Memoranda of the Plan and Results of the Rothamsted Field Experiments, June 1862

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MEMORANDA

OF THE

PLAN AND RESULTS

OF THE

ROTHAMSTED FIELD EXPERIMENTS,

&c.

JUNE, 1862.

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Experiments with different Manures on Permanent Meadow Land.

THE PARK.

The Land has probably been laid down with Grass for some centuries ; and no seed has been artificially sown for the last 25 years at any rate ; nor is there any record of fresh seed having been sown since the time the Grass was first laid down. The experiments commenced in 1856, at which time the character of the herbage appeared to be uniform over all the Plots. With with some few exceptions, the same description of Manure has been applied to the respective Plots each year.

(Area under experiment, about 6¼ acres).

Plots.	Manures, per acre, for the growing (7th) Grass-crop—1862.	Average Produce per Acre per Annum during 6 years. 1856–61. (Weighed as Hay.)
	1 acre = (about) 0·40 Hectare. 1 lb. (pound, avoir.) = (about) 0·45 Kilogramme. 1 cwt. (hundredweight) = (nearly) 51·0 Kilogrammes. 1 ton = (nearly) 1016·0 Kilogrammes. 1 lb. per acre = 1·12 Kilogramme per Hectare. 1 cwt. per acre = (about) 125·5 Kilogrammes per Hectare.	Cwts.
1	14 tons Farmyard dung ; and 200 lbs. "Ammonia-salts" (1)	48¾
2	14 tons Farmyard dung alone	42¼
3	Unmanured, continuously	23½
4 (a)	Superphosphate of Lime (2)	28 (5)
4 (b)	ditto ; and 400 lbs. "Ammonia-salts"	44 (5)
5	400 lbs. "Ammonia-salts"	33
6	400 lbs. ditto ; and 2000 lbs. Sawdust	33¼
7	Mixed Alkalies (3) ; and "Superphosphate of Lime"	34¼
8	ditto (4) ; ditto ; and 2000 lbs. Sawdust	36
9	ditto ; ditto ; and 400 lbs. "Ammonia-salts"	56¾
10	ditto (4) ; ditto ; 400 lbs. ditto ; and 2000 lbs. Sawdust	55½
11	ditto ; ditto ; and 800 lbs. (6) ditto	61
11 (a)	ditto ; ditto ; 800 lbs. (6) ditto ; and 200 lbs. each, Silicate of Soda and Silicate of Lime	(7)
12	Unmanured, continuously	25½
13	"Mixed Alkalies" ; "Superphosphate of Lime" ; 400 lbs. "Ammonia-salts" ; and 2000 lbs. Cut Wheat-straw	54¾
14	ditto ; ditto ; and 550 lbs. Nitrate of Soda	51¾
15	none ; none ; 550 lbs. ditto	37 (8)
16	"Mixed Alkalies" ; "Superphosphate of Lime" ; and 275 lbs. ditto	43½ (8)
17	none ; none ; 275 lbs. ditto	32½ (8)

(1) Equal parts Sulphate and Muriate of commerce. (2) 200 lbs. Bone-ash, 150 lbs. Sulphuric Acid (Sp. gr. 1·7).
(3) 300 lbs. Sulphate of Potass, 200 lbs. Sulphate of Soda, and 100 lbs. Sulphate of Magnesia.
(4) In previous years the same as described above (3); in the present season, no Sulphate of *Potass*, but 500 lbs. Sulphate of Soda, and 100 lbs. Sulphate of Magnesia.
(5) Average of 3 years only (1859–60–61); Sawdust alone the three previous years (1856–7–8).
(6) 800 lbs. in 1856–7–8, and 400 lbs. only in 1859–60–61.
(7) This is one-half of the former Plot "11," and the application of Silicates only commenced this Season (1862).
(8) Average of four years only, as these experiments did not commence until 1858.

EXPERIMENTS ON THE GROWTH OF BARLEY YEAR AFTER YEAR ON THE SAME LAND, WITHOUT MANURE AND WITH DIFFERENT KINDS OF MANURE.

HOOS FIELD.

