FARM AND FIELD.

THE SMUT OF WHEAT.

The term smut is popularly applied to two quite different diseases of the wheat plant. In this country it generally means a disease which leaves the grain nearly its normal size and shape, but filled with a black and stinking dust; this is the one doubtless referred to by a Wyoming inquirer—accordingly it alone will be considered here. It may, however, be well to say that the wheat smut of the books, and also of the English farmers, is that which turns the whole head into a black, dusty powder, and is known in some parts of this country as blast, black blast, black blight, etc. The names under which the wheat smut is generally known in England are bunt or stinking smut, and under these it has often been described. It is a true disease, and like many of the diseases of animals and man, is the result of the growth of a parasitic plant.

This wheat parasite (known to botanists as Tilletia caries) consists of slender threads of miscroscopic size which insinuate themselves between the cells and tissues of the young wheat plant, drawing therefrom the nutrient matters, and thereby reducing considerably the general vitality of the affected plant. As is well known, an ordinary plant consists of a great number of cells each resembling a microscopic bladder, filled with protoplasm, water and some other substances. Were our eyes stronger, the interior of a young wheat plant would appear not much unlike a barrel of potatoes, the potatoes representing the cells. The cells in the plant, much as the potatoes in the barrel, have empty of vacant spaces between one another. Now, if we can imagine some slender plant growing up between the potatoes in the barrel and drawing nourishment from them, we will have a crude illustration of the way that the smut parasite attacks the wheat plant. The parasite, however, not content with growing in between the cell of the wheat plant, and so robbing them, actually penetrates them, thrusting in branches and suckers here and there in order to more certainly secure their nutritious contents.

When the wheat begins to head the parasitic threads push their way into the young kernels, and there find an abundance of food. Here the parasite reaches its highest development, and produces an abundant crop of its minute black spores, to serve as seed for the next year's crop. A wheat kernel thus filled with spores is generally a little shorter and thicker than a healthy grain, and is always of a dark-greenish colour. Upon crushing it, a most offensive odour is given off by the black dusty mass of the interior. Now if we put some of this black dust under a good microscope, we shall see that it is made up of round bodies, the individual spores, which in these low plants answer the same purpose as the seeds of the higher ones. When the smutted grains are broken, as many are in threshing, the spores adhere to the tuft of hairs on the normal grains and are thus sown with the latter. I have repeatedly examined the good kernels in wheat which was somewhat effected by smut, and found that scores of spores adhered to them, especially in the hairs and the deep fold which runs lengthwise upon the grain. When once they had become attached they remain with great persistence, and it is very difficult indeed to separate them, so that a few crushed smut-grains may pretty thoroughly inoculate a considerable quantity of wheat.

It has been demonstrated repeatedly that the disease is propagated by the spores, and that the sowing of seed containing smut spores is followed, under favourable conditions by a new crop of smut. The spores can be readily germinated, and the process of growth watched for some distance, but, with perhaps one doubtful exception, all attempts to discover the exact mode of entrance of the parasite into the young wheat plant have signally failed. Still it can be shown that the infection must take place during the early growth of the wheat. Some years ago I made many careful examinations of smutted wheat in the field and found that the whole plant in nearly every case was affected, showing that the disease must have begun before the plant commenced branching, or "stooling out," and that it followed up the several branches as it grew. This accords with the results of investigations made some years since in Europe by Dr. Fischer von Waldheim, who found the threads of the parasite in the lower joints of the young plants.

When we come to the question of *prevention*, it is at once evident that whatever will destroy the spores or eliminate them from the seed-wheat will, in so far, lessen the liability to the disease. As the smutted grains are lighter than the normal ones they can be floated out by throwing the seed-wheat into water and violently agitating it. The common "smut-mills" of the millers may also be used, although in this case there is considerable danger of mechanical injury to the normal grains. In whatever manner the smutted grains are removed it must be borne in mind that many spores adhere to those which are not smutted, and these spores must be removed or destroyed, or but little good will come from the operation. This last may be accomplished by the use of caustic lime, which may be applied in the dry state to the wetted wheat after the washing spoken above. A solution of blue stone (copper sulphate) is also much used by English farmers for the same purpose, and appears to destroy the life of the spores without injuring the wheat.

It is utterly useless to make an application of any kind whatever to the growing wheat before "heading" by way of prevention or remedy, the disease being an internal one as shown above. So far as I am aware there is no variety of wheat which is smut-proof or even approximately so. Where a farmer is obliged to make use of seed which is considerably smutted, the best plan would be to first thoroughly wash the wheat and flood out the smutted grains, and then to sprinkle caustic lime upon the wet wheat. By so doing the danger of a recurrence of the disease will be greatly lessened. To reduce the general liability to smut in any locality, or upon a farm, care should be taken with the seed as above, and in addition there should be such a rotation of crops that a considerable interval will intervene between each succeeding wheat crop.—*C. E. Bessey.*

HEALTH ON THE FARM.

The farmer had at command every opportunity for perfect physicial development and health. Pure air and water, abundant, varied and nutritious food, proper exercise, and long periods of rest and sleep. Artists should look here for models of manly strength and beauty; but too often the faces and forms of farmers showed that there was reason for the frequent appearance of the doctor's gig before their doors. Their food lacked variety and was improperly cooked. They needed more vegetables and fruit and less pork and doughnuts. They should make more of the garden and less of the frying-pan. The barn with its cattle-yard, the pig-pen, the poultry-house, the privy and the well often seem to be striving to show the utmost sociability for the kitchen door, filling the air with ill odours, and the soil with filth and and fever germs to be carried into the well by every permeating rain. Trees were planted close to the house, obstructing the sunlight and making the air damp and unwholesome. The farmer's wife suffered even more from the unsanitary condition of the house than he, and she was more often overworked. But the farmer himself too frequently overtaxes his physical powers. Severe and constant labour leaves too little time to cultivate the cheerful and better sentiments or that higher education which contributes power and stability to mind and character.—*Philadelphia Press.*

SAVE THE LIQUID MANURE.

According to the experiments of the best German chemists, the liquid manure from the horse amounts to one and a-half tons per year, which contains nitrogen and potash worth $12.75. The cow furnishes four tons, containing $14. worth of the same elements. These figures show the importance of saving all the liquid manure possible, even if only one-half of the whole quantity be voided at the stables. If two horses and ten cows are kept, the liquid manure they would make provided it could all be saved, would be worth $165.50, or enough to buy about four tons of good phosphate. If but one-half of it is voided in the barn, and the half of that is wasted for the lack of absorbents, or washed away by rains, it would require a ton of phosphate to replace the loss.

If it will pay to build a silo for a herd of ten cows, will it not pay to build a cistern to hold the liquid manure of the same number ot animals? If dry earth or peat be used as absorbents it would require at least its own weight in the absorbent. Would it not be easier to pump out and spread forty tons of liquid, than to draw in forty tons of dry earth and draw out eighty tons thus saturated with moisture? These are practical questions for the consideration of the farmers, and worthy of their study.

If such a cistern were built, would it not pay to allow soapsuds and all waste water from the house to run into it, thus saving whatever of fertilizing value may be in them, and at the same time disposing of a material which is too often a nuisance about the house, and which, in a few years, may so saturate the ground near where the sink pipes discharge as to drain back into the well and pollute the water supply of the house? Such a dilution of the liquid from the stables would only better fit it for application to the soil.