

able enlargement of the superficial groups of lymphatic glands (supra-mammary excluded), and only some six or seven cows were in such poor condition as to be open on that ground to suspicion of tuberculosis. About fifty cows were the subjects of inflammation of the udder, or gave evidence of having suffered from that some time previously. In the majority of these cases, the history and the physical characters of the inflamed gland were regarded as sufficient to indicate that the disease was not tuberculosis. The small proportion of cases discovered in this inspection cannot, however, be accepted as evidence that these cows were healthy; but having regard to the 20 per cent. of tuberculosis found (as above mentioned) in the Edinburgh dairies when the extensive slaughter for pleuro-pneumonia was made, it merely testifies to the inefficiency of clinical examination in discovering tuberculosis in its early stages.

Although not absolutely certain, tuberculin presents the most successful method of diagnosing tuberculosis in its early stages in cattle. Somewhat varying opinions as to its value are expressed by continental experimenters. Professor M'Fadyen obtained permission to try its effects on seventy-five animals, chiefly cows, most of them having been condemned for slaughter in 1891-92 on account of having been in contact with pleuro-pneumonia. Only in three or four of these animals, it is stated, could any known physical, clinical, or bacteriological examination have detected tuberculosis. The temperature was taken morning and evening, and on the subsequent day, when doses of .25 to .33 centimeters of tuberculin were injected, and the animals were killed next day, or shortly thereafter, and the carcasses carefully examined. Taking a rise of temperature from the normal to 103° or over as evidence of tuberculosis, the tuberculin gave a right indication in fifty-one, and a wrong in twenty-four cases. The Professor thus states his conclusions:—"I have no hesitation in saying that, taking full account of its imperfections, tuberculin is the most valuable means of diagnosis in tuberculosis that we possess. The discovery of tubercle bacilli is, of course, the only means of arriving at a positively certain diagnosis; but that means, for reasons already set forth, has an exceedingly restricted sphere of application in veterinary practice. Without tuberculin, even the sharpest and most experienced practitioner is powerless to detect tuberculosis in its early stages; but it will find it possible to detect the majority of cases, even when the lesions are very slight. It is probable that by using the tuberculin test twice, with an interval of some days between the injections, the proportion of errors in diagnosis would be very small."

"Intimately connected with the diagnosis of tuberculosis is the danger of infection through ordinary milk, concerning which the Journal presents a contribution by Veterinary Surgeon St. Friis, Copenhagen. He states that it is firmly established that the milk of cows affected with udder tuberculosis must in all cases be considered infectious, since it always contains tubercle bacilli. It has further been found that not only is the milk infectious in the tuberculous quarter of an udder, but also the milk from the apparently healthy quarters of a cow affected with mammary tuberculosis may contain tubercle bacilli. Lastly, it has been certainly proved by a number of cases that the milk of cows suffering from a more or less advanced tuberculosis may be infectious, but to a much smaller degree."

"In order to determine whether the ordinary milk of Copenhagen was affected with tubercle, samples were bought several times a week from retail dealers. Five to ten centimeters from forty-six samples, yielded from forty-four herds, comprising ten to eighty cows, were inoculated into the peritoneum of eighty-four rabbits and four guinea pigs. Before reaching the Professor's laboratory, some samples had been contaminated with septic bacteria from the hands of the milkers or imperfectly cleansed vessels, and fatal septicæmia killed thirty-seven of the rabbits and the four guinea pigs in two to four days. Such milk might not have been injurious when swallowed, but septic bacteria are not a very safe addition to the food, especially of infants. The forty-seven surviving rabbits were killed in forty-two to fifty-four days, and six of them inoculated with four of the samples of milk showed characteristic tuberculosis lesions. The four herds which yielded the impugned milk were forthwith examined, and in all were found one or more animals exhibiting unmistakable tuberculosis. The worst cases, moreover, were discovered in those herds which had furnished the milk producing in the rabbits the most extensive lesions and the most numerous tubercle bacilli. St. Friis urges that this inoculation of rabbits, which for such experiments he prefers to guinea pigs, should be adopted by owners or sanitary authorities, as a means of testing the freedom of milk from tuberculous infection. By subdividing the herd into lots of three or four, and testing the mixed milk, the process would be simplified, for such dilution does not seriously impair the action of the bacilli. The milk of any suspected subject would be inoculated separately. In the event of the disease being thus detected, affected animals should be summarily got rid of, the premises cleansed and disinfected, the herd at intervals of ten to fourteen days professionally examined, and the rabbit inoculation test repeated."