Previous cropping—1847, Swedish turnips, with dung and superphosphate of lime, the roots carted off; 1848, Barley; 1849, Clover; 1850, Wheat; 1851, Barley manured with ammonia-salts.

First experimental Barley-crop in 1852. Barley every year since; and, with one or two exceptions, the same manures on the same plots each year.

(Area under experiment, about 4¼ acres).

PLOTS.	Manures, per acre, for the growing (11th) Barley crop—1862.	Average Produce per Acre, per Annum, during Ten Years, 1851-61.		
		Dressed Corn.	Total Corn.	Total Straw.
		Bushels.	lbs.	lbs.
1 O.	Unmanured, continuously	22¼	1281	1501
2 O.	Superphosphate of Lime (1)	28	1562	1661
3 O.	Mixed Alkalies (2)	24¾	1396	1548
4 O.	Ditto ; and "Superphosphate of Lime"	30½	1712	1805
6{1	Unmanured, continuously	25	1414	1573
6{2	Ashes (burnt soil, turf, and weeds)	24	1352	1462
7	Farm-yard dung (14 tons every year)	45	2541	2984
1 A.	200 lbs. Ammonia-Salts (3)	33½	1908	2211
2 A.	200 lbs. ditto ; and "Superphosphate of Lime"	45¾	2563	3121
3 A.	200 lbs. ditto ; none ; and "Mixed Alkalies"	35	1989	2445
4 A.	200 lbs. ditto ; "Superphosphate of Lime" ; and ditto	46¼	2593	3234
1 AA.	200 lbs. (4) ditto	39¾	2244	2689
2 AA.	200 lbs. (4) ditto ; "Superphosphate of Lime"	49	2744	3577
3 AA.	200 lbs. (4) ditto ; none ; and "Mixed Alkalies"	38½	2190	2889
4 AA.	200 lbs. (4) ditto ; "Superphosphate of Lime" ; and ditto	50	2772	3888
1 C.	1000 lbs. (5) Rapecake	47	2619	3287
2 C.	1000 lbs. (5) ditto ; and "Superphosphate of Lime"	47¾	2677	3451
3 C.	1000 lbs. (5) ditto ; none ; and "Mixed Alkalies"	44	2480	3236
4 C.	1000 lbs. (5) ditto ; "Superphosphate of Lime" ; and ditto	47½	2662	3506
1 N. (6)	275 lbs. Nitrate of Soda	37¾ (8)	2125 (8)	2620 (8)
2 N. (6)	275 lbs. (7) ditto	42¼ (8)	2376 (8)	3121 (8)
5 O.	200 lbs. (9) Sulphate of Potass ; and "Superphosphate of Lime" (10)	24¾ (11)	1373 (11)	1514 (11)
5 A.	200 lbs. (9) ditto ; ditto ; and 200 lbs. "Ammonia-Salts"	44¼ (11)	2470 (11)	3150 (11)
M.	100 lbs. each, Sulp. Soda and Sulp. Magnesia ; and ditto	22¾ (12)	1262 (12)	1312 (12)

[1 Acre .. .. .. = (about) 0·40 Hectare. ; 1 Bushel .. .. .. = (about) 0·36 Hectolitre. ; 1 lb. (pound, avoir.) = (about) 0·45 Kilogramme. ; 1 Bushel per acre = (nearly) 0·9 Hectolitre per Hectare. ; 1 lb. per acre .. = 1·12 Kilogramme per Hectare.]

(1) 200 lbs. bone-ash, 150 lbs. sulphuric acid (sp. gr. 1·7).
(2) 200 lbs. sulphate of potass, 100 lbs. sulphate of soda, and 100 lbs. sulphate of magnesia; for the first six years, 300 lbs., 200 lbs., and 100 lbs. respectively.
(3) Equal parts sulphate and muriate of commerce.
(4) 400 lbs. per annum for the first six years, and 200 lbs. only each year since.
(5) 2000 lbs. per annum for the first six years, and 1000 lbs. only, each year since.
(6) 300 lbs. sulphate of potass, 200 lbs. bone-ash, and 150 lbs. sulphuric acid (sp. gr. 1·7), without nitrate of soda, the first year (1852); nitrate alone each year since.
(7) 550 lbs. nitrate of soda for 1853-4-5-6, and 7; and 275 lbs. only each year since.
(8) Average of 9 years only.
(9) 300 lbs. per annum for the first six years, and 200 lbs. each year since.
(10) Ammonia-salts also the first year, but not since.
(11) Average of 9 years only.
(12) Average of 7 years only.

