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IN 1880,
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MODEL FARMS OF GLASNEVIN, CORK,
AND ATHY.

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1881.

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THE value of the potato crop raised in Ireland in 1879, was £5,000,000 under the average, and fully £8,000,000 under what it might have been had the land been fairly treated all through, and the crop handled with moderate skill. Very many small farmers pay little or no attention to the selection of good seeds. In 1879, I often saw potatoes planted which were not bigger than marbles and which had been badly stored, and which were the refuse of the entire crop. It is true of all crops, that the sounder the seed the better the yield. This ought never to be forgotten in so important a crop as the potato. Good sound tubers should always be selected, and each "set" should contain two eyes or germs. Again, many of our farmers neglect to bestow the necessary care and attention on introducing fresh seed. Many of them never change the seed at all, and as they repeat the crop at short intervals on the same land the variety degenerates, and actually dies or disappears altogether. It has been found that any variety of potatoes shows signs of degeneration and decay after some years, and the average duration of its existence has been put down at twenty years. If the seed be properly selected and the land properly tilled and manured, a good variety may last far longer. Given a healthy germ, and the conditions favourable to healthy growth we may expect a good crop. The more we neglect the selection of good seed, and the oftener we repeat the crop on the land the greater the necessity for a change of seed. The production of new varieties of the potato by hybridization is absolutely essential to the well-being of the small farmers of Ireland, under present circumstances. It is easily accomplished. The Champion added upwards of one million sterling to the

wealth of Ireland last year. In time it will begin to degenerate from the causes already indicated. New varieties should be ready to take its place.

I now draw attention to some important experimental results obtained in raising the potato crop with artificial manures. A few of these results were put before the Select Committee of 1880, presided over by Major Nolan. The experiments to which I refer, have extended over many years, and been made under a great variety of circumstances. I shall add one remark more in introducing the results obtained with different manures on potatoes last year. These experiments soon showed that potash is capable of influencing the growth of the potato crop. The effects of potash on the crop was little known when those experiments were commenced. This year several cargoes of kainit (the cheapest source of potash) have been introduced. When applied for the first time to potatoes on light land deficient in potash, the effects of kainit are very striking. If repeated soon the result may be very small. Phosphates, in many cases, increase this crop, but not to the same extent as root crops. They increase the soundness of the crop, more especially when used in conjunction with potash. Ammoniacal manures may also in some cases stimulate the potato; but the figures I shall submit, show that they should never be used alone for this crop. Rich farmyard manure, as is well known, promotes the growth of the potato in common with other crops, but the effects of this manure on all crops is owing to the circumstance that it contains all the constituents required by plants (including potash, which according to my experiments ought to exist largely in every potato manure). The striking effects of seaweed as a manure for the crop, is to be ascribed largely to the large quantity of potash present in it. The beneficial effects of Peruvian guano, as contrasted with a mixture of ammonia and phosphate, is in a great measure owing to its containing some potash. Without any further preface, I submit tables of the results obtained last year on the three Government farms, at Glasnevin, Cork, and Athy:—

GLASNEVIN FARM.

Soil, a deep, strong, clay loam.

—	Sound, per acre.	Unsound, per acre.	Total, per acre.
	ton ct. st.	ton ct. st.	ton ct. st.
1. Peruvian Guano,	7 16 0	0 3 4	7 19 4
2. Mineral superphosphate,	7 7 0	0 2 6	7 9 6
3. Dissolved bones,	6 2 4	0 7 4	6 10 0
4. Ground coprolites,	6 11 4	0 3 6	6 15 2
5. Ground bones,	6 14 4	0 4 4	6 19 0
6. No manure,	5 19 2	0 4 4	6 3 6
7. Kainit,	9 11 0	0 6 0	9 17 0
8. Nitrate of soda,	6 4 4	0 19 0	7 3 4
9. Sulphate of ammonia,	5 6 4	0 3 0	5 9 4
10. Sulphate of ammonia and mine- ral superphosphate,	6 5 4	0 6 0	6 11 4
11. Four cwt. mineral superphosphate, two cwt. sulphate of ammo- nia, and five cwt. kainit,	10 9 0	0 10 4	10 19 4
12. Bone superphosphate, 1½ cwt., sulphate of ammonia and five cwt. kainit,	9 16 4	0 16 4	10 13 0

MUNSTER FARM, CORK.

