Rust and Smut.

Within the present century a number of professional microscopists have distinguished themselves, and the aid which they have given to agricultural science is underestimated. In some instances they have struck out into new fields of investigation, and in others they have come to the aid of chemistry and other sciences Microscopic investigations are still comparatively young, and from an agricultural standpoint, they have been chiefly confined to parasitic fungi in plants. Much has been ascertained with regard to the life history of these minute organisms, although practical remedies have not always followed ; but by knowing the history the remedy becomes more apparent.

The condition which we call rust is caused by minute parasitic plants, most of the species being too small to be detected by the naked eye. Many thousands of these plants have already been classified and described like other plants, and new species are fast being discovered. They become visible, however, by their manner of growth, viz , in masses. The spores or seeds are, of course, still less distinguishable, and can be seen in none of the species without the aid of the microscope. But there are certain indications of the presence of rust, such as the discoloring of leaves in spots, when they sometimes wither and die. Like destructive insects, these parasites have their favorite pasture fields, so that simply by knowing the affected plant, the name of the species of fungus may frequently be known with tolerable certainty, although some of these parasites often attack more than one species of our cultivated plants.

It must not be supposed that these fungi produce nothing but rust and smut. It is the cause of all kinds of fermentation; it sours the milk, rots the wood, decays the fruit, putrifies animal and vegetable substances, and causes disease in animals. The black-knot, so destructive to the plum and the cherry trees, is also a fungoid growth, as is also the spots found on the potato leaves, causing a rotting of the tubers. It is now time for scientists to pay more attention to remedial measures. Rust is propagated by rusted straw through the manure heap, and through the droppings of animals that have eaten rust in their food; but if the heap is fermented, or the manure remains for a season in the yard before it is applied, the spores germinate and thereby become destroyed.

The smut fungus is a parasite of a different nature. So far as known it is confined to the cereals and grasses; hence by changing the crop the vitality of the spores will become lessened. Precaution must be taken that there be no smut in the grains of neighboring fields, for the spores are liable to waft. Wheat, oats, and barley are liable to some variety of this parasite. The spores are exceedingly minute, —about 7,500,000 can be placed side by side in a square inch,—and although they have strong vitality, they require a certain degree of moisture for their germination. A single spore may, under favorable conditions, affect or destroy a whole plant. The spores, while the grain is being threshed, are very liable to become attached to the minute hairs which are found on the germ end of the grain. Whether left in the ground or on the seed grain, they commence to grow in spring by throwing off buds which fasten themselves to the cultivated plant, and grow up with it, living on its juices, and thus weakening its vitality. The slender filaments of the fungus grow up between the cells of the straw, throwing out shoots into these cells, by means of which the parasite feeds. It finally finds its way into the ear, where it feeds upon the milky juices of the kernels. At first it appears as a blackish, slimy mass, but gradually increases in consistency until it forms a smut ball, containing myriads of spores.

Several successful remedies have been employed for destroying smut, the most popular and effective being that of sulphate of copper, also known as bluestone and blue vitriol. The users of this remedy differ very much in opinion as to the quantity to be used, depending probably upon the quantity and vitality of the smut spores. An English authority, Mr. A. J. Burrows, F. R. G. S., of Puckley, Kent, in a recent article on the subject, says: "We were once very much troubled with smut, but the practice of dipping all seed wheat into a solution of bluestone and water before planting has well nigh eradicated it upon all our best cultivated farms. Here we use about a pound of the vitriol to six bushels of wheat, dissolving it first in hot water ; but the most economical way I find is to make a tub of the mixture and immerse the wheat by means of a dipping basket. I have seldom seen smut in the crops after the seed has been thus treated." A pound of bluestone will dissolve in about five quarts of water. It is the impression of some farmers that this remedy destroyes the vitality of the seed to be sown ; but no apprehension need arise in the use of moderate quantitie . Smutty heads of grain should be gathered and destroyed as soon as they make their appearance, and no grain should be used for seed in which smut is known to exist. The greatest caution should therefore be exercised in the selection of seed.

