

Soil Inoculation.

Few changes go on in organic substances in this scientific age that are not inquired into with a view to the discovering of the specific microbe depended upon for the transformation. It is now known that the practical application of the principle of inoculation of bacterial life to the soil is a profitable line of action. The breeds or species recommended for introduction to the soil are identical with the forms found in connection with the tubercles within the roots of leguminous plants, giving those crops their special value as soil-enrichers.

The British agricultural scientist, Prof. C. M. Aikman, deals with the subject in a recent issue of the *Scottish Farmer*. He refers to the discovery made by Hellriegel and Wilfarth with regard to the presence of nitrogen-fixing bacteria on the root nodules of leguminous plants in 1886. The following year the pot experiments first carried out were made by applying quantities of soil extract to pots containing leguminous crops and noting the influence which such soil extracts had on the growth of the plant and on the development of nodules. It was soon found that all soils are not equally suitable for inoculating leguminous plants in this way, and, moreover, that under exactly the same circumstances some plants grew better than others. The inference to be derived from this was that there existed a variety of nitrogen-fixing bacteria. The difference between the leguminous plants in this respect, however, was found to be considerable. The bacteria useful for peas was also useful for vetches, but not for the various varieties of clover. To Dr. Nobbe, of Saxony, we believe, belongs the credit of applying the discovery to practical farming.

The net results of these experiments amounted to this: that many soils are so poor in nitrogen-fixing bacteria that leguminous crops will not grow upon them in the absence of proper nitrogenous manure, but that when such soils are inoculated with soil extract, or with soil itself from fields which have been proved to be capable of producing luxuriant growth of leguminous crops, satisfactory growth takes place.

The specific cultures are now made on a wholesale scale by the great German firm of Meister, Lucius & Bruning, who have already undertaken the manufacture of the anti-toxic serum for the treatment of diphtheria. Of nitrogen some seventeen different kinds are prepared, so that the cultures specially suited for each of the more commonly grown leguminous crops can be prepared. The special value of this mode of inoculating soils as contrasted with the older one of inoculating with other soil or soil extracts is that it is much more convenient and very much less cumbersome. It avoids the risk, which is not inseparable from the other method, of imparting organisms which may exert a distinctly unfavorable action on plant growth. The mode in which inoculation is effected with nitrogen is either by making a watery solution of the pure culture and then immersing the seed to be sown in it and thus inoculating the seed, or by inoculating in a similar manner fine sand and distributing this over the field and working it into the soil. The cost at present of such an inoculation is only 5s. per acre. Thus from the economic point of view it has much to recommend it.

It is too early yet to pronounce an opinion as to the full import of this latest discovery in agricultural science. So far, however, as can be at present predicted, it seems to be one of the most important advances made for many years. While it is being thoroughly tested experimentally, we counsel all readers of the *ADVOCATE* not to relinquish their faith and practice in the application of old-time fertilizing materials and clover-growing. When the utility of the new method has been demonstrated we may then start manuring our fields with a seeder or a spraying apparatus.

Mons. Leon Joue, special Professor of Agriculture at Reole (Gironde), gives the following new method for combating mildew: Take about 4 lbs. of oak bark, or 22 lbs. of the bark of the pine tree of Landes, and break it up into large pieces, and put it into 11 gals. of water. Boil up the liquid, and leave it for a short time; then add to it the following mixture: 2½ lbs. of sulphate of copper to from 1½ to 2 qts. of water, and well shake it in order to mix perfectly. When it is wanted for use, about another 11 gals. of water should be added.

The South American Demand for Shorthorns.

To the Editor FARMER'S ADVOCATE:

SIR,—I am glad to see you are watching the interests of the stock-breeder, and in one of your late issues called attention to the continued demand of South American breeders for England's best Shorthorn bulls; but the strange freak is that they now are invading foreign countries and carrying off the plums. France has had the benefit of this raid, and the best offerings were none too good, and where such suited price appeared no object. English agricultural papers are full of items of sales, and special note is made of the fact that they will have the very best. Neither age or color stands in the way, for heavy four-year-old show bulls have been purchased, as well as white ones, one of the latter commanding nearly \$1,000, and a light roan made \$5,000. The Shorthorn Society issued export certificates (from June 2nd to July 27th) for South America, 237; for Sweden, 3.