Soil, a good sandy loam.

Manures mixed and applied same as at Glasnevin.

—	Sound, per acre.	Unsound, per acre.	Total, per acre.
	ton ct. lb.	ton. ct. lb.	ton ct. lb.
1. Peruvian guano,	4 16 16	—	4 16 16
2. Mineral superphosphate,	4 9 0	—	4 9 0
3. Dissolved bones,	3 18 0	—	3 18 0
4. Ground coprolites,	3 13 0	0 0 56	3 13 56
5. Ground bones,	4 1 0	—	4 1 0
6. No manure,	3 15 0	—	3 15 0
7. Kainit,	10 6 0	0 0 56	10 6 56
8. Nitrate of soda,	3 15 0	9 1 0	3 16 0
9. Sulphate of ammonia,	4 7 0	0 1 0	4 8 0
10. Four cwt. mineral superphos- phate, and two cwt. sulphate of ammonia,	3 15 0	0 1 0	3 16 0
11. Four cwt. mineral superphos- phate, two cwt. sulphate of ammonia, and five cwt. kainit,	7 17 0	0 0 56	7 17 56
12. Six cwt. bone superphosphate, 1½ cwt. sulphate of ammonia, and five cwt. kainit,	8 18 0	0 2 56	9 0 56

ATHY FARM, CO. KILDARE.

Soil, a light and sandy character, not as good as that of Cork. Manures mixed, and applied at same rate per acre as at Glasnevin and Cork.

	Produce per acre.		
	ton	ct.	st.
1. Peruvian guano,	4	18	4
2. Mineral superphosphate,	5	1	4
3. Dissolved bones,	5	1	4
4. Ground coprolites,	2	5	4
5. Ground bones,	2	11	4
6. No manure,	2	12	4
7. Kainit plants uneven, results cancelled,*	—	—	—
8. Nitrate of soda,	1	14	4
9. Sulphate of ammonia,	1	18	4
10. Four cwt. mineral superphosphate, and two cwt. sulphate of ammonia,	3	5	4
11. Four cwt. mineral superphosphates, two cwt. sulphate of ammonia, and five cwt. of kainit,	5	2	4
12. Six cwt. bone superphosphate, 1½ cwt. sulphate of ammonia, and five cwt. kainit,	6	7	4

I would state briefly a few of the practical lessons which may be drawn from the foregoing tables. I would first refer to the table which gave the results obtained on the Glasnevin farm. The soil there is a strong deep clay loam, which has been, as it ought to have been, fairly treated for a good many years, and which is consequently in good condition. The power of the production of the field experimented on is shown by the fact that the yield without manure was 5 tons 19 cwt. 2 stone per statute acre. It will be observed that the phosphates used alone in a dissolved and undissolved state produced little effect on the crop. We will be pretty safe in saying that on good sound land like that, and treated well for a series of years, phosphate alone or ammoniacal manures alone, will not pay when applied to potatoes. On the other hand, it will be seen that on plot 7, kainit used alone gave a yield of 9 to 11 cwt. I wish, however, to offer a word of caution against the purchase of manures sold under the name of kainit, which, owing to their impurities, may poison the land.

Looking at the results of this experiment, we find that ammoniacal manure apparently gave less than no manure. I look upon this result as accidental. In the best conducted experiments of this kind we need not expect the results to be absolutely correct, the same as in mathematics or pure science, but this table affords internal evidence that the results are substantially reliable. The second lesson to

* In previous experiments kainit gave results in accordance with those obtained in 1880, on Glasnevin and Cork farms.

which I wish to draw attention is that on land in an improved condition like that to which I refer, a mixture of three manures—namely, 4 or 5 cwt. of superphosphate, with a small quantity of a manure capable of yielding ammonia, and 5 cwt. of kainit—would give the maximum result; that is the heaviest yield and the soundest crop.

