

firm, the cell walls unaltered with sharp outlines, and about 2-3-5 μ in width. The tissues in the unheated tubes were very soft, much swollen, and in some cases quite disintegrated. The cell walls were much enlarged, some striated and from 5-8 μ in thickness.

This experiment shows that *B. oleraceae*, secretes a cytase which has a very powerful action on the cell wall and particularly on the middle lamella, and that this enzyme is killed by a temperature of 65 degrees C. for 10 minutes.

CONDITIONS AFFECTING THE SPREAD OF THE DISEASE.

1. *Meteorological Conditions.* The weather of July, August, and part of September was very favourable for the growth and spread of both fungus and bacterial diseases. In Ontario, the rust on cereal crops was very bad. Many newspapers spoke of the grain "being blasted in a single night."

The Toronto Meteorological Register shows that July and August, 1901, were warmer and rather moister than the average; in the month of August when the cauliflower diseases was noticed, the average humidity was 86, and the rainfall 3.67 inches. The temperature also was high. Very many mornings in July and August, the dew was so heavy that, in spite of great heat and cloudless sky, one could get quite wet when walking through the rows of cauliflowers in the afternoon. An examination of these plants in the field showed that the base of the plant, or the juncture of the petioles of the leaves with the stem, contained considerable water and in most cases particles of soil and if the organism exists in the soil, which is probably the case, it would be in a favourable situation to cause infection.

The warm weather, combined with excessive moisture, both of the soil and the exterior of the plant, and the fact that transpiration would be checked by this condition, and consequently the plant-cells themselves would be full of sap, undoubtedly played an important part in the spread of the rot amongst the cauliflowers and turnips. In short, we can state that the atmospheric conditions were ideal for vigorous bacterial growth, and that these meteorological conditions have considerable influence on the ease with which the bacillus penetrates the plant.

2. *Rankness of Growth.* The weather conditions above mentioned, and the plentiful use of manure by market gardeners, favor very quick, rank growth. The plants most affected were large, heavy, and