EXPERIMENTS ON THE GROWTH OF **WHEAT** YEAR AFTER YEAR ON THE SAME LAND; WITHOUT MANURE, AND WITH DIFFERENT KINDS OF MANURE.

BROADBALK FIELD.

Previous Cropping—1839, Turnips, with Farmyard Manure; 1840, Barley; 1841, Peas; 1842, Wheat; 1843, Oats. The last four Crops Unmanured.
First Experimental Wheat Crop in 1844. Wheat every year since; and with some exceptions, nearly the same description of Manures on the same Plots each year—especially during the last 10 years.

(Area under experiment, about 13 acres).

PLOTS.	Manures, per acre, for the growing (19th) Wheat-crop—1862. [1 acre = (about) 0·40 Hectare. 1 bushel = (about) 0·36 Hectolitre. 1 lb. (pound, avoir.) = (about) 0·45 Kilogramme. 1 bushel per acre = (nearly) 0·9 Hectolitre per Hectare. 1 lb. per acre = 1·12 Kilogramme per Hectare.]	Average Produce per Acre, per Annum, during the last ten Years, 1852-61.		
		Dressed Corn.	Total Corn.	Total Straw.
		bushels.	lbs.	lbs.
0	Superphosphate of Lime (three times as much as on No. 5 and succeeding Plots).	17¾	1106	1829
1	Mixed Alkalies (twice as much as on No. 5 and succeeding Plots).	16	995	1771
2	Farm-yard dung (14 tons every year).	34¼	2145	3795
3	Unmanured, continuously.	15½	944	1663
4	Unmanured for Crop of 1852, and since (previously Superphosphate and Ammonia-salts).	16¾	1051	1747
5 (*a*–*b*)	Mixed Alkalies [1]; and Superphosphate of Lime [2]	18¼	1149	1919
6 (*a*–*b*)	ditto; ditto; and 200 lbs. Ammonia-salts.[3]	27¼	1697	2946
7 (*a*–*b*)	ditto; ditto; and 400 lbs. ditto.	34¾	2158	4076
8 (*a*–*b*)	ditto; ditto; and 600 lbs. ditto.	36	2251	4530
9 *a*	ditto; ditto; and 550 lbs. Nitrate of Soda.	31½	1967	4075
9 *b*	none; none; 550 lbs. ditto.	24¼	1509	3080
10 *a*	none since 1844; none since 1844; 400 lbs. "Ammonia-salts."	21	1318	2516
10 *b*	none (except 1844, '48, & '50); none (except 1844, '48, & '50); 400 lbs. ditto.	25½	1586	2984
11 (*a*–*b*)	none; "Superphosphate of Lime"; and 400 lbs. ditto.	28½	1757	3159
12 (*a*–*b*)	366½ lbs.[4] Sulphate of Soda; ditto; and 400 lbs. ditto.	33½	2086	3832
13 (*a*–*b*)	200 lbs.[5] Sulphate of Potass; ditto; and 400 lbs. ditto.	33	2078	3847
14 (*a*–*b*)	280 lbs.[6] Sulphate of Magnesia; ditto; and 400 lbs. ditto.	33½	2094	3916
15 *a*	"Mixed Alkalies"; ditto[8]; and 400 lbs. ditto.	32	2007	3699
15 *b*	ditto; ditto[8]; 300 lbs. ditto; and 500 lbs. Rape-cake.	33¾	2108	3946
16 (*a*–*b*)	ditto; ditto; and 800 lbs. ditto.	37	2322	5044
[7] 17 (*a*–*b*)	none; none; 400 lbs. ditto.	31¾ [9]	1993 [9]	3718 [9]
[7] 18 (*a*–*b*)	"Mixed Alkalies"; "Superphosphate of Lime"; none.	18¾ [10]	1174 [10]	2001 [10]
19	none; ditto [8]; 300 lbs. "Ammonia-salts"; and 500 lbs. Rape-cake.	31	1966	3508
20	Unmanured continuously.	15¾	991	1758
21	"Mixed Alkalies"; "Superphosphate of Lime"; and 100 lbs. Muriate Ammonia.	21⅜	1329	2344
22	ditto; ditto; and 100 lbs. Sulphate Ammonia.	21	1300	2283

