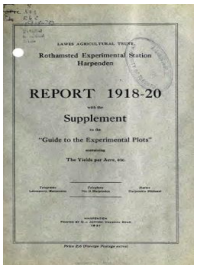
Report 1918-20 With the Supplement to the Guide to the Experimental Plots Containing the Yields per Acre Etc.



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Rothamsted Experimental Plots - Crop Results

Rothamsted Research

Rothamsted Research (1921) *Rothamsted Experimental Plots - Crop Results ;* Report 1918-20 With The Supplement To The Guide To The Experimental Plots Containing The Yields Per Acre Etc., pp 60 - 85 **- DOI: https://doi.org/10.23637/ERADOC-1-109**

WINIFRED E. BRENCHLEY. *"Weeds of Farm Land."* Longmans, Green & Co., 1920. 41 Illustrations.

The book deals with the weed problem from both the practical and scientific standpoints. Attention is directed to the habits and characteristics of farm weeds, the methods of distribution, prevention and eradication, to the importance of the vitality of seeds when buried in the soil and to parasitic and poisonous weeds.

Separate chapters are devoted to the weeds of grass land and of arable land, and in the latter case the association of the weeds with various types of soil and crop is discussed. The uses of farm weeds and the popular and local names of the plants are collected together for the purpose of reference.

"The Rothamsted Memoirs on Agricultural Science."

The more important of the papers issued from Rothamsted are bound up periodically into volumes and sold from the laboratory. The following are now available :—

Vols. 1-8	. 1847-1912	. 30/-	postage extra
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CROP RESULTS.

SEASON, OCTOBER, 1917—SEPTEMBER, 1918.

The season that ended September 30th, 1917, had been bad for hay and corn, though favourable for roots and potatoes. There had been a drought through May and June, followed by a wet July and an unusually wet August, which greatly protracted the harvest. Fortunately, however, the weather improved in September and part of October, so that the land was in good condition for ploughing, and by dint of hiring extra teams, including two "Government" teams, we were able to overtake some of the arrears of work. November was exceptionally mild, but dull and fine, and by the 22nd the oats in Great Knott Field were well up, and the Broadbalk wheat was beginning to appear; the crops were much more forward than in the previous year. December was frosty and without snow, and the frost held over Christmas and the New Year; snow fell on January 16th but did not last; by February 18th the wheat, oats and clover had suffered, some of the plants had been killed and the survivors lacked vigour. Early in March the weather turned very cold, but afterwards it was wonderfully fine, and by the 20th the ground was dry and in beautiful condition for seeding and cleaning, so that hand-hoeing was done both in Broadbalk and in Long Hoos, where grass was growing among the wheat. The corn and clover all began to improve. On Sunday, March 24th, 1918, at 2 a.m., the clocks were put forward an hour to "summer time." In 1916 and 1917 the farm workers had declined to observe the change and continued to work by sun time, but this year they decided to adopt it now and henceforward. After the beginning of April the dry period was over; the barley and seeds mixture were safely in, but the potato land was not ready. On April 20th and 21st there fell snow and much rain, so that there was a great deal of water on the land and the Broadbalk drains were all running. February and March had been drier than the average, but April made up the deficit. Wireworm appeared in Long Hoos wheat and some eelworm in the Great Knott oats.

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May was very fine. The winter oats were short in straw and rather backward. The grass also was short. On the other hand, the wheat was looking well, especially in Little Hoos after clover. Long Hoos wheat also looked much better than last year : there was some charlock in the west end, otherwise the field was tolerably clean. The root land was still not prepared by the end of May. June was dry, with sunny days but cold nights;. the pastures and meadows seemed unusually thick with buttercups and dandelions, perhaps because the grass was so short; later on thistles gave trouble : temporary grass, on the other hand, was longer and the clover was excellent. The drought continued till July 9th, ruining the new sown seeds and also the swedes (which were finally finished off by the " fly "), and making barley very short. On the other hand, the wheat was long in straw (5ft.) so also were the oats. King Edward potatoes suffered. Turnips were sown after the swedes, but failed.

At the end of July, Harpenden Field was ploughed by Government tractor and cleaned in preparation for oats. August was beautifully fine, hot and dry, and the harvest came in in record time. Much of the wheat was never stooked but was carried as it lay : some farmers indeed cut and carted on the same day, but we preferred not. September was wetter (4.8in.) and while this improved the mangolds it interfered with the lifting of the potatoes.

The harvest returns showed that wheat had been unusually good (5 qrs. per acre Red Standard; 4 qrs. Red Marvel). Potatoes had been only moderate (5 tons), mangolds poor and swedes failed.

OCTOBER, 1918—SEPTEMBER, 1919.

On September 29th no less than 1.3in. of rain fell, and this, coming at the end of a spell of wet weather, left the ground very wet. Rain fell almost daily in October and November, although the total was below the average. Its persistence, however, and shortage of labour interfered with ploughing, but, owing to the early harvest, work was fairly forward : by the time the Armistice was signed (Nov. 11th) oats and the first sown wheat were well up. Throughout November and December the weather continued mild and muggy, and the carting of mangolds was wet, dirty work. January was wet, impeding alike the ploughing and threshing; on the 28th came snow, which lay 9½ inches on the ground and then froze : the weather remained cold for some time. Then followed much rain till March 7th. The winter corn suffered and came out a bad colour after the snow, and the wheat contained some grass; clover, however, was looking well. Long Hoos had been intended for roots, being weedy, but owing to labour shortage half was put into barley, and our acreage of potatoes was cut down from 13 to 4.