We come next to the experiments made on the Cork Model Farm, the results of which are in some respects still more striking than those obtained at Glasnevin. The soil of the Cork Model Farm is a sandy loam differing from the soil at Glasnevin in this, that it is not so heavy but it is a good kind sandy loam, on which neither phosphates nor ammoniacal manures alone, did not give any perceptible results. When we mixed superphosphate and kainit we got an increased produce, and when we used a large quantity of kainit by itself on that farm we found the maximum gross yield: it increased the produce from 3 tons 15 cwt. to 10 tons 6 cwt. On the three farms the manures were applied to plots 1 to 9 at the same money's worth per acre, except the plots to which no manure was applied, and on plots 10, 11, and 12 an endeavour was made to find out the mixture of manures capable of giving the best crop. A mixture of the three manures—superphosphate of lime, kainit, and ammonia in certain proportions—gave the next best result. In explanation of the result with kainit alone, I would state that kainit had never before been applied to the field experimented on; and the soil contained from previous treatment all the other constituents required by the crop.

Finally, let me refer to the results obtained on the Athy Model Farm, which is peculiarly well adapted for experimental purposes. It is a sandy soil inferior to the soil of the Cork Model Farm. Owing to circumstances which it is not necessary to mention large quantities of phosphates had been put on certain fields of that farm from time to time; and for some years phosphate produced no results on those fields. Several farms in this country have been overdosed with phosphates, and it may be mere waste of money to apply any more to these farms, at all events until a certain number of years shall have elapsed. There is great room for the exercise of skill in the application of manures to these lands. The results of the Athy experiments on potatoes were quite confirmatory of the results obtained on the other two farms. The unmanured plot produced practically the same as those to which undissolved phosphates were applied. Dissolved

phosphates, however, on this farm increased the produce in 1880 on an average 2 tons 8 cwt. 4 stones per statute acre over the undissolved phosphates. The relative merits of undissolved and dissolved phosphates is a subject of great importance, on which I have experimented largely, and which I shall follow up. On this farm a mixture of 6 cwt. of bone phosphate, $1\frac{1}{2}$ cwt. of sulphate of ammonia, and 5 cwt. of kainit, gave the maximum result of 6 tons 7 cwt. 4 stones, as against 2 tons 12 cwt. 4 stones without manure.

The general lesson to be learned from these experiments is that on certain soils we may apply with great advantage kainit, and on others a mixture of kainit and superphosphate of lime, together with a small quantity of ammonia, according to the condition of the ground. With regard to nitrogenized matter, I would suggest an experiment to find out the particular form of presenting nitrogen to this crop. I am experimenting in this direction. Shoddy is one of the cheapest sources of nitrogen, and it remained to be tried whether it may not be a better manure for the potato, as far as nitrogen is concerned, than far more costly materials.

I have not found that kainit produced wetness in the potato raised on the land on which I have experimented. It would be likely to cause softness in the potato on land which did not contain an adequate supply of the other ingredients required by the crop. A great deal would depend on the soil. The land on which I have experimented has been fairly treated, as I hope all the land of Ireland will some day be. For peaty land I recommended a mixture of kainit and superphosphate of lime in equal parts. The mixture would also be most suitable for mountain bog land.

I would next submit a Table giving the relative yield of different varieties of potatoes grown in the experimental ground at Glasnevin, in 1880 :—

	Produced per Statute Acre.								
	Good.			Diseased.			Total.		
	t.	ct.	st.	t.	ct.	st.	t.	ct.	st.
1. Veitche's Improved Ash-leaf Kidney,	3	0	3	0	10	0	3	10	2
2. River's Royal do.,	5	18	2	0	12	4	6	10	6
3. Myatt's Improved do.,	8	8	3	0	12	4	9	0	7
4. Mona's Pride Kidney,	9	0	7	1	17	5	10	18	4
5. Carter's Magnum Bonum,	15	3	3	0	5	0	15	8	3

TABLE—continued.