(1) Since 1858, 200 lbs. Sulphate of Potass, 100 lbs. Sulphate of Soda, and 100 lbs. Sulphate of Magnesia; for Crop of 1857-8, and previously, 300 lbs., 200 lbs., and 100 lbs., respectively.
(2) 200 lbs. Bone-ash, 150 lbs. Sulphuric acid (Sp. gr. 1·7). (3) Equal parts Sulphate and Muriate of Commerce. (4, 5, 6) For 1858, and previously 1½ time as much.
(7) The Manures of 17 and 18 alternate. (8) With Hydrochloric instead of Sulphuric Acid. (9) Average of 10 years' Ammonia-salts alternated with Mineral Manures.
(10) Average of 10 years' Mineral Manures alternated with Ammonia-salts.

EXPERIMENTS ON THE GROWTH OF LEGUMINOUS CROPS.

I.—Beans, Peas, and Tares.

Experiments on the growth of Leguminous corn-crops, with different descriptions of manure, were commenced in 1847, about 9 acres being devoted to the purpose. The experiments with beans were continued for thirteen consecutive seasons, to 1859 inclusive; but with a great falling off in the crop during the later years. The land was then fallowed for one season; in the next (1861) a crop of wheat, without manure, was taken; and beans have now (1862) again been sown, but with some variation in the manuring. The experiments with peas were soon abandoned, owing to the difficulty of keeping the land free from weeds, and an alternation of beans and wheat was substituted: the beans being manured as in the case of the other experiments with the same crop. Those with tares were also soon abandoned for the same reason; beans being substituted, with a slight variation in the description of the manures employed.

The general result of the experiments with beans was, that mineral constituents added as manure (more particularly potass, and, to a certain extent, phosphoric acid also) increased the crop very much during the early years; and, to a certain extent, afterwards, whenever the season was favourable for the crop. Nitrogenous manures, on the other hand, produced very little effect; notwithstanding that a Leguminous crop contains two, three, or more times as much nitrogen as a Graminaceous one grown under parallel circumstances. But Leguminous crops grown too frequently on the same land seem to be peculiarly subject to disease, which no combination of manuring that we have hitherto tried seems to obviate.

In alternating wheat with beans, the remarkable result has been obtained that about the same amount of wheat and about as much nitrogen were yielded in 5 crops in alternation with the highly nitrogenous beans, as in 10 crops of wheat grown consecutively without manure. It is also remarkable that about the same amount of wheat, and of nitrogen were obtained in another field in 5 crops alternated with fallow.

II.—Red Clover (*Trifolium pratense*).

Experiments on the growth of clover, with different descriptions of manure, were commenced in 1849, and, with the occasional interposition of a corn-crop, or fallow, have been continued up to the present time. As with beans, the result was that mineral constituents, applied as manure, particularly potass, and, more or less, phosphoric acid also, considerably increased the early crops; whereas ammonia-salts had comparatively little effect. But after the first few years all further attempts to grow clover year after year on this land have failed, notwithstanding that fresh seed has again and again been sown. Neither ammonia-salts, nor organic matter rich in carbon as well as other constituents, nor mineral manures, nor a mixture of all, has availed to restore the clover-yielding capabilities of the land.

It is, however, worthy of remark that, in 1854, red clover was sown in a kitchen-garden only a few hundred yards distant from the experimental field, on soil which has been under ordinary garden cultivation probably for two or three centuries, and it has every year since shown very luxuriant growth; and (after once re-sowing during the period) there is, at the present time, little or no indication of failure.

EXPERIMENTS ON THE GROWTH OF ROOT-CROPS.