There were frequent frosts in April and on the 29th a snow storm with 11in. of snow in the open; this, however, soon went. May was a magnificently fine month, with long sunny days and good dews at night; the total rainfall was only 0.46in. The hot weather continued till the end of June, parching the meadows and greatly retarding the potatoes. Currants, gooseberries and peas were full of blossom. Oats and early sown wheat and Stackyard barley looked well, but the late sown wheat and New Zealand barley were thin and full of thistles. Long Hoos barley was also weedy. July was a bad month; it was very cold and sunless

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and towards the end the corn showed signs of lodging, although there was no great length of straw. The local term for the condition of the wheat and barley was "scrawly," *i.e.*, many individual straws lodged, though the bulk stood: this is a common result of thin or uneven growth. The winter oats only were actually "lodged." The roots showed signs of picking up, but the second cut of clover was disappointing. The early part of August was hot; harvest began well, and although crops were light they were quickly brought in on our farm (though many others were less fortunate). Having now our own tractor, we pushed on well with the ploughing immediately the corn was cut; by September 8th we had ploughed Harpenden, Sawpit, Foster's, West Barnfield and part of Broadbalk fields. August and September were delightful months. A spell of wet weather lasting from August 25th to Sept. 5th rather delayed the carting, but it facilitated cultivation, cleaning and early sowing. Owing to the spring drought much of the seeds failed: only the clover sown in spring wheat in Great Knott Field survived. This was a great season for Daddy Longlegs. The differences on the experimental mangold plots showed up very well this year, though the yields were distinctly poor. When the corn was threshed out the yields were not unsatisfactory. Many farmers in the locality estimated their yields at 20 bush. of wheat, 22 of barley and 26 of oats only; ours were 34 bush. of wheat in two cases, but 20 only in the third. Oats, following clover, yielded 62 bushels. Potatoes improved considerably during the later part of the season, but finally yielded only 5½ tons per acre. Taking it altogether the season was a bad one and it ended badly: hay and roots had both proved disappointing.

OCTOBER, 1919—SEPTEMBER, 1920.

This season began in the extraordinary position that much of the ploughing was already nearly completed, consequently cross-ploughing and cultivations were carried out. The weather was remarkably suitable for cultivations: throughout October it was sunny by day and frosty by night, and the rainfall was only 1.0in. instead of 3.2in., the average. During the war years the fields had become foul: during this autumn we did much cleaning. On October 20th, Great Harpenden was drilled easily in spite of the drought: on October 23rd, New Zealand was drilled, but with more difficulty, the clods being not well broken. On October 24th, however, rain came, Stackyard and Broadbalk were, therefore, drilled easily. The oats in Sawpit were looking well, but nothing was yet showing in West Barnfield. By October 31st we had sown all our winter corn, excepting only 8 acres after mangolds and roots not yet lifted. The autumn tints were remarkably fine: this was popularly attributed to the dryness. November was very cold: the first snow came on the 11th.

In spite of the early sowing the wheat was late in starting, and it did not show in Harpenden Field till November 24th, a month after seeding: New Zealand, Stackyard and Broadbalk were not yet showing. December was milder and wet (5.3in. instead of 2.5in.), and it was not till the 18th that the bullocks were taken in: January was somewhat mild, the winter corn had strengthened considerably but was not too forward; February was also mild and March had some very warm days. February was

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very dry (0.5in. of rain only) : during March we had mild and growing weather. The wheat and oats looked well, having completely overcome the November check ; and the grass kept growing. The arable land remained free from weeds. Long Hoos barley was drilled on February 23rd, this being the earliest date for many years. April was wet and windy and unpleasant, but not cold. May was cold and dry ; the terrible flood that devastated Louth was represented here by a slight shower that barely wetted the soil. Oats made poor growth in Sawpit, except under the shelter of the plantation on the east side, and the hay was poor : wheat, however, looked well—indeed it was the best looking crop of the year, especially in Stackyard, New Zealand and Harpenden Fields : on Broadbalk, however, it was not so good, and there were many poppies, especially on the incompletely fertilised plots where the wheat had suffered during the spring ; oats were lengthening in the straw. July opened well, and the prospects for the season seemed very bright. Then, however, there set in a disastrous change ; after the first four days it became cold, wet, sunless and generally execrable to farmers. The position now altered very much for the worse. Fortunately, the seeds hay had been got in, but the permanent grass was still uncut. August was wintry and towards the end of the month we only just escaped frost ; the rainfall was low (1.2in.) but heavy downpours on the 2nd and 18th were harmful. A cold, sunless July always has a bad effect on our wheat crops, and this was no exception : good farmers had estimated at the beginning of July the yields on New Zealand at 48 bush., Harpenden at 46, and Stackyard at 44 bush. When we threshed out, the yields were only 40, 32 and 39 bushels respectively. Further, the oats were badly laid, although the yield was only 40 bushels. Fortunately, the harvest was got in easily and by the end of August practically all the corn and the second cuts of hay were in and a good beginning had been made with the ploughing. The mangolds had made good progress. The new clover was well established in Great Knott (west end) and on West Barnfield, and a strip of Long Hoos sown by the drill, whilst the part sown by the barrow (a usual practice on the farm in the past) was poor. Owing to the weedy condition of the last year's clover on Great Knott (east end), no second cut had been taken but the land ploughed in July and sown with mustard : this grew well and was ploughed in in September in preparation for oats. Mangolds in Barnfield and swedes in Little Hoos looked well : potatoes on Long Hoos, however, showed some disease and went off before the middle of September ; when lifted in October they were a fair crop (5 tons) clean, but with many small tubers. A sunless July is as bad for potatoes as it is for wheat.

