

way to prevent ailments in live-stock, it does not always avail, and it behooves no herdsman, no matter how successful he may have been, to become boastful, for pride goeth before a fall. An experienced practitioner recalled to us the other day having a farmer come into his office and remark, "I've been farming fifteen years and never had a vet on the place."

"You have been very fortunate," was the reply. "But I want one now," was the rejoinder, and the professional man added that he did a hundred and sixty dollars worth of work for that man before he was through.

## The Great London Markets at Christmas.

(Our English correspondence.)

At Christmas time London's four great markets, Smithfield, Covent Garden, Leadenhall and Billingsgate, are centers of boundless energy, with vast supplies of seasonable eatables.

At Smithfield on the Monday preceding Christmas, a year or two ago, 4316 tons of beef, mutton, pork, veal, poultry and game entered the gate, and succeeding days were but little less in quantity. In spite of these vast supplies there was a shortage, especially in poultry, and prices ruled firm.

A visit to Smithfield in Christmas week is an education to most people. In front of the visitor as he enters are avenues of dead meat and poultry stretching in all directions. The salesmen are smartly dressed in the blue and white smocks, and all the time there is a perfect babel of hoarse cries. Scores of vans are in waiting outside the market to carry the purchasers to all parts of the vast metropolis. To and from these vans pass and repass a silent procession of strong men who carry thick slabs of slippery meat on their backs with seeming ease. There are said to be fully 10,000 men employed at Smithfield market during the Christmas rush.

At Covent Garden are veritable forests of Christmas trees of all sizes and mountains of holly and mistletoe. Huge stacks of oranges in boxes confront one, and barrels of apples seem innumerable.

If you wish to see fat geese all beribboned, the Leadenhall market will provide a feast. There seems to be no end of the avenues of geese, turkeys and fowls brought from near and far for the great London trade.

Billingsgate is rather prosaic in comparison—fish everywhere if the visitor is there early in the day, because Billingsgate does most of its business before dawn.

A wonderful sight indeed are London's gigantic markets at Christmas time, and the great provincial markets at Manchester, Leeds, Birmingham and Liverpool are worthy rivals of the London centers.

The Canadian Ministerial Order of 24th September last, prohibiting the importation of hay, straw, fodder, feed stuffs or litter accompanying horses from Great Britain has been renewed for a further period of three months from 24th December.

## THE FARM.

### Some Facts about Rain.

An inch of rainfall means 27,154 gallons of water per acre, or 113 tons per acre. The place of the greatest recorded rainfall is Cherra Punji, Assam, India, where the average is about 500 inches a year. In 1861 the rainfall there was about 905 inches. The rainfall of the whole globe, including both land and water areas, is estimated to be about 5 feet a year. In the eight great corn states in the United States an increase of one inch in the rainfall at the critical point makes an average increase in the value of the corn crop amounting to \$180,000,000. The above facts are given in the November number of the Agricultural College Extension Bulletin, published by the Ohio State University. The author of the Bulletin is J. Warren Smith, Professor of Meteorology, U. S. Weather Bureau.

### A Short Course in Road Making.

Under direction of the Roads Division of the Nova Scotia Department of Public Works and Mines, a practical course of instruction in road making is to be given at Truro, Jan. 7th to 17th, in connection with the usual short course in stock and grain judging, etc. The lectures will refer chiefly to dirt roads such as are most common in the rural districts. The classes in this subject will be arranged so as not to conflict with the classes in agriculture and horticulture, hence it will be possible for any student either to take this one course by itself or to attend the other more distinctively agricultural classes in addition.

## Fungous Diseases of Grain.

Editor, "The Farmer's Advocate":

One of the problems facing the modern farmer is the control of fungous diseases affecting grain crops. Annually thousands of dollars are lost throughout Ontario which might be saved if effective measures were employed for their extermination. These remedies while simple, can be intelligently applied only with a knowledge of the life history of the fungi.

The fungi attacking grain are microscopic organisms, the body, termed the thallus, being divided into thread-like structures, termed the mycelium, and a stalk-like fruiting portion. The former are concerned with the nutrition, and the latter with the re-production of the organism. None of the parasitic fungi of grain crops are capable of manufacturing the food substances required for their growth; they obtain this by sending mycelio into their host-plants and suck elaborated food-materials from them. Some fungi live upon the surface of the host sending suckers into the plant cells from the exterior; while others live in the interior of the host, directly within or between the cells. This distinction plays an important part in the remedial measures employed, as external applications to grain infected with fungi of the first class are quite effective, whereas in the latter case they are practically of no avail.

These organisms are re-produced by means of spores, which are minute structures produced upon the fruiting portion or by division of the mycelium. They are easily carried through the air considerable distances, and resemble in function the seeds of higher plants. Attached to the host-plant, under favorable conditions, they germinate, developing a shoot called the germ tube, which attacks the food supplies of the plant. These reproductive organs are dispersed in various ways; the wind, light drizzly rains, insects, birds, and animals proving very potent factors in their dissemination. They enter the host through the tiny openings in the leaves, through the fine root-hairs, and through injured insects, birds, and animals proving very potent enzyme that weakens the plant tissues sufficiently to give them admission.

It is not the purpose of the writer to consider in detail the life history of any of these fungi. Only such an account is given of their symptoms, life history, and treatment as may enable anyone to suggest methods of how to prevent or remedy their inroads, to determine to what extent his crops are effected, to give him a general idea of their various stages of growth. The following are those that have proven the most widespread and harmful in Ontario.