Experimenting with Saline Soils.

Prof. Shutt, chemist of the Central Experimental Farm, has favored us with copy of his evidence before the Select Standing Committee of the House of Commons on Agriculture, including photographic plates illustrating the experiments made in treating so-called alkali soils of Manitoba and the Northwest. We reproduce the following interesting notes:—

With these few words of introduction, I shall now proceed to give you an outline of some of the more important features of our work and results that have been obtained in the laboratories during the past year. I wish first to draw your attention to some experiments that I have made with regard to the improvement or amelioration of certain alkaline soils in the Northwest Territories and Manitoba. It was on a previous occasion that I said we had commenced these experiments, and they are still in progress, but we have, however, reached a stage in which I can speak definitely with regard to the results. My attention was first called to the question of so-called alkali in the soil of certain districts in the Northwest Territories, by the fact that analysis of waters from these areas showed a very large proportion of mineral matter of a peculiar character. These waters were rich in saline matter, which consisted chiefly of sulphate of magnesium or Epsom salts. The next step was the analysis of samples of soil supposed to be barren, and supposed to be saturated with alkali, that had been forwarded to us for examination from these districts. I found that the chief ingredient or rather impurity in the majority of these soils, as in the case of the waters already mentioned, was Epsom salts. The analysis of the water had indicated correctly the character of the soil.

It then occurred to me that most probably the barrenness of the soil was due to the presence of Epsom salts in large quantities, and not from true alkali, that is to say, the carbonate of soda or sulphate of soda, as is very often the case in California and some others of the western states. Further analysis of these soils show this to be the case. Several of the soils manifested an almost entire absence of salts of soda or true alkali, but at the same time the examination proved the presence of considerable quantities of Epsom salts.

I then instituted some experiments with ordinary potting soil, adding to it certain percentages of Epsom salts, and I found the effect on vegetation (wheat, corn and pease) were used in the experiments) was extremely disastrous. I came to the conclusion then that there were probably certain districts in the Northwest Territories in which the soil was rendered barren to a greater or less degree by supersaturation with sulphate of magnesium or Epsom salts. The problem of counteracting the effect of this Epsom salts that crops might be grown on the land economically then presented itself to me. In the endeavor to solve it a number of what we call "pot" experiments was inaugurated. It occurred to me that the addition of calcium carbonate, or chalk, in other words, would be effective to that end; that there would be a chemical reaction between the Epsom salts and the chalk, which would finally result in the production of insoluble magnesium carbonate and gypsum or sulphate of lime, which as we know is not deleterious to vegetation. These experiments were carried on with wheat, pease and corn, since these plants represent some of our more important farm crops. Very accurate records were taken of the germination and the extent of growth of the plants under these conditions, and at certain intervals photographs were taken. I wish to show you, in the first place, the photographs of the experiments, in which are depicted the results of adding carbonate of lime, or ordinary chalk or marl, to the soil already impregnated with Epsom salts. The amount of magnesium sulphate added to the soil amounted to 5 per cent., and to such soil in one pot sufficient carbonate of lime was added to theoretically cause the final decomposition of the whole of this magnesium sulphate. The photographs were taken at an interval of some weeks after the germination of the seed, and represent the relative growth of the plants of the same age in the different soils.

THE EFFECT OF CARBONATE OF LIME.

In pot No. 1, which appears in the centre of the photograph, we have wheat grown in ordinary potting soil. To this soil no chemical had been added. It may therefore be considered as the standard of the growth.

In pot No. 2, the same number of seeds were sown, but to its soil was added and intimately mixed 5 per cent. of Epsom salts.

In pot No. 3, there were planted also the same number of seeds, and to the soil 5 per cent. of Epsom salts was added, plus an amount of carbonate of lime sufficient to neutralize or cause the decomposition of the Epsom salts. Though the growth in pot 3 does not equal by any means that in No. 1, it is patent at once from the photographs that, comparing Nos. 2 and 3, the carbonate of lime has had a beneficial effect in neutralizing or overcoming the deleterious action of the Epsom salts on vegetation.