The season began well but ended execrably. The yield of corn was disappointing, leaving the farm in an unfavourable financial condition. Only the grass flourished, and after the first cut it continued growing in a way that promised much winter keep

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DATES OF SOWING AND HARVESTING (Harvest of 1918).

Field.	Crop.	Variety.	Sowing began.	Sowing finished.	Cutting began.	Carting began.	Carting finished.	Yield per Acre.
Great Knott Wood, east	Oats	Grey Winter	Oct. 24, '17	Oct. 27, '17	Aug 1	Aug. 15	Aug. 17	37 bush.
,, ,, west	,, ...	,, ...	,, ,,	,, ,,	,,	,,	,,	
Little Knott Wood ...	Wheat	Red Standard (6 acres) ...	Nov. 8, '17	Nov. 8, '17	Aug. 10	Aug. 18	Aug. 18	40·5 ,,
		Red Marvel (7 acres)	Nov. 28, '17	Dec. 1, '17	,,	Aug. 27	Aug. 27	33 ,,
Fosters, east	Barley	Plumage Archer	Apr. 4, '18	Apr. 10, '18	Sept 7	Sept 11	Sept. 12	28 ,,
,, west	,, ...							
West Barnfield	Potatoes	Arran Chief and King Edward	May 3, '18	May 11, '18	Nov 7	... ...	... ...	5 tons* ware & 5 cwts. chats
Long Hoos, east ...	Wheat	Red Standard	Nov. 6, '17	Nov. 23, '17	Aug 17	Aug. 24	Aug. 30	40·5 bush.
,, west ...	,, ...							
Great Harpenden ...	Clover	Red	May 8, '17	May 8, '17	June 20	June 27	June 27	1·5 tons†
New Zealand	Swedes	Magnum Bonum and Early White ...	June 11, '18	June 11, '18	Failed	... ...	... ...	... ...
Stackyard	Mangolds ...	Yellow Globe	May 28, '18	May 28, '18	Nov. 18	... ...	... ...	12·3 tons
Sawpit	Wheat	Red Marvel (6 acres)	Nov. 30, '17	Nov. 30, '17	Aug. 16	Aug. 24	Aug. 24	33 bush.
Broadbalk	,, ...	Red Standard	Oct. 31, '17	Nov. 1, '17	Aug. 12	Aug. 20	Aug. 21	see p. 74
Little Hoos	,, ...	,, ...	Nov. 3, '17	Nov. 5, '17	Aug. 12	Aug. 20	Aug. 21	,, 77
Hoos	Barley	Plumage Archer	Mar. 18, '18	Mar. 18, '18	Sept. 2	Sept. 7	Sept. 9	,, 76
Barnfield	Mangolds ...	Sutton's Yellow Globe ...	Apr. 27, '18	Apr. 27, '18	Nov. 7	... ...	... ...	,, 69
Agdell	Clover	Red 1st Crop	May 14, '17	May 14, '17	June 22	July 2	July 2	,, 67
,, ...	,, ...	,, 2nd Crop	,,	,,	Aug 31	Sept. 3	Sept. 3	,, 67
Greatfield	Grass	Rented out for Grazing ...						
Park	,, ...	1st Crop	... ...	... ...	June 24	July 3	July 4	see p. 70
		2nd Crop	... ...	... ...	Sept. 16	Sept. 24	Sept. 25	,, 70

NOTE.—7 acres of Sawpit were fallow. * Quantity sold after clamping, see pp. 79 and 82. † Estimated always on measurements, not weighed.

DATES OF SOWING AND HARVESTING (Harvest of 1919).