Milk and Eggs as Food.

Average eggs weigh about eight to the pound. Thus a dozen weigh one and a half pounds. A pound of eggs contain more nourishment than a pound of meat and bone. Hence eggs at 24 cents per dozen are as economical a food as beefsteak at 16 cents per pound. There is no flesh food that may be served in so many palatable ways as eggs, nor so easily obtained by farmers. They may be boiled, poached, scrambled, fried, made into omelets plain or mixed with herbs or salted meats, and used in a great variety of ways in cake, Indian bread, and other cookery. Thus there are few seasons when it will be good economy in the farmer's family to stint themselves in this easily assimilable and nutritious food. Every family having an ice-house or other cold storage, should preserve a good supply to be used when they are scarce. They be may kept fairly well in a cold cellar if put down in the autumn.

One reason why persons suppose eggs lack nutrition is that they are in a semifluid state. Yet heat readily converts them into a solid by coagulation. Like milk, eggs are a perfect food, containing all the constituents of nourishment, and, like rare roast beef, soft boiled eggs are digested in three hours. Milk, like eggs, is capable of great variety in the cooking, and milk and cream should constitute a considerable portion of the diet in farm life, especially in the preparation of puddings, sauces, and the many dishes that form palatable accessories to table enjoyment. It is, therefore, bad economy for the farmer's family to stint themselves in milk, cream and eggs, on the ground that they are not solid food. Salt pork, bacon and ham are indeed solid food in the sense of indigestibility. It takes five hours to digest either, and only strong stomachs can bear them. They should be used more as relishes than as true food on the farm in summer, as they are everywhere else. It should be remembered that it is simply the juices of any food that serve the purposes of digestion.

It is only that portion of any food that is soluble in the fluids of digestion that is assimilated and taken up by the system. Fresh meat is largely water—about 71 per cent., and that of eggs about the same, or about that of blood, which contains 3 per cent. more. The marketable meat of the ox contains 10 per cent. bone, so that this again would bring eggs fully up to the standard of lean meat. The fact that the farmer is compelled to depend so largely upon salted meats in summer, and the added fact that milk, cream, and eggs are especially valuable in the preparation of salted meat dishes, render careful thought on the subject all the more necessary.—[Chicago Tribune.

Corn vs. Ensilage.

The New Jersy Experiment Station, which has been conducting some valuable experiments in ensilage, wanted an answer to the following questions :

1. How much digestible food can be secured from one acre planted in field corn, and how much from a corresponding acre planted in fodder corn ?

2. What is the value per acre of gathering a crop of field corn, and preparing it for dairy food ; and what is the cost per acre of ensilaging a crop of fodder corn ?

3. What is the relative feeding value of the digestible food in corn meal, in dried stalks, and in corn ensilage ?

4. How much potash, phosphoric acid, and nitrogen are removed from an acre by a crop of field corn ; and how much by a crop of fodder corn ?

Having tested, analyzed, and figured to the best of its ability, the Station arrived at the following results : The corn meal, dried stalks, and cobs produced digestible matter valued at $68.21 per acre, while the digestible food in an acre of ensilage only brought $62.33. The cost per acre of producing the corn meal was $14.95; corn stalks, $7.76; total, $22.71, while the cost of ensilaging an acre amounted to $26.41, showing a balance of 15 per cent. in favor of field corn. Actual feeding experiments were also made, the result being that the digestible carbo-hydrates in the field corn, stalks and in the corn ensilage, were quite as valuable as those in the corn meal. In the experiment with regard to the quantity of plant food removed from an acre of soil, the slight difference is not worth mentioning, the quantity of potash having been somewhat more in the field crop than in the fodder crop, although the total value of the nitrogen, phosphoric acid and potash removed from the soil in each case was practically the same.