THE FARMER'S ADVOCATE.

us to look forward to still further improvement in the art of culture, and independent of such as may be derived from mechanical principles. Theoretical chemistry seems to point out the direction in which important advances of another kind may be reasonably looked forward to. And what more important subject could engage the young mind taught in our schools than the all important subject of agricultural chemistry? The Chinese are said to be not only familiar with the relative value and efficiency of the various manures, but also to understand how to prepare and apply, without loss, that which is best fitted to stimulate and support each kind of plant.

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How few practical farmers in Canada are acquainted with what is even already known of the principles of the important art by which they live ? Trained up in ancient methods-attached generally to conservative ideas in every shapethe practical agriculturists, as a body, have always been more opposed to changes than any other large class in the community. They have been slow to believe in the superiority of any methods of culture which differed from their own, from those of their fathers, or of the district in which they live; and, even when the superiority could no longer be denied, they have been almost as slow to adopt it. But I hope the awakening spirit will soon make itself felt, and old prejudices die out, so that the noblest of callings receive that just position and recompense which so rightly belongs to it.

[TO BE CONTINUED.]

Beterinary.

Veterinary Questions.

Dear Sir,—As you offered in your first issue to answer veterinary questions, I hereby send you the following :—

1. Mare five years old, in foal, standing in stable, is badly swollen in one hind leg, a few sores about heel, but not at all bad looking.

2. Mare five years old, sweats profusely, with but slight exertion, coat pretty heavy.

3. What is cause of quivering about forequarters, say next morning after a day's work. SUBBORIDER, Mordon, Man.

1. You should have given a more extended lescription of the case, such as mentioning

Garden and Orchard. Parasitic Plants—The Farmer's

Microscopic Foes.

J. HOYES PANTON, M. A., F. G. S. (Continued from March issue.)

In this paper we shall discuss the life history of the so-called potato rot (*Phytophthora infestans*). The minute spores from which this fungus develops, reach the potato plant, usually the leaves first, but may also develop on the stem and even upon the tubers. Here they

FIGURES ILLUSTRATING THE HISTORY OF Phytophthora infestans (POTATO ROT.)



dead appearance. A close examination of the potatoes at this period with the microscope will show innumerable slender stems growing up through openings (stomata) on the surface of the leaves of the affected plants. These are the fruit-bearing parts of the fungus; they branch, and in some respects resemble trees in miniature, bearing upon their branches pear-shaped bodies (conidia) from which the fungus is developed, These are produced by millions when the conditions are favorable, such as moisture and heat. When ripe they separate from the stem, and being very light pass into the atmosphere, where they are wafted about, many of them finally reaching the ground or settling upon plants. If considerable moisture and heat be present the contents of a conidium undergo a change, the mass breaks up into several portions, the pear-shaped body (conidium) bursts and the little clumps develop upon them a couple of tail-like structures. These peculiar bodies (Zoospores) are able to move about, but only in the presence of water, hence the need of a large amount of moisture for the propagation of this fungus. From this tiny form of spore as soon as it reaches a suitable place, the vegetative part (mycelium) of the fungus will develop among the tissues of the plant, between the cells, and in time again give rise to the tiny tree-like structures, which make their appearance through pores in the leaves. This form of reproduction (asexual) in the plant is very rapid, and seems to be followed during the summer months. But there is another form followed later in the season, the object of which seems to be to carry the trouble into another year. This takes place among the thread-like structures (hyphæ) in the tissues of the plant (host) and gives rise to the so-called resting spores, which serve to keep the species over certain periods, while the spores already considered are produced rapidly so as to hasten the spread of the fungus under favorable conditions.

tops presenting a blotched, brownish, spotted,

In this form of reproduction (sexual) a roundlike structure (Oogonium) developes, and at its side another organ (Antheridium) arises; the elements of the latter intermingle with those of the former and the result is fertilization takes place and an Oospore (the resting spore) is produced. This remains until another season, when it gives rise to the fungus, which, during the summer season, is developed more rapidly by other spores (Zoo pores) already described. is maintained by others. There is no doubt but that it has been discovered in some species closely allied to the potato rot, and by some it is asserted that it has been discovered here as well. In Phytophthora infestans we have a plant of a very low order indeed, incapable of preparing food from the mineral kingdom, but growing upon other plants, feeding upon their juices and eventually destroying them. A wet season supplies conditions well adapted for its growth, and hence we find the "rot" associated with such weather. There is no doubt that many spores are always present, but are prevented from being a source of trouble because the weather is not suitable for their development It has been maintained that the thread like structure of the fungus is sometimes perennial and hardy, and that from fragments of it new fungi may arise. Remedies :- The " rot " usually appears in the early part of August, and if the weather is favor-able its spread is very rapid. Hence it is important to examine the plants about that time for the appearance of the brownish spots on the leaves that indicate its attack.

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whether the mare is in high, middling, or low condition, and whether the swelling of the leg occurred suddenly, or appeared gradually. A mare being in foal often makes the successful treatment of such cases somewhat difficult. Give, in a small bran mash morning and evening for one week, hyposulphite of soda half an ounce. Use following lotion by hand, rubbing it well into the leg (downward) morning and evening, acetate of lead two ounces, tincture of arnica four ounces, alcohol four ounces, fluid extract belladonna one ounce, water sufficient to make one quart. Apply flannel bandage firmly after each rubbing. Give moderate walking exercise every day.

2. Debilitated system, perhaps from insufficient or unwholesome food, torpid liver, worms, etc. Give morning and evening, ferri sulphate one drachm, soda bicarbonate one drachm, potash nitrate one drachm, gentian pulv. one drachm. Give in the morning in good sound oats, and at night in a well scalded bran mash. Continue treatment for one week. Give regular, but not heavy, work.

3. Muscular weakness-system needs toning up. Give as per directions in No. 2.



I. Fruit bearing structure with conidia upon it. 2. Conidium preaking up.

. Contents of conidium passing out.

Zoospores capable of moving about.
Zoospores, having dropped the tails, beginning

to grow. 6. a Oogonium, b Antheridium, the process of fertilization.

7. Vegetative part of the fungus growing between cells, into which the haustoria have penetrated.

germinate and penetrate the tissues, working their way between the cells, from which they extract nourishment by means of little structures (haustoria) growing into the cells. In the course of time the tissue of the affected part becomes permeated by a mass of colorless thread-like structures (hyphæ), the whole spoken of as the vegetative part of the fungus and named the *mycelium*. Consequently, in a short time the plant weakens, and shows where it is affected by the

1. As soon as discovered dig the potatoes, or the disease will soon reach the tubers.

2. Grow early varieties.

mycetum. Consequently, in a short time the plant weakens, and shows where it is affected by the parts dying. This is indicated by the