Field.	Crop.	Variety.	Sowing began.	Sowing finished.	Cutting began.	Carting began.	Carting finished.	Yield per Acre.
Great Knott Wood, east	Wheat	Red Standard	Nov. 26, '18	Nov. 26, '18	Aug. 23	Sept. 8	Sept. 8	20 bush. (see p. 83)
,, ,, west	,, ...	Red Marvel	Mar. 25, '19	Mar. 25, '19	Sept. 18	Oct. 1	Oct. 1	
Little Knott Wood ...	Grass and Clover Ley ...	Red Standard	Nov. 9, '18	Nov. 9, '18	Aug. 22	Sept. 5	Sept. 5	
		Red Clover, Alsike, Timothy, Cocksfoot and Bent ... 1st Crop	Apr. 8, '18	Apr. 8, '18	June 12	June 17	June 17	1 ton
		2nd Crop	,, ,,	,, ,,	Aug. 15	Aug. 18	Aug. 18	12 cwt.
Foster's, east	,, ...	,, ,, ,,	May 10, '18	May 10, '18	June 21	June 26	June 30	1 ton
,, west	,, ...	,, ,, ,,	May 10, '18	,, ,,	June 21	June 26	June 30	16 cwt.
West Barnfield	Wheat	Red Standard	Nov. 19, '18	Nov. 25, '18	Aug. 21	Sept. 1	Sept. 1	35 bush.
Long Hoos, east ...	Barley	Plumage Archer	Apr. 18, '19	Apr. 18, '19	Sept. 8	Sept. 17	Sept. 17	28 bush.
	Mangolds ...	Sutton's Prize Winner, Yellow Globe	May 27, '19	May 27, '19	Oct. 19	... ...	... ...	9¼ tons
,, west ...	Turnips	Sutton's Aberdeen Green Top Turnip	June 21, '19	June 21, '19	Oct. 28	... ...	... ...	
	Potatoes ...	King Edward and Arran Chief	May 20, '19	May 20, '19	Oct. 16	... ...	... ...	5½ tons
Great Harpenden ...	Oats	Grey Winter	Oct. 3, '18	Oct. 3, '18	July 31	Aug. 12	Aug. 14	62 bush
New Zealand	Barley	Plumage Archer	Apr. 11, '19	Apr. 17, '19	Sept. 2	Sept. 11	Sept. 16	36 bush.
Stackyard	,, ...	,, ,, ,,	Apr. 9, '19	Apr. 9, '19	Sept. 1	Sept. 8	Sept. 8	32 bush.
Sawpit	Wheat	Red Standard	Oct. 16, '18	Oct. 23, '18	Aug. 15	Aug. 23	Aug. 27	34 bush.
Broadbalk	,, ...	,, ...	Oct. 25, '18	Oct. 26, '18	Aug. 14	Sept. 2	Sept. 5	see p. 74
Little Hoos	Barley	Plumage Archer	May 6, '19	May 6, '19	Sept. 11	Sept. 22	Sept. 22	,, 77
Hoos	,, ...	,, ...	Apr. 8, '19	Apr. 8, '19	Sept. 9	Sept. 16	Sept. 16	,, 76
Barnfield	Mangolds ...	Sutton's Yellow Globe ...	May 14, '19	May 14, '19	Oct. 29	... ...	... ...	,, 69
Agdell	Wheat	Red Standard	Oct. 18, '18	Oct. 18, '18	Aug. 11	Sept. 5	Sept. 5	,, 67
Greatfield	Grass	Rented out for Grazing ...						
Park	,, ...	1st Crop	... ...	... ...	June 16	June 18	June 18	,, 70
		2nd Crop	... ...	... ...	Sept. 23	Sept. 29	Sept. 30	,, 70

DATES OF SOWING AND HARVESTING (Harvest of 1920).

Field.	Crop.	Variety.	Sowing began.	Sowing finished.	Cutting began.	Carting began.	Carting finished.	Yield per Acre.
Great Knott Wood, east	Clover	Red	May 7, '19	May 7, '19	June 25	July 16	July 16	¾ tons
,, ,, west	Barley	Plumage Archer	Mar. 31, '20	Mar. 31, '20	Aug. 20	Aug. 30	Aug. 30	37 bush.
Little Knott Wood ...	Grass and Clover Ley ...	Red Clover, Alsike, Timothy, Cocksfoot and Bent ... 1st Crop	Apr. 8, '18	Apr. 8, '18	June 11	June 25	June 25	1½ tons
		2nd Crop	,, ,,	,, ,,	Sept. 2	Sept. 10	Sept. 10	
Foster's, east	Wheat	Yeoman	Sept. 25, '19	Sept. 25, '19	Aug. 9	Aug. 21	Aug. 21	22 bush.
,, west	Grass and Clover Ley ...	Red Clover, Alsike, Timothy, Cocksfoot and Bent ...	May 10, '18	May 10, '18	June 28	July 14	July 14	1¾ tons
West Barnfield	Oats	Grey Winters	Oct. 3, '19	Oct. 3, '19	Aug. 9	Aug. 17	Aug. 23	*40 bush.
Long Hoos, east ...	Potatoes	Arran Chief	May 13, '20	May 22, '20	Oct. 25	... ...	... ...	4 tons 1 cwt.
,, west ...	Barley	Plumage Archer	Feb. 23, '20	Feb. 27, '20	Aug. 13	Aug. 26	Aug. 28	36 bush.
	Wheat	Yeoman	Oct. 17, '19	Oct. 17, '19	Aug. 10	Aug. 21	Aug. 26	32 bush.
New Zealand	,, ...	Red Standard	Oct. 22, '19	Oct. 22, '19	Aug. 11	Aug. 25	Aug. 25	40 bush.
Great Harpenden ...	,, ...	Red Standard	Oct. 18, '19	Oct. 18, '19	Aug. 10	Aug. 23	Aug. 23	32 bush.
Stackyard	,, ...	Red Standard	Oct. 27, '19	Oct. 27, '19	Aug. 12	Aug. 26	Aug. 26	39 bush.
Sawpit	Oats	Grey Winters	Sept. 29, '19	Oct. 2, '19	Aug. 2	Aug. 16	Aug. 17	*40 bush.
Broadbalk	Wheat	Red Standard	Oct. 24, '19	Oct. 25, '19	Aug. 16	Aug. 28	Aug. 31	see p. 74
Little Hoos	Swedes	Sutton's Magnum Bonum ...	May 18, '20	May 19, '20	Oct. 19	... ...	... ...	,, 77
Hoos	Barley	Plumage Archer	Mar. 1, '20	Mar. 1, '20	Aug. 14	Aug. 27	Aug. 27	,, 76
Barnfield	Mangolds ...	Sutton's Yellow Globe ...	Apr. 29, '20	Apr. 29, '20	Dec. 5	... ...	... ...	,, 69
Agdell	Swedes	Sutton's Magnum Bonum ...	June 14, '20	June 14, '20	Oct. 19	... ...	... ...	,, 67
Greatfield, north ...	Grass	— —	... ...	... ...	July 19	Aug. 4	Aug. 18	,, 81
,, south ...	,, ...	— —	... ...	... ...	Aug. 17	Aug. 31	Sept. 9	,, 81
Park	,, ...	1st Crop	... ...	... ...	June 22	June 25	June 26	,, 70
		2nd Crop	... ...	... ...	Sept. 10	Sept. 27	Sept. 28	,, 70

* Sawpit and West Barnfield produce not kept separate this year.

