SCIENCE

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RECENT WORK ON PLANT DISEASES BY THE DEPARTMENT OF AGRICULTURE.

FARMERS' BULLETIN No. 5, on "Treatment of Smuts of Oats and Wheat," is in press and will shortly be issued by the Department of Agriculture. It has been written by W. T. Swingle, a special agent of the Division of Vegetable Pathology, who has studied the subject for three or four years past. After describing the loose smut of oats and the stinking smuts of wheat, there is given a statement of the loss resulting from the diseases. That from the former is estimated at from 5 to 10 per cent of the crop, but from the latter as much as 40 to 50 per cent. The author calculates that if the oats had been treated as now recommended, there would have been saved to the country between 1880 and 1890 over $162,000,000.

The treatment, however, now used to prevent smut was only discovered in 1887, and it is known as the Jensen hot-water treatment. The process given is to immerse the seed to be treated, placed previously in a wire-netted receptacle or some other perforated vessel so that the water percolates freely, in a kettle of water at a temperature of 110° F., until all the grains are thoroughly wetted. Then plunge them into a second vessel, with the water heated to 132½°, for fifteen minutes, dipping up and down and twirling around so that the hot water comes into contact with all the grains. They are then taken out and dried thoroughly if not sown immediately, but only partially dried if the grain is not to be kept. The treatment for wheat is similar, but the water should be heated to a temperature of 143½°, and the seed immersed only five minutes.

Potassium sulphide, in the proportions of 1 pound to 24 gallons of water, in which the oats are soaked for 24 hours, is also recommended. If made of double strength, an immersion of 12 hours will be sufficient. For wheat a solution of 1 pound of copper sulphate to 24 gallons of water, soaking 12 hours, and then leaving for 5 or 10 minutes in lime-water made by slaking 1 pound of lime in 10 gallons of water, is considered beneficial in preventing stinking smut of wheat.

This bulletin is directly in the line of work now being actively pursued by the Department of Agriculture, and especially by the Division of Vegetable Pathology. It is the business of this division to investigate the diseases of plants due to fungi, and the work of the past year has been of such a practical character, that in the treatment of one disease alone, black-rot of the grape, it is calculated to have saved grape-growers between $75,000 and $100,000, or about four times the total amount of the annual appropriation for the whole division. When this is remembered, and it is known that many other diseases, such as pear leaf-bright, apple scab, potato rot and blight, powdery mildew of the grape and apple, celery blight, etc., have been studied, and remedies or preventives suggested, the valuable character of the work of the division will be readily seen.

During 1891 experiments were conducted on an extensive scale in western New York in the treatment of nursery stock, several million trees having been treated with success in preventing the attacks of fungi. The practical character of the work of the division is further shown in its action during the "grape scare" in New York City. Last fall the Board of Health of the city seized a small consignment of grapes that had been sprayed with a solution containing a small amount of copper. This solution, known as Bordeaux mixture, had been found effectual in preventing black-rot, and had been extensively used. When the graves were seized, exaggerated reports of the bad effects resulting from the use of sprayed fruit were telegraphed far and wide, and the grape market was demoralized. As soon as the situation became known in Washington, the chief of the division was sent to New York, and by explaining to the Board of Health the harmlessness of the small amount of copper that properly sprayed grapes received, he allayed the excitement and the market was restored to its previous condition. There is no doubt but that this prompt action saved thousands of dollars to the vineyardists of New York and other States. The amount of copper which the sprayed grapes contain has been shown to be less than that normally present in many of the articles of ordinary diet.

Besides the bulletin mentioned in the first part of this article there is ready for the press a report on the virulent vine disease of California, which, appearing near Anaheim about 1884 or 1885, has caused widespread destruction of vines in that vicinity. The causes and cure or prevention of this disease are at present unknown, but are being diligently studied with the hope of finding some remedy. There is also in preparation a report upon the work done by the division during the past year, and this will be issued as soon as circumstances permit. Finally, a new number of the *Journal of Mycology* will be issued soon, which will contain valuable and interesting matter. One article is upon an Almond Disease in California, caused by a fungus attacking the leaves and making them drop prematurely. This article is illustrated by four plates, and is followed by a statement of how to prevent the attack of the fungus. Another article is on Club-Root, a disease caused by a fungus which attacks the roots of cabbages, turnips, etc. This is also illustrated. Other articles deal with descriptions of new species, or notes upon old ones. An important portion of the number will be the "Index to Literature." This covers the whole subject of diseases of plants, and embraces the literature of the entire world. It is the intention to give a brief notice or abstract of the contents of each paper. These notices are arranged under subjects, so that it will be possible for one interested in any special subject to find the articles treating of that subject without wading through the entire index. There will be over three hundred articles indexed in this single index, and an earnest endeavor will be made to have it as complete as possible.

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