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The Field.

The Potato Disease—Experience of Scotland.

The Royal Agricultural Society of England has been instituting an inquiry into the cultivation of the potato, with special reference to the disease. For this purpose, a schedule of questions was issued to various growers in England, Scotland and Ireland, by Mr. Jenkins, F. G. S., the secretary of the Society, and that gentleman's report has just appeared. The results of experience have been sought for in the North of Scotland, and replies from Lieut.-Col. Ogilvy, describing the experience of Mr. James McGregor, tenant of the farm of Carmichael's, Longforgan, Perthshire, and from Mr. T. Yool, Coulard Bank, Elgin, have been received.

Mr. McGregor has grown about 25 acres of potatoes annually, at an interval of five, six or seven years from the last potato crop on the same land, according as the seeds in the following course have been left for one, two or three years:—Oats after grass, potatoes, wheat, turnips, barley and seeds left for one or more years as just stated. Mr. Yool grows annually from 100 to 110 acres of potatoes, at an interval of six or seven years, the course being on clay loams, the same as that given above, the seeds being left one year only; on the lighter loams the seeds are left two years, and followed by oats, then potatoes, etc., and on the lightest land potatoes hollow the second year seeds, oats being omitted from the rotation.

At Millhill farm, Col. Ogilvy grew, from *diseased* uncut seed, in a drill 110 yards in length, manured with farmyard dung at the rate of 12 tons to the imperial acre, 342 lbs., of which 107 were diseased; with *sound* seed, grown under similar conditions, 413 lbs. were got, of which 146 lbs. were diseased, from which it would appear there was a larger proportion of diseased potatoes from the sound seed than from the unsound. Mr. James Skirving, of Luffness, Mains, Drem, in the Lothians, sums up his experience as follows:—It is his firm belief that until we can control the elements we must just fight the disease as experience suggests. His experience leads him to adopt the following rules:—1, Don't manure excessively; 2, change your seed every second year at least; 3, what are early lifted, sell at once; 4, those for late sale allow to reach full maturity before they are raised, and never touch them after being stored until they are dressed for sale.

The replies of the Lothian growers are generally in harmony with those rules, but Mr. S. D. Shirreff, of Saltcoates, Drem, as to Mr. J. Skirvings rule 1, favors heavy manuring, thus:—He says farmers had better limit their acreage of potatoes if they cannot apply as much as 30 tons of farmyard manure, 4 cwt. of guano, 3 cwt. of mineral phosphate, and 1 cwt. of potash per acre, besides a top-dressing of 1 cwt. of nitrate of soda, and 2 cwts. of phosphates before earthing up. The prevailing opinion, however, is that high manuring renders the potato crop more liable to disease. In the south-west of Scotland the rotation consists of oats after lea, then potatoes, followed by wheat sown out with seeds, which remain one or two years. As to manure, Mr. G. Richmond, of Scotstown, Mains, Patrick, Glasgow, last year used no artificial manure, and had less disease. Large sized setts are most in favor. On the whole, the Scotch growers appear to be no nearer a solution of the phenomenon than their English brethren. Mr. Myatt, of Offenham, Evesham, Worcestershire, and Mr. Knowles, of East Plain, Cark-in-Cartinel, Lancashire, have experienced singular immunity from the disease, although the circumstances of soil, locality, and climate are different, and the details of cultivation are also dissimilar, excepting in the particular that both drill 36 inches apart.

Mr. Jenkins, in concluding his interesting report, after narrating the rotation of crops, says.—"The question suggests itself—Is it possible that the preceding crop, whether clover, wheat or oats, or roots, beans, peas, &c., can produce any effect, whether prejudicial or beneficial, on the succeeding potato crop, as regards the potato disease? And if it can produce any effect, in what manner is it done, and what is the *rationale* of the process? There are some indications that the first question may eventually be answered in the affirmative; and although at present they are slight, I am very hopeful that they point in the right direction." Assuming that the potato fungus may find a home on clover and straw, and, under a combination of circumstances favorable to its development, may even germinate there; or if it be that the potato fungus has two stages of existence, one of which it passes on the potato plant and the other on clover or straw—then, says Mr. Jenkins, in either case it will be seen at once that the systems of cultivation of the potato which are dominant in the United Kingdom appear almost designed to produce the *maximum* amount of injury to the crops; but this is mere assumption, for it must be frankly "admitted that at present we have no proof of the identity" of the potato fungus, the clover fungus, and the straw fungus, the one with the other.

Many growers attach great importance to early planting as a remedial measure. Much stress is also laid on the importance of effectually earthing up the plants, with a sharp ridge close to the haulm. It is also generally admitted that potatoes required for keeping should be harvested when the land is dry, if possible.

The inquiry thus instituted by the Royal Agricultural Society, and ably conducted by Mr Jenkins, will not be altogether in vain. Certainly, in the interests of both growers and consumers, it would be highly desirable to arrive at such *data* as would enable growers to reduce to a *minimum*, if not altogether evade, the ill effects of this perplexing disease.

Concentrated Manures.

