as conclusive as to the similar introduction of this Oidium ; and, to my mind, they both furnish admirable illustrations of a change of habit in an organism sufficiently marked that, without the historic evidence, the question of the exact specific identity of the parent, and its transcontinental issue, might well be raised. The interesting question, philosophically considered, is why, if the winter spore is necessary to the perpetuation of the Uncinula in America, the species can propagate for an indefinite period without it in Europe?

Effect on the Vine.—The fungus is less injurious to our hardier native grape-vines than to the European Vitis vinifera and hybrids of it. Hence it is more to be dreaded in California and in Europe than in the Eastern United States. It also prevails most in a dry atmosphere.

Remedies.

Sulphur is well known to be one of the most satisfactory remedies against this fungus, and is in universal application where the disease prevails. It is generally applied dry, by means of bellows, though, it seems to me, the wet method would have advantages with the use of the cyclone nozzle. Mr. A. Vitch, of New Haven, Conn., has found that in green-houses the sulphur may be advantageously applied by mixing it with linseed-oil to the consistency of paint, and brushing it on the flues or hot-water pipes. Mr. Wm. Saunders, the Horticulturist of the Department of Agriculture, has for many years used with great satisfaction, a weak solution of lime and sulphur, obtained by pouring water on one-half bushel of lump lime and ten pounds of sulphur, and then diluting for use.

The Downy Grape-vine Mildew.

General Appearance.—The other mildew, namely, the Peronospora, shows itself on the underside of the leaves in the form of a small patch of whitish down, and sends its mycelium into the adjacent tissues, destroying the parts, which scorch and turn brown, as if sunburnt. It has been known by various popular names, as "blister of the leaf," "blight," and so on. It generally escapes attention in its earlier stages, and experience shows that it is most destructive where the dews are heavy, or in continued damp, rainy weather. This particular mildew is the Peronospora viticola (Berkeley & Curtis), De-Barry having first referred to it as Botrytis viticola.

Structural Characteristics.—The mycelial threads or hyphæ, are about .01 mm. in diameter, somewhat larger in the stems and petioles than in the leaves. They are found everywhere except in the wood proper, but particularly in the tissues of the leaves. Their contents are granular and somewhat oily, and cross partitions so characteristic of the Uncinula, are rare. Just beneath the stomata of the leaves, the hyphæ are particularly abundant. Those which are to bear the conidia pass through the stomata and grow more rapidly than the rest, ramifying and reaching from .3 to .6 mm. in heighth, and bearing the conidia on the tips of the branchlets. The conidia are oval and obtuse, varying in size from .012 to .03 mm. in diameter. Germination takes place with great rapidity whenever there is sufficient moisture. Conidia placed in water become swollen and somewhat segmented in an hour. The segments become oval bodies, collect at the distal end of the conidia, rupture the wall in a short time and escape, swimming off as zöospores, each with two ciliæ. Each conidium produces, on an average, five or six zöospores, though the number is quite variable. They vary also in shape, and from .008 to .01 mm. in length. They move about from 15 to 20 minutes ; then come to rest, when the cilia drops off, and a new mycelium develops from the side.

The winter spores, or öospores, are found in September and October, in discolored and shriveled parts of the leaves. They are spherical, .03 mm. in diameter, with a thick, smooth, yellow cell-wall. They fall to the ground with the leaves and lie dormant till spring.

So far as I can find, the actual steps by which the winter spores are produced, have not been observed in this species, or for that matter, in the Uncinula, but as the process