CROP YIELDS ON THE EXPERIMENTAL PLOTS.

NOTE.—In each case the year refers to the harvest, *e.g.*, Wheat harvested in 1920.

1 acre	=	0·404 Hectare	0·963 Feddan
1 bushel (Imperial)	=	0·346 Hectolitre (36·346 litres) ...	0·184 Ardeb.
1 lb. (pound avoirdupois)	=	0·453 Kilogramme	1·009 Rotls.
1 cwt. (hundredweight)	=	50·8 Kilogrammes	113·0 Rotls. 1·366 Maunds
1 metric quintal ...	=	100·0 Kilogrammes ... ... 220·46 lb.	
1 bushel per acre ...	=	0·9 Hectolitre per Hectare ...	0·191 Ardeb per Feddan.
1 lb. per acre ...	=	1·12 Kilogramme per Hectare ...	1·049 Rotls per Feddan.
1 cwt. per acre ...	=	125·6 Kilogrammes per Hectare or 1·256 metric Quintals per Hectare	117·4 Rotls per Feddan.

In America the Winchester bushel is used = 35·236 litres. 1 English bushel = 1·032 American bushels.

Crops Grown in Rotation. Agdell Field.

PRODUCE PER ACRE.

Year.	CROP.	O. Unmanured		M Mineral Manure.		C. Complete Mineral and Nitrogenous Manure.	
		5. Fallow.	6. Beans or Clover.	3. Fallow.	4. Beans or Clover.	1. Fallow.	2. Beans or Clover.
EIGHTEENTH COURSE, 1916-19.							
1916	Roots (Swedes) cwt.	12·4	1·4	125·2	145·2	285·2	37·8*
1917	Barley Grain bush.	9·4	2·5	14·2	15·2	13·1	15·0
	Barley Straw ... cwt.	11·6	5·1	16·8	15·6	13·1	19·8
1918	Clover Hay ... cwt. (1st and 2nd crops)	—	19·5	—	59·5	—	17·0
1919	Wheat Grain bush.	8·0	3·4	13·5	7·9	17·5	2·2
	Wheat Straw ... cwt.	14·2	7·4	19·0	17·5	17·2	2·3
PRESENT COURSE (19th), 1920.							
1920	Roots (Swedes) cwt.	20·4	2·2	163·8	270·0	262·2	56·4*

In 1920 Rape Cake was omitted from Plots 1 and 2.
In 1916 and 1920, the roots on Plot 2 were badly attacked by finger and toe disease.

RAIN AND DRAINAGE.
MONTHLY MEAN FOR 50 YEARS, 1870—1920.

	Rainfall.	Drainage.			Drainage % of Rainfall.			Evaporation.		
		20-in. Gauge	40-in. Gauge	60-in. Gauge	20-in. Gauge	40-in. Gauge	60-in. Gauge	20-in. Gauge	40-in. Gauge	60-in. Gauge
	Ins.	Ins.	Ins.	Ins.				Ins.	Ins.	Ins
September	2·330	0·754	0·717	0·657	32·4	30·8	28·2	1·576	1·613	1·673
October ...	3·233	1·848	1·798	1·669	57·2	55·6	51·6	1·385	1·435	1·564
November	2·795	2·132	2·169	2·047	76·3	77·6	73·2	0·663	0·626	0·748
December	2·869	2·437	2·527	2·414	84·9	88·1	84·1	0·432	0·342	0·455
January...	2·364	1·892	2·078	2·001	80·0	87·9	84·6	0·472	0·286	0·363
February	2·008	1·480	1·584	1·513	73·7	78·9	75·4	0·528	0·424	0·495
March ...	2·103	1·148	1·285	1·215	54·6	61·1	57·8	0·955	0·818	0·888
April ...	2·012	0·653	0·727	0·695	32·5	36·1	34·5	1·359	1·285	1·317
May ...	2·025	0·475	0·537	0·502	23·5	26·5	24·8	1·550	1·488	1·523
June ...	2·375	0·595	0·616	0·595	25·1	25·9	25·0	1·780	1·759	1·780
July ...	2·667	0·680	0·703	0·654	25·5	26·4	24·5	1·987	1·964	2·013
August ...	2·719	0·740	0·741	0·697	27·2	27·3	25·6	1·979	1·978	2·022
Year ...	29·500	14·834	15·482	14·659	50·3	52·5	49·7	14·666	14·018	14·841

All four gauges measure $\frac{1}{1000}$ acre. Drain gauge records start Sept. 1st, 1870. Rain gauge records start Feb., 1853. For purpose of comparison the above figures deal with the same period as the drain gauge records, viz., Sept. 1st, 1870, to Aug. 31st, 1920.