So great has been the demand that one of England's most observant writers bewails the loss of the best young bulls, looking forward to the probability of poor classes at the next season's shows, as well as the direct loss the country sustains in being despoiled of what would in the natural course of events be the leading sires.

I have written before, "Why can't we get a portion of that trade?" We have cattle suitable as far as quality is concerned, the records at the Columbian clearly proving such; moreover, our cattle are raised in a drier climate, much more like their own, and the food is similar—all in our favor. If we can't get a portion of this trade let us know, and for what reason? Commissioners have been appointed to Australia—cannot one be sent to Argentina to inquire into this matter? I leave it with you to agitate this question. Since I first mooted it at the Shorthorn Breeders' meeting many have been found to advocate "doing something," but no feasible scheme has as yet been hatched.

[NOTE.—So far as we are aware, there are no boats loading from any Canadian ports for the Argentine Republic, but steamers run regularly from New York, and some shipments of U. S. bred sheep, at least, have been going forward. One line (the Norton) quotes on cattle a rate of \$50 per head and ten per cent. primage, the shipper to provide fittings, fodder, and attendance, one man being carried free for six head or more. The rate on sheep is \$12 per head and ten per cent. primage. Unless Canadian bulls were allowed to reach New York harbor in bond for shipment, so avoiding the 90-day quarantine, we do not see at present that much can be done in that direction. England doing a large trade both ways with Argentina, the breeders there are much more favorably circumstanced.—EDITOR.]

The Inspection of Australian Exports.

The Bill introduced by the Minister of Agriculture (Victoria) to provide for Government inspection of all live stock, meat, dairy produce, and fruit intended for export does not interfere with the intercolonial trade. Power is taken to appoint Government inspectors and to provide for the establishment of cool stores, where dairy produce and meat will be kept pending inspection and shipment, fruit being examined on the pier before being placed on board the steamer. The Minister is also empowered, with the consent of the Governor-in-Council, to declare certain stores, such as the freezing works at Flinders street, Newport, Geelong, and Portland, to be "cool stores" within the meaning of the Act for the purpose of facilitating inspection and shipment of the meat and dairy produce stored in them. All meat or dairy produce intended for export must pass through a "declared" store, as this course is necessary in order to secure Government supervision. No live stock will be allowed to be shipped abroad until a certificate has been obtained from the Government inspector that the beasts are free from disease. Meat cannot be exported until the inspector has given a certificate that it is sound. The inspector is empowered to reject any unsound butter, cheese or fruit, and to open any cask, keg, box or parcel to take samples. All butter for export has to be forwarded to the cool stores at least four days prior to shipment to enable it to be examined and cooled or frozen. The port of shipment shall be Melbourne and such other ports as the Governor-in-Council may declare from time to time. Provision is made for grading butter according to its quality, into "choice factory," "choice dairy," "second grade," and "milled" or "mixed." Every person who mills or mixes butter is to put a distinctive brand on the boxes, so as to indicate that the butter is mixed. This is to be done before it leaves his premises. The aeration of milk intended for buttermaking is made compulsory, this provision being inserted to give effect to the recommendation of the Perishable Products Committee. All brands and marks are to be registered, and a penalty will be imposed on anyone using a brand which is not registered. The Governor-in-Council is authorized to make regulations to require vessels carrying live stock to provide food, proper accommodation, and water for the animals during the voyage, and to recover penalties from persons exporting in contravention of the Act or obstructing the inspector.

The Outlook for the Ontario Farmer.

[From a Farmers' Institute paper by Thos. Mason.]