It is generally admitted that about 85 per cent. of fresh stable manure is pure water, and therefore comparatively useless as a fertilizer, in fact as much so as ordinary rain-water. It is further pretty widely understood that for every 100 lbs of dry, active fertilizing matter gained, about 550 lbs. of manure so-called have to be handled. The result, from almost any business point of view, is not as profitable as it should be. Of course the principle is in a sense much like that followed in the extraction of precious metals; hundreds of tons of ore have sometimes to be overhauled to obtain but a few ounces of gold or silver as the case may be; but the analogy, although in many respects similar, dwindles into comparative insignificance when we contrast the precious rhino on the one hand with the droppings of quadrupeds on the other. Concentration of manure, therefore, in other words the elimination from the wet compost of those elements which neither in themselves nor yet in combination with other matters are of any essential use, must be a very important consideration, and, to begin with the elimination of water from common stable manure by evaporation or otherwise, will be an initiatory step in the right direction.

In England a custom, or rather process, has for some time prevailed of dry[illegible] animal excrements in what are termed "earth closets," [illegible] with such good effect that 200 lbs. of such excrements, when dried, have repeatedly proved equal to twenty tons weight of wet stable manure. The saving in handling and transportation alone in this instance is very material. The deodorization of stable manure by the free use of dry pulverized clay, loam or charcoal has proved successful in every case in which it has as yet been adopted. One hundred pounds of hay and oats consumed by a horse in 24 hours returns to nature more than half their carbon, hydrogen and oxygen, in the forms of carbonic acid and watery vapor, leaving less than half the weight consumed in the shape of dung and urine, and from this fact the *Rural New Yorker* wisely deduces the following lessons:

"The atmosphere receives from the respiration of all animals a vast amount of carbon and vapor, elements of manure in one form and of crops in another, which the air can return to growing plants, therefore their presence in the dung heap is not essential to its fertilizing power. The same hint is still further enforced by the fact that decaying plants and animals give to an ever-moving atmosphere a still larger share of their organic elements as gases. Our most valuable fertilizers, such as the nitrate of potash and soda, the sulphate of magnesia and lime, the phosphate of lime and other bases, may be characterized in a general way as concentrated manures with carbon and the elements of water organized, happily left out. By natural fermentation and rottings, stable manure parts with much carbon, oxygen, hydrogen and nitrogen. The residue, thoroughly dried, is very porous, and will fix and hold a good deal of volatile carbon and nitrogen in their usual gaseous state. Dry stable manure, concentrated, will deodorize with Peruvian guano and dry privy manure to a considerable extent. Hence, it is practicable to make an odorless yet powerful manure for all agricultural and commercial purposes."

Repeated experiments in the United States have proved that in hog-feeding from 3 to 3½ lbs. of corn-meal will make a pound of pork. In most irrigated districts corn can be raised in sufficient quantity to pay well at 1 cent per lb for the meal. This would make the cost of pork from 3 to 3½ cents per lb., whilst it is usually sold at from 8 to 10 cents per lb. Now it has been shown in addition to these facts that in the feeding process corn does not really part with one-fourth of its bone-earth, nitrogen and magnesia; hence corn manure, with its oil and starch removed, is allowed to be equal to the best cotton seed or flax-seed cake as a fertilizer.

Following out these ideas Mr. Lee in the *Rural* says:—

"To extract alcohol in whiskey from corn does not impair its value as a manure. To fatten grown cattle or hogs on still slops does not materially lessen its value as a dry commercial fertilizer. It is important that the farmer studies all the changes that grain undergoes in the beer tub and in the digestive and respiratory organs of farm stock. Practically considered, 50 lbs. of corn meal should make about 14 lbs. of good meal pork, and 10 pounds of superior manure.

"One advantage in fermenting and rotting stable manure is, that the active chemical action in the mass enables one to dissolve bones ground fine and buried in the manure cheaper than to use sulphuric acid for that purpose. Oil of vitriol, far in the interior, is a very expensive article to use as a manure. Hence, I have sought for a cheaper solvent of bone phosphates. Rather hot carbonic acid in decomposing stable manure appears to act similar to sulphuric acid, in forming a soluble phosphate of lime. Whatever may be the chemical action or reaction bone-dust rots fast in rotting manure. I have not tried hot vinegar on bone dust, but I have a theory that this organic acid may be made very cheap from sorghum syrup, and then used to dissolve bones.

"What nature does in as low way may often be done rapidly by simply concentrating her forces, as when wood is burnt by bringing the sun's rays to a focus through a common lens. Cheap hot acids made at home may give us potash from fine granite and phosphoric acid from fossil bones and apatite much cheaper than commerce now supplies them. About 75 per cent. of the ash of wheat is the phosphate of potash."

The Action of Drains.

In my travels among farmers, and especially among those who believe in drains and their attendant improvements, I am surprised that many do not properly understand the manner, or rather position in which the water enters the drain. It is of course understood that a drain only removes the *surplus* water, and hence a common barrel filled with earth may be taken as the representative of the undrained soil. If into this barrel we pour water until the earth becomes saturated, the surplus will run over the top and our barrel represents a soil too wet for cropping. If, previous to putting in the water, we make holes in the side of the barrel at different distances from the bottom, they will represent so many drains laid at different depths. If