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METEOROLOGICAL RECORDS, 1918-20

	Rain.			Drainage through soil.			Bright Sunshine.	Temperature. (Mean)			
	Total Fall.		No. of Rainy Days. (0·01 inch or more)								
	5-inch Funnel Gauge.	1/1000 Acre Gauge.	1/1000 Acre Gauge.	20 ins. deep.	40 ins. deep.	60 ins. deep.		Max.	Min.	1 ft. in ground.	Solar Max.
1918	Inches.	Inches.	No.	Inches.	Inches.	Inches.	Hours.	°F.	°F.	°F.	°F.
Jan. ...	2·314	2·990	15	2·951	3·059	*3 045	57·2	42·6	31·4	37·5	71·7
Feb. ...	1·027	1·232	15	0·537	0·553	0·526	66·3	46·9	36 6	40·8	78·2
Mar. ...	0·861	0·985	8	0·024	0 078	0·073	141·4	49·9	33·2	40·5	94·1
April ...	3·946	4·548	17	3·481	3·537	3·294	97·2	48·8	36·5	43·1	91·4
May ...	2·258	2·471	10	0·487	0·633	0·640	207·5	63·5	45·1	52·3	116·9
June ...	0·862	0·998	12	0·003	0·024	0·027	226·5	64·3	45·5	57·1	123·4
July ...	3·215	3·447	18	0·654	0·698	0·620	200·4	68·0	51·6	60·0	124·5
Aug. ...	1·163	1·331	11	0·004	0·032	0·040	178·9	68·9	52·9	61·4	122·9
Sept. ...	4·974	5·421	24	2·293	2·181	2·044	155·3	60·0	47·6	55 8	111·8
Oct. ...	1·703	1·964	15	1·094	1.140	1·065	78·8	53·5	41·9	49·6	88·1
Nov. ...	2·518	2·674	17	2·165	2·064	1·947	70·8	47·4	35·3	43·9	75·1
Dec. ...	2·839	3·175	26	2·814	2·897	2·754	36·5	48·7	39·8	44·3	65·1
Total or Mean	27·680	31·236	188	16·507	16·896	16·075	1516·8	55·2	41·5	48·9	96·9
1919											
Jan. ...	3·840	4·281	25	2·964	3·079	2·980	32·7	40·3	31·5	38·3	60·9
Feb. ...	2·901	3·290	14	3·975	3·961	3·925	48·1	38·7	27·9	35·3	73·1
Mar. ...	3·432	3·747	19	2·796	2·871	2·801	107·3	43·9	33·2	38·7	88·0
April ...	3·311	3·693	16	1·970	2·034	2·020	120·4	51·3	36·2	43·1	106·0
May ...	0·460	0·535	5	0·208	0·359	0·370	257·7	65·1	45·1	52·7	119·0
June ...	1·045	1·159	7		0·009	0·018	230·7	66·6	47·6	59·6	124·3
July ...	2·625	2·767	15	0·330	0·394	0 379	120·1	63·0	49·0	57·7	114·2
Aug. ...	3·239	3·404	12	1·337	1 389	1·346	228·9	70·3	52·2	61·4	124·1
Sept. ...	1·191	1·293	10	0·076	0·118	0·093	158·3	63·4	47·1	57·2	112·2
Oct. ...	0·977	1·073	14	No drainage this month			136·2	51·4	36·5	46·7	93·5
Nov. ...	2·049	2·239	20	1·569	1·331	1·238	48·6	41·4	32 4	40·5	67·4
Dec. ...	5·048	5·573	24	5·717	5·836	5 801	33·4	46·1	35·3	40·0	63·2
Total or Mean	30·118	33·054	181	20·942	21·381	20·971	1522·4	53·5	39·5	47·6	95·5
1920											
Jan. ...	2·730	3·015	21	2·548	2·620	2·590	51·0	45·7	34·3	39·6	66·5
Feb. ...	0·432	0·511	10	0·044	0·136	0·108	84·2	48·1	34·8	40·2	79·9
Mar. ...	1·403	1·629	17	0·399	0·405	0·407	141·4	52·3	36·4	42·5	98·6
April ...	4·246	4 585	20	3·167	3 183	3·163	90·3	52·3	40 8	47·1	100·8
May ...	1·208	1·336	13	0 009	0·064	0 061	241·6	61·1	45·1	52·7	118·9
June ...	1·832	1·927	12	0·045	0 079	0·098	233·5	65·6	48·8	59·0	124·9
July ...	4·613	4·780	20	2·036	2·060	1·983	148·2	64·3	50 2	59 4	120·0
Aug. ...	1 256	1·363	8	0·148	0·230	0·211	150·7	63·0	48·8	58·1	118·4
Sept. ...	1·961	2·131	13	0·417	0 388	0 368	110·5	62·9	48·1	55 8	109·3
Oct. ...	1·427	1·530	10	0·592	0·666	0·618	144·8	57·7	42·2	51 9	99·7
Nov. ...	1·687	1·846	9	1·365	1·206	1·129	71·8	48·2	35·3	43·4	77·4
Dec. ...	2·288	2·545	25	2 244	2·362	2·284	37·7	43·0	34·4	40·0	58·7
Total or Mean	25·083	27 198	178	13·014	13·399	13 020	1505·7	55·4	41·6	49·1	97·8

* On January 18 and 19, 1918, the cylinders and tank of 60" gauge were submerged: the figures for the 40" gauge are adopted (2·735") and included in above total.

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Mangolds, Barn Field, 1918, 1919, 1920.

Roots since 1856. Mangolds since 1876.
Produce per Acre.