Experiments with turnips were commenced in 1843. Eight acres, divided into numerous plots, were set apart for the purpose, and the crop was grown for ten consecutive years (1843-52) on the same land, without, and with different descriptions of manure, on the respective plots. Barley was then grown for three consecutive years (1853-55), without manure, in order to test the comparative corn-growing condition of the different plots, and also to equalize their condition, as far as possible, by the exhaustion of some of the most active and immediately available constituents supplied by the previous manuring. A new series of turnip experiments was then arranged, having regard to the results previously obtained and to the character of the manures previously applied on the different plots. This series commenced in 1856, and is still in progress.

It is impossible adequately to state the bearing of the results in a few words, but the following are some of the most characteristic indications:—

1. Without manure of any kind, the produce was reduced in a few years to a few cwts. per acre; but the diminutive plants contained a very unusually high percentage of nitrogen.

2. Of "mineral" constituents, phosphoric acid (in the form of superphosphate of lime) was by far the most effective manure; but when the crop is grown by this manure alone, the immediately available nitrogen of the soil is rapidly exhausted.

3. Really large crops of turnips can only be obtained when the soil supplies a liberal amount of both carbonaceous and nitrogenous matter; and when these are already available, or are supplied in the form of farmyard manure, rape-cake, Peruvian guano, ammonia-salts, &c., the rapidity of growth (and consequently the amount of the crop) is greatly increased by the use of superphosphate of lime applied near to the seed.

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AGDELL FIELD.

Experiments on an actual Course of Rotation—Turnips, Barley, Leguminous Crop (or Fallow), and Wheat.

These Experiments were commenced in 1848; so that the present crop is the ~~15~~ (1865) 18th experimental one, or the ~~third~~ second crop of the ~~Fourth~~ Fifth Course.
One-third of the land has been continuously unmanured; one-third manured with superphosphate of lime alone once every four years, that is, for the turnip-crop commencing each course; and one-third manured (also for the turnip-crop only) with a complex manure, as described below.
In the Second, Third, and Fourth Courses, instead of clover, half of each plot was sown with beans, and the other half left fallow.
From half of each of the three plots the whole turnip-crop (roots and leaves) was removed; and on the other half the roots were eaten on the land by sheep, and the uneaten leaves were spread and ploughed in. In the case of all the other crops, the total produce was removed from the land.
The abstract of results given below relates to the portions of each plot from which the turnip-crops were entirely removed; and on which, in the later Courses, beans (not fallow) replaced the clover.

(Area under experiment about 2½ acres.)