Now, with regard to pease. In the photograph No. 4, we see the pease growing in the ordinary potting soil. To the soil in pot No. 5 was added a quantity (5 per cent.) of Epsom salts; while in pot No. 6 we have the ordinary potting soil, plus the

Epsom salts and the carbonate of lime in the quantities already mentioned. The effect of the sulphate of magnesium on the pease has been more disastrous than in the case of wheat. When these photographs were taken there was no sign at all of the pease in the earth mixed with the Epsom salts, *per se*. However, in the soil to which the carbonate of lime had been added to counteract the magnesium sulphate the plants have made a very successful effort to grow, and we see that although they do not equal in luxuriance the growth of the pease in the ordinary potting soil, yet they have made a very fair attempt towards that end. In the case of the corn we have exactly the same arrangement, and much the same result. The centre pot (No. 7) shows corn growing in good potting soil. Pot No. 8 shows a very diminutive plant, the result of the action of the magnesium sulphate or Epsom salts; in pot No. 9, we see by increased growth the beneficial action of the carbonate of lime when added to the soil containing the Epsom salts.

THE EFFECT OF LIME.

These experiments, while pointing to a certain line of work for the future, were not entirely satisfactory to me—the beneficial results were not sufficiently marked. On thinking the matter over, therefore, I deemed it well to try another series of experiments. I need not here go into the chemistry of the question to the committee, but I came to the conclusion that better results would possibly be obtained by using lime rather than carbonate of lime. As a result the magnesium sulphate would be converted into magnesia and gypsum. I will now show the committee photographs taken of pots in which the experiments were conducted on these lines, namely, by substituting lime for the calcium carbonate or marl. The first photograph gives the results with wheat. Pot No. 1 shows the wheat plants growing in good soil. Pot No. 8 we have the wheat growing in the same soil, to which has been added 5 per cent. of Epsom salts. In pot No. 2, we have the wheat growing in the soil to which has been added 5 per cent. of Epsom salts, plus sufficient lime to theoretically neutralize the effect of the magnesium sulphate or Epsom salts. The highly beneficial effect of the lime upon that soil will at once be perceived. The committee will notice also that this beneficial effect has been very much greater than where the carbonate of lime was used.

Q. Have you made an estimate of the probable cost per acre of reclaiming the alkaline lands of the Northwest Territories in this manner?—A. No. I should require to know the cost of lime in the particular district. I simply bring this before the committee now to show you the stage the experiments have reached.

Mr. W. S. Hawkshaw's Shropshires.

One of our staff visited the flock of Mr. W. S. Hawkshaw, Glanworth, Ont., and was shown an exceedingly fine flock of Shropshires, consisting of one hundred and twenty yearling ewes, all of which are in lamb. Fifty were sired in England, the remainder are in lamb by the imported stock ram now on the farm, which is a sheep of excellent quality both in carcass and fleece. The entire flock, both rams and ewes, are imported, selected in person by Mr. Hawkshaw from the best English flocks, the majority being descended from the flocks of Bowen Jones, T. S. Minton, Wm. Mansell, Wm. Thomas, and Mr. Harding. The fifty ewes which were served in England are in lamb to a sheep bred by Mr. J. Bowen Jones. He is closely related to the ram which Mr. Thomas paid Mr. Jones \$1,000 for, and is of equal quality, both of fleece and form, but is not as large. The ewes, all yearlings, are a splendid lot, their average weight being over 150 lbs., not at all in high condition. Their constitution and form are excellent, and they are well covered with fleece of good quality. They are very even throughout, no poor ones among them. They are due to lamb in March, which will insure an excellent development of young stock for the summer and autumn trade. There are no grade sheep on the farm; in fact all are imported Shropshires of superior quality.

Mr. Hawkshaw's sales last year were very heavy. All his ewe lambs are sold, and he is only wintering three ram lambs. During the last three years he has imported nearly three hundred sheep, and has made it a rule never to buy a poor one. The latest importation, which was made last autumn, consists of one hundred and fifty, all ewes but one, not a single cull among them.

Mr. Hawkshaw is a capital judge and a good buyer. We know he is an honorable, capable man, and bespeak for him liberal patronage, for we know he will deal fairly with all who buy from him.

A Profitable Crop.

Mr. John McMillan, Weston, Ont., sold George Keith, Esq., Toronto, \$1,365 worth of Alsike clover seed, and retained seven bushels for his own use, making a total value of \$1,420 from a crop of thirty-two acres. The total export from Toronto this season up to date has been about twelve thousand bags, an average of about \$30.00 per bag, making a total of about \$360,000. Mr. Keith's sales have been principally in Great Britain and Germany.