Strip.	Strip Manures.	Cross Dressings. O. None.	N. Nitrate of Soda	A. Ammon. Salts.	A.C. Ammon. Salts and Rape Cake.	C. Rape Cake.
	1918.	Tons.	Tons.	Tons.	Tons.	Tons.
1	Dung only	R. **17 98**	**33 79**	**25 39**	**24 45**	**24 48**
		L. 2·79	4·17	3·39	3·16	3·69
2	Dung, Super., Potash ...	R. **25·26**	**38 58**	**34·73**	**34 04**	**28 30**
		L. 3·11	4·63	4·45	5·02	3·88
4	Complete Minerals ...	R. **4 61**	R. **28 59**	**22 39**	**29 65**	**16 88**
		L. 0 82	L. 3·15			
			R. **27·65**			
			L. 3·34	2·03	3·63	2·11
5	Superphosphate only ...	R. **5 65**	**25·18**	**12 50**	**12 33**	**12·50**
		L. 0·93	2·49	2·56	2·11	1·79
6	Super. and Potash ...	R. **4·58**	**25 09**	**20·30**	**25·56**	**15 03**
		L. 0·86	2·45	1·83	2·94	1·46
7	Super., Sulphate of Mag., and Sodium Chloride	R. **4 71**	**28·81**	**23 94**	**25 01**	**17 21**
		L. 0·84	2·82	2·41	3·05	1·97
8	None	R. **3·18**	**19 92**	**11·05**	**10 32**	**9·76**
		L. 0 69	2·81	2·94	2·53	1 89
9	Sodium Chloride, Nit. Soda, Sulph. Potash, and Sulph. Mag. ...	R. **26·56**				
		L. 2·57				
	1919					
1	Dung only	R. **9 05**	**17·49**	**14 14**	**10·60**	**11·28**
		L. 3·60	6·36	4·55	4·74	4·83
2	Dung, Super., Potash ...	R. **13·97**	**18 51**	**19 87**	**15 24**	**18·17**
		L. 5·67	8·89	8·23	7·60	6·92
4	Complete Minerals ...	R. **2·46**	R. **12 98**	**7·75**	**11·77**	**9 57**
		L. 0·97	L. 6·55			
			R. **12·86**			
			L. 5·69	4·43	6·86	3·48
5	Superphosphate only ...	R. **1·97**	**9·98**	**1 13**	**3 05**	**4·58**
		L. 0·81	4·38	1·00	1·86	1·88
6	Super. and Potash ...	R. **2·44**	**14·46**	**11·45**	**13 14**	**12 08**
		L. 0·91	5·81	4·54	5·98	2·84
7	Super., Sulphate of Mag., and Sodium Chloride	R. **3 13**	**15·93**	**14 48**	**14·98**	**13·94**
		L. 0·91	5·23	4·73	5·31	2·98
8	None	R. **2·16**	**7 63**	**3·08**	**4·06**	**6 50**
		L. 0·82	3·63	1·58	1·63	2·57
9	Sodium Chloride; Nit. Soda, Sulph. Potash and Sulph. Mag. ...	R **20·38**				
		L. 5·14				
	1920.					
1	Dung only	R. **18·99**	**30·26**	**21·38**	**23·89**	**25·12**
		L. 3·51	4·27	3·95	4·62	5·31
2	Dung, Super., Potash ...	R. **26·84**	**37·69**	**33·11**	**32·67**	**28·73**
		L. 4·78	6·74	6·69	7·28	5·94
4	Complete Minerals ...	R. **4·54**	R. **26·10**	**20·81**	**26·35**	**12·39**
		L. 0·96	L. 4·68			
			R. **21·21**			
			L. 2·90	3·54	4·75	2·17
5	Superphosphate only ...	R. **4·82**	**20·73**	**7·72**	**8·31**	**8·48**
		L. 0·95	3·33	2·84	2·86	2·13
6	Super. and Potash ...	R. **4·65**	**21·50**	**18·94**	**24·74**	**9·89**
		L. 1·04	3·49	2·84	4·39	2·25
7	Super., Sulphate of Mag., and Sodium Chloride	R. **4·91**	**21·84**	**19·95**	**19·05**	**11·86**
		L. 1·28	3·27	3·08	4·13	2·41
8	None	R. **3·99**	**13·81**	**5·91**	**4·44**	**6·17**
		L. 0·82	2·69	2·19	1·92	2·04
9	Sodium Chloride: Nit. Soda; Sulph. Potash and Sulph. Mag. ...	R. **29·35**				
		L. 4·86				

R.—roots. L.—leaves.

Notes: 1918—All Potash, Magnesia, and Rape Cake omitted.

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Hay. The Park Grass Plots. 1918, 1919, 1920.