[1 cwt. (hundredweight) per acre = (about) 125·5 kilogrammes per hectare. 1 lb. (pound, avoir.) per acre = 1·12 kilogramme per hectare.]		Plot 1. Unmanured continuously.			Plot 2. Superphosphate of Lime, (1) alone, for the Turnip crops only.			Plot 3. Complex Manure, (2) for the Turnip crops only.		
Years.	Description of Crop.	Corn (or Roots).	Straw (or Leaf).	Total Produce.	Corn (or Roots).	Straw (or Leaf).	Total Produce.	Corn (or Roots).	Straw (or Leaf).	Total Produce.
				1st Course, 1848-51.						
1848	Swedish Turnips	175¼ cwts.	19¾ cwts.	195 cwts.	292 cwts.	35 cwts.	327 cwts.	394¾ cwts.	46¼ cwts.	441 cwts.
1849	Barley	1706 lbs.	2088 lbs.	3794 lbs.	1705 lbs.	1870 lbs.	3575 lbs.	2673 lbs.	2983 lbs.	5656 lbs.
1850	Clover (weighed green) ..	.. ..	.. ..	194¼ cwts.	.. ..	.. ..	199¼ cwts.	.. ..	.. ..	219¼ cwts.
1851	Wheat	1958 lbs.	3431 lbs.	5389 lbs.	1882 lbs.	3371 lbs.	5253 lbs.	1948 lbs.	3552 lbs.	5500 lbs.
				2nd Course, 1852-55.						
1852	Swedish Turnips	26 cwts.	4¼ cwts.	30¼ cwts.	223¼ cwts.	20¼ cwts.	243½ cwts.	396½ cwts.	36½ cwts.	433 cwts.
1853	Barley	2035 lbs.	2430 lbs.	4465 lbs.	1687 lbs.	1873 lbs.	3560 lbs.	2269 lbs.	2604 lbs.	4873 lbs.
1854	Beans	390 lbs.	1055 lbs.	1445 lbs.	431 lbs.	1103 lbs.	1534 lbs.	710 lbs.	1355 lbs.	2065 lbs.
1855	Wheat	2240 lbs.	3619 lbs.	5859 lbs.	2264 lbs.	3525 lbs.	5789 lbs.	2429 lbs.	3942 lbs.	6371 lbs.
				3rd Course, 1856-59.						
1856	Swedish Turnips	32 cwts.	2½ cwts.	34½ cwts.	136 cwts.	7½ cwts.	143½ cwts.	333¾ cwts.	12⅓ cwts.	346¼ cwts.
1857	Barley	2737 lbs.	2600 lbs.	5337 lbs.	1601 lbs.	1475 lbs.	3076 lbs.	2733 lbs.	2435 lbs.	5168 lbs.
1858	Beans	415 lbs.	1100 lbs.	1515 lbs.	450 lbs.	1155 lbs.	1605 lbs.	837 lbs.	1520 lbs.	2357 lbs.
1859	Wheat	2232 lbs.	4030 lbs.	6262 lbs.	2190 lbs.	3930 lbs.	6120 lbs.	2544 lbs.	4610 lbs.	7154 lbs.
				4th Course, 1860-(63).						
1860	Swedish Turnips	1 cwt.	(6¼ lbs.)	1 cwt.	29¼ cwts.	1¼ cwt.	30¾ cwts.	87½ cwts.	3¼ cwts.	90¾ cwts.
1861	Barley	2196 lbs.	2522 lbs.	4718 lbs.	1775 lbs.	2000 lbs.	3775 lbs.	3451 lbs.	3940 lbs.	7391 lbs.
1862	Beans	1821 lbs.	1840 lbs.	3661 lbs.	1890 lbs.	2150 lbs.	4040 lbs.	2710 lbs.	3280 lbs.	5990 lbs.
1863	Wheat	2883 lbs.	3467 lbs.	6350 lbs.	2229 lbs.	3390 lbs.	5619 lbs.	2929 lbs.	4697 lbs.	7626 lbs.

(1) First Course—100 lbs. bone-ash, and 100 lbs. sulphuric acid (sp. gr. 1·7); Second Course—160 lbs. bone-ash, 120 lbs. sulphuric acid; Third and Fourth Courses—200 lbs. bone-ash, 150 lbs. sulphuric acid *per acre*.

(2) First Course—100 lbs. pearlash, 100 bone-ash, 100 lbs. sulphuric acid, 100 lbs. sulphate of ammonia, 100 lbs. muriate of ammonia, and 1000 lbs. rape-cake; Second Course—300 lbs. sulphate of potass, 100 lbs. sulphate of soda, 100 lbs. sulphate of magnesia, 160 lbs. bone-ash, 120 lbs. sulphuric acid, 100 lbs. sulphate of ammonia, 100 lbs. muriate of ammonia, and 2000 lbs. rape-cake; Third and Fourth Courses—300 lbs. sulphate of potass, 200 lbs. sulphate of soda, 100 lbs. sulphate of magnesia, 200 lbs. bone-ash, 150 lbs. sulphuric acid, 100 lbs. sulphate of ammonia, 100 lbs. muriate of ammonia, and 2000 lbs. rape-cake *per acre*.

ROTHAMSTED FARM.

JUNE, 1862.

SUMMARY STATEMENT OF THE PRESENT AND PREVIOUS CROPPING, &c., OF THE ARABLE LAND NOT UNDER EXPERIMENT.

(7 Years, 1856-62, inclusive).

