

SMUT DISEASES OF CULTIVATED PLANTS.

THEIR CAUSE AND CONTROL.

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I.

GENERAL REMARKS.

Smut Diseases not confined to cultivated plants.—The well-known conspicuous diseases commonly designated as 'Smut Diseases' are by no means exclusively confined to cultivated or economically important members of the natural order of grasses—among which our cereals, for instance, are the most valuable—but they also occur in other plants widely distant in relationship from the grass family. Their importance to the farmer diminishes as the properties of the plants attacked become of less economic value. For this reason, the following pages are devoted to a study of the more important forms occurring on plants of agricultural value.

'Smuts' caused by microscopic fungi, their nature and action on the host plant.—All smut diseases are caused by minute parasitic plants known as microscopic fungi. Many of these minute plants—popularly referred to as moulds—are of decidedly destructive habit, owing to their parasitic mode of life. Their parasitism is due to the fact that all fungi are incapable of manufacturing their own food and, therefore, depend for their sustenance upon ready prepared food, which the parasitic fungi find in the tissues of the plant—or host plant, as it will be called for our purpose—on which they live. As a result of such relationship, they either seriously interfere with, or frustrate altogether, the purposes for which certain plants are cultivated—the production of grain in the case of cereals—or may finally cause the death of the plant on which they depended so long for their livelihood. The various fungi causing smut diseases are among the best examples of parasites, and on occasion may prevent entirely the production of grain. The smut fungi, like other related microscopic fungi, possess delicate vegetative organs—the mycelium—by which they live partly or exclusively in the cells of the host plant. After having gained sufficient strength by the absorption of food from that plant, they produce an abundance of generative or reproductive organs—the spores—which penetrate to the surface of the parts of the infected plant involved, where they produce more or less prominent symptoms (smut heads, smut balls or smut boils). The disturbance of the growing smut fungus within the cells of the host plant may be of so slight a nature as not to be perceptible by any outward symptom until the fungus has reached maturity and produces its spores. At times, enormous spore masses are produced within the cells of the host plant, so that the latter cannot resist the increased local pressure from within, and the tissues involved expand and finally burst open, when the spores appear on the outside in the form of blackish or brownish dust.

The spores of smut fungi and their dispersal.—When this stage is reached, spore dispersal follows immediately. Fungus spores are comparable to seeds of more highly organized plants inasmuch as they reproduce their kind. They are, however, not seeds in the true botanical sense.