After one of the most trying seasons (1895) that Ontario agriculture has ever been subjected to, it is a difficult thing to try to speak of the farming outlook in Ontario in a very optimistic strain. Still, if we will look carefully at our position, study the causes of financial depression and the inevitable revulsion that always follows, as surely as day follows night, it will be seen that we have good cause for hopefulness; that we are almost through the stretch of hard times, and are rapidly nearing the point where better times begin. We have had in the past, periods of great prosperity, due to our fertile soil, healthy climate for man and beast, unequalled water communication, giving cheap transportation before the development of railways; the best cereal land on the North American Continent, giving the largest yield per acre, and the finest quality of wheat, peas, barley, and oats. We have also one of the most hardy, industrious, vigorous, and economical populations on the Continent. Then, too, our freedom from wars and military expenditure has conduced to our prosperity, while we have had the benefit of supplying the waste caused by the wars of other countries. The civil war in the United States, and the construction period following for years after the war, made an immense market for Ontario produce at remunerative prices. The last few years has witnessed a great change. There have been no great wars, while there has been an immense production in the development in the production of cereals in different parts of the world, owing to the opening up of new regions and the cheapening of transportation. Russia, India, the Argentine Republic, Chili, Australia, the United States, and our own Northwest have all wonderfully increased their exports, and it seems that the limit of expansion has not yet been reached. Now, bear in mind these facts. It would seem that, under ordinary conditions, so far as the grain trade is concerned we have reached a permanent lower level of prices. There will be fluctuations, and a great war or a great failure of crops would see a temporary return of old prices and a greater reaction after the cause had been removed.

After a reference to the cattle and cheese trade, Mr. Mason goes on to say: The sheep trade is in a healthy condition, the prospects being brighter than for three years past. The number of sheep on this Continent has been reduced 4,000,000 since the spring of 1893. For some years previous to 1893 we had good prices for sheep and lambs; as a consequence the stocks were increased. In 1893, when the Mills Bill was before Congress, it was proposed to put wool on the free list. The United States is a great wool-importing country, and wool-growers thought that their business would be ruined. There was a panic and a stampede to get out of the business. All through the West flocks were sacrificed at ridiculously low figures, in some cases as low as 50 cents and \$1 per head. When at Chicago in the fall of 1893, going through the Stock Yards, I found the pens crowded with breeding ewes that were being forced on the market at any price. The receipts at the great receiving points in the West—Chicago, Omaha, St. Louis, and Kansas City—for the four years previous to 1893 averaged 2,800,000 annually. In 1893 they increased to 3,800,000, and the movement has continued till the receipts for 1895 are the largest on record—over 4,300,000 head.

In Ontario we are largely following the lead of our American friends, our exports to Great Britain having increased from 5,000 to 10,000 annually to 217,000 in 1895, and these are largely the pick of the young breeding ewes of the country. As a consequence there is sure to be a shortage in sheep and lambs in the near future.

As to the horse trade, I know it requires a good deal of courage to say anything cheerful in regard to it, but I believe that there will be a great scarcity of horses in Ontario before two years are over. According to the returns of the Bureau of Industry in 1892, when the business was comparatively prosperous, we had in Ontario some 688,000 horses, of which number 220,000 were three years and younger, giving an annual production of more than 70,000. In 1894 the numbers were reduced to 674,000, 190,000 of which were young horses. After making careful inquiry in a good many sections of Ontario, I do not believe that we are raising more than 20 per cent. of the number raised in 1892. If that estimate be correct, we are producing about 14,000 horses annually. On the other hand, owing to the low prices of horses and the scarcity of feed, we have had more horses sacrificed, that under ordinary conditions would have given years of useful service on the farm, than ever before in the history of the country. Then, too, we have this year exported to Great Britain some 13,105 head. I do not know the number to the United States, but it is several hundred heads—enough to practically bring the number up to the old figures when the trade was prosperous. I do not wish to advocate that every farmer should go into horse breeding, but I do wish that every farmer would examine these figures carefully and draw his own conclusions. But you may say, "I can go out and buy horses for half what it costs me to raise them." So you can to-day, but if we do not raise any young horses, how will we replace the horses that are being worn out on our farms. I believe that by that time we will find horses dear, and I think that every farmer should take steps to replace his farm teams by the time his old ones are unfit for use.