Name of Field.	Acres	Previous Cropping and Manuring.						Crop, &c.; Present Season. 1862.
		1856.	1857.	1858.	1859.	1860.	1861.	
Barn	20	Turnips, Artificial.	Wheat, Artificial.	Oats, Artificial.	Red Clover (peren.), Unmanured.	Wheat, after Sheep-Folding.	Swedes, Dung & Artificial.	**Oats, Artificial** (2 cwts. Guano).
Thirty Acres ..	30	Oats, Artificial.	Red Clover (peren.), Unmanured.	Wheat, after Sheep-Folding.	Oats, Artificial.	Swedes, Dung & Artificial.	Oats, after Sheep-Folding.	**Red Clover (peren.), Unmanured.**
Upper Harpenden	14	Turnips, Artificial.	Barley, after Sheep-Folding.	Beans, Dung.	Wheat, Artificial.	Barley, Artificial.	Swedes, Dung & Artificial.	**Oats, after Sheep-Folding.**
Harpenden ..	22	Red Clover (peren.), Unmanured.	Wheat, Artificial.	Oats, Artificial.	Swedes, Dung & Artificial.	Oats, after Sheep-Folding.	Red Clover (peren.), Unmanured.	**Wheat, Artificial** (2 cwts. Guano).
Little Hoos ..	9	Oats, Artificial.	Turnips, Artificial.	Wheat, after Sheep-Folding.	Oats, Artificial.	Mangolds, Durg & Artificial.	Oats, Unmanured.	**Barley, Artificial** (2 cwts. Guano, 1 cwt. superphos.).
Fosters'	18	Wheat, Artificial.	Barley, Artificial.	Swedes, Artificial.	Barley, after Sheep-Folding.	Red Clover (peren.), Unmanured.	Wheat, Artificial.	**Oats, Artificial** (3 cwts. Guano).
Knott Wood ..	30	Oats, Artificial.	Swedes, Dung & Artificial.	Barley, after Sheep-Folding.	Red Clover (peren.), Unmanured.	Wheat, Artificial.	Oats, Artificial.	**Swedes, Dung & Artificial.**
Little Knott Wood	14	Wheat, Artificial.	Oats, Artificial.	Swedes, Dung & Artificial.	Oats, after Sheep-Folding.	Red Clover (peren.), Unmanured.	Wheat, after Sheep-Folding.	**Oats, Artificial** (3 cwts. Guano).
Sawpit	14	Red Clover (peren.), Unmanured.	Wheat, Artificial.	Oats, Artificial.	Mangolds, Dung & Artificial.	Oats, Unmanured.	White Clover, Unmanured.	**Wheat, Artificial** (2 cwts. Guano).
Rick-yard	8	Oats, Artificial.	Mangolds, Dung & Artificial.	Wheat, Unmanured.	Oats, Artificial.	Tares, Dung.	Oats, Unmanured.	**Mangolds, Dung & Artificial.**
Six Acres	6	Barley, after Sheep-Folding.	Trefoil, Unmanured.	Wheat, after Sheep-Folding.	Barley, Artificial.	Beans, Dung.	Wheat, Unmanured.	**Oats, Artificial** (3 cwts. Guano).
Clay-Croft	5	Oats, Artificial.	Beans, Dung.	Wheat, Artificial.	Oats, Artificial.	Red Clover (peren.), Unmanured.	Wheat, Artificial.	**Beans Dung & Fallow.**
Apple Tree ..	18	Swedes, Dung & Artificial.	Oats, after Sheep-Folding.	Red Clover (peren.), Unmanured.	Wheat, Artificial.	Oats, Artificial.	Mangolds, Dung & Artificial.	**Wheat, Unmanured.**
Ten Acres	10	Barley, Artificial.	Tares, Dung.	Oats, Unmanured.	Tares, Dung.	Oats, Artificial.	Red Clover (peren.), Unmanured.	**Wheat, after Sheep-Folding.**
Park Field	10	Wheat, Artificial.	Red Clover (bien.), Unmanured.	Wheat, after Sheep-Folding.	Wheat, Artificial.	Oats, Artificial.	Red Clover (peren.), Unmanured.	**Wheat, Artificial** (2 cwts. Guano).
Agdell	9	Barley, Artificial.	Tares, Dung.	Oats, Unmanured.	Barley, Artificial.	Garden-ground.	Oats, Unmanured.	**Tares, Dung.**

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