	Produced per Statute Acre.								
	Good.			Diseased.			Total.		
	t.	ct.	st.	t.	ct.	st.	t.	ct.	st.
6. Schoolmaster,	4	10	3	1	3	7	5	14	2
7. Carter's Red Champion,	10	13	5	2	17	7	13	11	4
8. Nicoll's Champion,	16	1	5	0	12	4	16	14	1
9. Flounder,	8	18	3	2	17	7	11	16	2
10. Scotch Regent Kemp,	10	6	0	2	2	5	12	8	5
11. Red Bog Kemp,	9	11	0	1	5	1	10	16	1
12. Patterson's Victoria,	9	3	3	1	0	0	10	3	3
13. Red Skin Flourball,	10	16	0	1	15	1	12	11	1
14. Scotch Down,	13	5	1	0	3	6	13	8	7
15. Sutton's Magnum Bonum,	12	6	2	0	0	2	12	6	4
16. Early Vermont,	5	10	3	0	7	4	5	18	0
17. Greenlie's Prolific,	6	8	1	2	5	1	8	13	2
18. Grampian,	7	10	6	0	11	5	8	2	3
19. American Early Rose,	8	2	0	0	8	6	8	10	6
20. Rentoul's Don,	9	0	7	1	15	1	10	16	0
21. American Prolific,	7	18	2	1	5	1	9	3	3
22. Coldstream Early,	1	10	1	1	0	0	2	10	1
23. Pride of Ontario,	7	15	6	1	17	5	9	13	3
24. Alpha,	5	3	0	0	5	0	5	8	0
25. Bresse's Prolific,	6	5	5	1	0	0	7	5	5
26. Early Oxford,	6	10	1	3	7	6	9	17	7
27. American Chili,	13	1	3	1	0	0	14	1	3
28. Lancashire Fluke,	13	8	6	0	15	0	14	3	6
29. Dalmahoy,	8	8	3	1	17	5	10	6	0
30. Taylor's Purple Forty-fold,	16	11	6	1	7	5	17	19	3
31. Skerry Blue,	14	6	4	0	10	0	14	16	4

Different varieties grown on the same farm in land under regular rotation.

1. Dalmahoy,	4	19	0	2	3	0	7	2	0
2. Early Oxford,	2	18	0	7	15	0	10	13	0
3. Early Handswort,	7	4	0	0	13	0	7	17	0
4. Scotch Champion,	14	15	0	1	0	0	15	15	0
5. Scotch Down,	11	19	0	0	15	0	12	14	0
6. American Chili,	9	0	0	0	16	0	9	16	0
7. Magnum Bonum,	12	4	0	0	0	4	12	4	4
8. Kemp,	6	8	0	3	1	0	9	9	0
9. Kerr's Red Champion,	11	2	0	3	6	0	14	8	0
10. Early Rose,	6	6	0	0	19	0	7	5	0
11. Patterson's Victoria,	7	8	0	1	2	0	8	10	0
12. Coldstream Early,	0	15	0	1	14	0	2	9	0
13. Forty-fold,	11	13	0	1	2	0	12	15	0
14. Flounder,	9	12	0	1	7	0	10	19	0
15. Snow-flake,	7	5	0	2	12	0	9	17	0
16. American Prolific,	6	4	0	0	15	0	6	19	0

It is important to bear in mind as regards the Champion potato that it is a very strong-growing plant. It is generally known it is a hybrid, obtained by mixing the seed of two or three potatoes. Being a strong potato, if we raise the crop in wide drills, and manure it very heavily, we increase the individual tuber, and produce a hollow in the centre. I advise farmers to grow it in drills of moderate width; and if they do they will have a satisfactory yield per acre. The individual tuber will not be so large, but the potato will, in a great measure, be free from the defect referred to.

The foregoing remarks embody the substance of a verbal report made to the Cork Agricultural Society.

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