

which may attain a length of 1 ft. or more. Some time after a canker has been formed fructifications of the fungus appear on the surface of the killed area.

Spots become noticeable on the leaves shortly after they emerge from the bud, and infection may occur during the whole of the growing season should conditions become favourable. At first the spots are minute, circular, scattered, and dark purple in colour. They soon increase in size, growth proceeding in a radiate manner, so that the centre portion (the original spot) may appear surrounded by definite zones. Later this central portion changes to greyish-brown, and as the surrounding zones are darker, these spots present a characteristic appearance, which has led to the name "frog-eye" being applied to them. Finally, spots may lose their circular outline and become lobed and irregular in shape. In cases of severe infection the spots may become so numerous as to coalesce, forming irregular dead areas on the leaf. Severe infection may be followed by defoliation.

Fruit-infection is followed by the appearance on the surface of small circular brown areas; these rapidly increase in size until the whole fruit becomes rotted. As these areas enlarge, zoning may occur, as in the case of leaf-infection, but this is not a common manifestation of the disease. Infected fruits do not become soft, but remain firm and spongy. Finally, the colour changes to jet-black, and the fruit gradually shrivels and becomes mummified (Fig. 3).

ECONOMIC IMPORTANCE.

Although in certain parts of the United States black-rot is a serious disease, causing an annual loss of several hundred thousand dollars, in New Zealand it is of minor importance, its chief damage being due to the cankers it forms on the branches of apple and pear trees. On leaves its effects with us are so slight as to be negligible, and on fruits it has little effect, as it appears to be confined to those which have been injured by codlin-moth or damaged during picking or packing. During the recent fireblight campaign in the Auckland District many hundreds of cankers were forwarded to this Laboratory, and in nearly every instance these were found to be caused by fireblight, black-rot, or *macrophoma*-canker. In most cases it was found that the source of infection of black-rot was through some bark-injury, such as is caused by branches rubbing together, or abrasions caused by woolly aphid.

LIFE-HISTORY OF THE CAUSATIVE ORGANISM.

Black-rot is caused by the fungus *Physalospora Cydoniae* Arnaud,* an ascomycete having two spore stages in its life-cycle. The first or pycnidial stage, commonly known as *Sphaeropsis malorum*, is the parasite, the second or ascomycetous stage being saprophytic, as it appears in the dead bark of old cankers. In North America this stage

* Considerable doubt exists in mycological literature as to the proper name that should be applied to this species. For Shear (1914) claimed that ascospores of *Melanops Quercuum* Rehm. forma *Vitis* Sacc. produced in pure cultures pycnidia and spores morphologically identical with *Sphaeropsis malorum* Berk.,