### STEM AND LEAF RUST OF CEREALS.

Symptoms.—In the summer red streaks or red spots appear upon the leaves and stems of cereals, which turn to a black color in the winter.

Life History.—The red rust is produced by thousands of spores, called summer spores, attacking the stems. During the fall these undergo change, becoming black in color, and are then termed winter spores. In the spring these produce many tiny spores, which when scattered, alight upon the barberry or some other host-plant and cause the fourth and last stage, known as the alternate-cup stage. Upon the leaves of this alternate host, cup-like structures grow, which finally burst open disseminating innumerable spores which attack the foliage of the cereals, producing the red rust or summer stage.

Remedy.—There is no effective method known of treating this disease, but it may be prevented. First of all select rust resisting strains of grain. These may be secured upon any farm by a careful selection of the largest, plumpest seeds. These are least liable to attack, and by this method a strain will be evolved in the course of time which will be more immune to the rust. Good drainage, early sowing, and the avoidance of nitrogenous manures are also very beneficial.

### LOOSE SMUT OF OATS.

Symptoms.—The entire seeds and their coverings are reduced to a mass of olive-brown powder.

Life History.—This powder consists of thousands of spores. These alight upon the sound seeds near them, particularly at threshing time, and are carried over the winter upon them. When the grain is planted in the spring these spores germinate, and send the mycelium to the interior portions of the young plant where they

follow the growing parts until fertilization takes place. They then enter the ovary, feeding upon and consuming it, until finally they divide into countless spores, producing the powder seen in the diseased spikelets of grains.

### STINKING SMUT OF WHEAT OR BUNT.

Symptoms.—The spikes of diseased plants have the glumes—the chaff—bleached and distended. The grains are shorter and plumper than normal, and when broken open are found to be filled with a dark brown powder, which has a very disagreeable odor and is greasy when moistened.

Life History.—This powder consists of spores which are distributed when the wheat is handled, chiefly at threshing time. They remain upon the seed and germinate when the wheat is sown in the spring. They grow and develop exactly as in the case of the Loose Smut of Oats.

Remedy.—The same treatment is applied to this disease and the Loose Smut of Oats. In both cases the spores winter over on the external surface of the seeds, so that both may be treated quite effectively. The best method now known is the formalin treatment which is as follows: In a 40-gallon barrel of water mix 1 pint—1 lb.—of formalin. In this immerse the grain, placed in a coarse sack, and allow to soak for 20 minutes. Then place it upon a clean floor and turn several times to dry it. If it is stored in a granary again before sowing, the floor and walls should be thoroughly disinfected with formalin solution of twice the given strength.

### THE LOOSE SMUT OF WHEAT.

Symptoms.—The kernels and glumes are reduced to a mass of dark powder, composed of spores, as in the case of the Loose Smut of Oats.

Life History.—The spores are distributed at flowering time and entering the glumes attack the ovaries. They develop germ-tubes which lie in a dormant state throughout the winter inside the seeds. In the following spring these become active when the seed is sown, and following the growing point of the plant attack and consume the ovary and glumes when these are developed, finally dividing into spores and producing the dark powder.

### THE LOOSE SMUT OF BARLEY.

The symptoms and life history of this fungus are exactly identical to the preceding one.

Remedy.—Owing to the fact that both these diseases winter over inside the kernels, it is impossible to apply any practical treatment that will not injure the seed. There is one method, called the Hot Water Treatment, but this isn't practical for use upon the average Ontario farm. For full particulars apply for bulletin 152, to the Bureau of Plant Industry, Dept. of Agriculture, Washington, U. S. A., where it may be obtained for five cents, by dropping a card.

The only preventive measure to be taken is to secure clean seed that has been grown in a neighborhood where these diseases are not active.

### CORN SMUT.

Symptoms.—Boils are developed on ears, leaves, stems or tassels. In the earlier stages these are white, polished swellings, but later become dark and finally burst, scattering great numbers of spores. The boils vary in size from walnuts to several inches in diameter.

Life History.—These spores are carried over the winter in the soil or in manure. In the spring they infect any of the young growing tissue of the plant causing the hard, polished boils.

Remedy.—1st. Remove and burn all boils. Be very sure that they are destroyed, as merely throwing them in some waste place will only tend to scatter the spores.

2nd. Avoid the application of fresh manure to land directly before a corn crop.

3rd. Practice a rotation of crops, so that the spores may be worked out of the soil before corn is again planted. The ordinary four year rotation—hay, pasture, grain, corn—has proven very satisfactory.

There are a few general preventive measures that may be profitably employed in treating all these diseases, as follows:

(1) Keep crop in healthy growing condition by liberal fertilization and proper cultivation.

(2) In every case practise a rotation of crops.

(3) Avoid sowing seed from diseased fields, and, if possible, from diseased districts.

(4) Never allow diseased crop refuse to remain in the fields or gardens, and be sure that such refuse is burned.

(5) Avoid spreading by carrying the spores on the clothing, on implements, or on grain bags; and avoid their introduction by seed grain, nursery stock, or fertilizers.

(6) Disinfect any bags, implements, granaries, etc., that have been used in handling or in storing contaminated grain. This may be accomplished with any good disinfectant, as the formalin solution already given—1 pint to 20 gallons of water. Dufferin Co., Ont.

J. MILLER.