

of a leaf, it develops rapidly at the expense of the tissues of the latter. Pushing forward from one cell to another, the contents are appropriated and fresh vigour is thus gained by the parasite. This goes on till the vigour of the host plant is much impaired, or its life destroyed. Some of the principal parasitic diseases attack both foliage and the fruit of the host plant, as in the case of the "mildew" of the grape, "scab" of the apple and pear, and "rot" of the plum and peach. They are thus doubly destructive. If this destruction were confined to a few cells, leaves, or even to a few plants, the loss would be trifling; but the extraordinary rapidity with which fungi multiply, and the ease with which their reproductive bodies (spores) are carried from plant to plant, renders their extirpation a very difficult matter.

This explanation of the methods of reproduction and growth of these diseases emphasizes the truth of the maxim that "prevention is better than cure." When the mycelium of the fungus has become established within the tissues of the host plant, any remedy applied to the exterior of the plant, it is readily seen, can at the best be only partially effective. The copper salts have long been known to possess valuable germicidal properties. One of the commonest and cheapest of them, copper sulphate (blue-stone) has been used for many years to kill the spores of smut infesting seed wheat. *Bordeaux mixture*, which is composed of blue-stone, dissolved in water, combined with lime, has proved to be the most effective and the cheapest preventive agent yet discovered. A very concentrated mixture was used at first, which was difficult to apply and rather expensive. This has now been abandoned for weaker mixtures as hereafter explained.

#### EXPERIMENTAL WORK.

In the spring of 1890, the first year of the appointment of the writer as Horticulturist to the Central Experimental Farm, Ottawa, experiments were planned and carried out in orchards at Abbotsford, Quebec. The experiments were designed to show the benefit of spraying with ammoniacal copper carbonate in varying proportions, copper sulphate of varying strength, as well as the value of other fungicides. The variety of apple treated was Fameuse, and the results gained demonstrated the profit of spraying with *ammoniacal copper carbonate*, of the strength since recommended by the Horticultural Division of the Experimental Farm. Experiments have been continued each year up to the present, all marked with more or less success according to the character of the season. In the initial stages of this work, the important questions of economy and ease of application, in addition to the effectiveness of each mixture, had to be studied by the experimenter so that a remedy when discovered might be practicable and thus commend itself generally to the public.

These experiments have covered the trial of over thirty spraying mixtures, and among the fruits included were apple, pear, plum, cherry, peach, and the majority of the small fruits.