Plot.	Manuring.		Yield of Hay per acre. 1918. 1st Crop.	1918. 2nd Crop.	1918. Total.	Yield of Hay per acre. 1919. 1st Crop.	1919. 2nd Crop.	1919. Total.	Yield of Hay per acre. 1920. 1st Crop.	1920. 2nd Crop.	1920. Total.	Plot.
			cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	
1	Single dressing Amm. Salts (=43 lbs. N.); (with Dung 8 years, 1856-63)	not limed	9·8	8·3	17·1	10·0	7·8	17·8	23·8	10·2	34·0	1
		limed ...	17·2	7·6	24·8	10·4	8·5	18·9	24·3	7·8	32·1	
2	Unmanured; (after Dung 8 years, 1856-63)	not limed	16·5	3·5	20·0	6·4	4·2	10·6	17·5	5·2	22·7	2
		limed ...	16·0	2·5	18·5	6·4	2·0	8·4	19·2	5·5	24·7	
3	Unmanured	not limed	14·7	2·8	17·5	4·1	3·7	7·8	15·7	4·1	19·8	3
		limed ...	15·1	3·4	18·5	3·8	2·2	6·0	16·0	4·2	20·0	
4-1	Superphosphate of Lime	not limed	24·2	4·3	28·5	9·1	4·9	14·0	24·1	6·8	30·9	4-1
		limed ...	17·6	3·4	21·0	6·1	1·9	8·0	25·0	6·2	31·2	
4-2	Superphosphate of Lime and double dressing Amm. Salts (=86 lbs. N.)	not limed	18·5	5·0	23·5	9·4	1·9	11·3	25·6	5·2	30·8	4-2
		limed ...	26·3	10·5	36·8	17·4	9·0	26·4	31·4	10·0	41·4	
5-1	(N. half) Unmanured; following double dressing Amm. Salts (= 86 lbs. N.) 1856-97	not limed	12·1	2·8	14·9	4·4	3·8	8·2	10·3	5·4	15·7	5-1
5-2	(S. half) Super., Sulphate of Potash; following double dressing Amm. Salts (= 86 lbs. N.) 1856-97	not limed	24·5	5·8	30·3	13·0	7·3	20·3	20·8	8·8	29·6	5-2
6	Complete Mineral Manure as plot 7; following double dressing Amm. Salts (= 86 lbs. N.) 1856-68	not limed	41·5	7·9	49·4	23·0	13·1	36·1	35·3	14·8	50·1	6
7	Complete Mineral Manure	not limed	37·9	7·3	45·2	19·8	13·1	32·9	31·7	14·3	46·0	7
		limed ...	42·3	5·5	47·8	21·1	10·7	31·8	41·8	12·3	54·1	
8	Mineral Manure without Potash	not limed	21·7	4·2	25·9	9·9	9·8	19·7	19·9	7·4	27·3	8
		limed ...	19·3	4·2	23·5	8·8	6·8	15·6	16·4	7·2	23·6	
9	Complete Mineral Manure and double dressing Amm. Salts (= 86 lbs. N.)	not limed	32·5	14·2	46·7	36·5	16·7	53·2	34·3	15·3	49·6	9
		limed ...	46·7	12·8	59·5	50·6	17·1	67·7	42·3	13·1	55·4	
10	Mineral Manure (without Potash) and double dressing Amm. Salts (= 86 lbs. N.)	not limed	24·5	9·0	33·5	26·1	8·4	34·5	22·1	10·5	32·6	10
		limed ...	42·8	10·8	53·6	37·1	13·5	50·6	35·3	12·0	47·3	
11-1	Complete Mineral Manure and treble dressing Amm. Salts (=129 lbs. N.)	not limed	44·9	19·0	63·9	35·4	30·1	65·5	41·0	35·4	76·4	11-1
		limed ...	52·5	17·5	70·0	49·1	18·0	69·1	52·6	21·4	74·0	
11-2	As plot 11-1 and Silicate of Soda	not limed	48·0	23·3	71·3	51·8	26·9	78·7	50·9	33·4	84·3	11-2
		limed ...	49·0	18·6	67·6	57·6	21·5	79·1	52·1	28·1	80·2	

12	Unmanured	not limed	17·9	5·8	23·7	7·7	6·9	14·6	12·7	6·9	19·6	12
13	Dung in 1905, and every fourth year since (omitted in 1917)	not limed	41·2	13·4	54·6	45·0	15·9	60 9	34·0	14·4	48 4	13
	Fish Guano in 1907 and every fourth year since	limed ...	37·8	10·9	48 7	35·1	15·0	50·1	34·2	11·6	45·8	
14	Complete Mineral Manure and double dressing Nitrate of Soda (=86 lbs. N.)	not limed	44·3	19·2	63·5	65·2	17·7	83·9	68·8	18·9	87·7	14
		limed (sun)	—	—	—	—	—	—	74·7	13·6	88·3	
		limed (shade)	—	—	—	—	—	—	53·5	34·7	88·2	
15	Complete Mineral Manure as plot 7; following double dressing Nitrate of Soda (= 86 lbs. N.) 1858-75	not limed	29·8	9·5	39·3	17·4	9·1	26·5	34·8	10·8	45 6	15
		limed ...	—	—	—	—	—	—	28·3	12·5	40·8	
16	Complete Mineral Manure and single dressing Nitrate of Soda (= 43 lbs. N.)	not limed	41·0	14·3	55·3	34·0	10·1	44·1	48·3	10·1	58·4	16
		limed ...	35·8	9·4	45·2	25·3	13·2	38·5	43·4	11·1	54·5	
17	Single dressing Nitrate of Soda (= 43 lbs. N)	not limed	25·4	5·2	30·6	11·3	6·3	17·6	36·2	9·5	45·7	17
		limed ...	—	—	—	—	—	—	30·9	10·2	41·1	
18	Potash, Sulphate of Soda, Magnesia, and double dressing Sulphate of Amm. (= 86 lbs. N.) 1905 and since	not limed	29 0	12·7	41·7	24·9	13·5	38·4	25·1	24·5	49·6	18
		limed (6788 lbs.)	—	—	—	—	—	—	27·8	17·9	45·7	
		limed (3951 lbs.)	—	—	—	—	—	—	34·3	12·1	46·4	
19	Farmyard Dung in 1905 and every 4th year since (omitted in 1917)	not limed	32·7	6·8	39·5	16·4	11·3	27·7	29·6	14·7	44·3	19
		limed (3150 lbs.)	—	—	—	—	—	—	32·1	14·1	46·2	
		limed (570 lbs.)	—	—	—	—	—	—	31·3	12·0	43·3	
20	Farmyard Dung in 1905 and every 4th year since (omitted 1917); each intervening year, plot 20 receives Sulphate of Potash, Superphosphate and Nitrate of Soda (= 26 lbs. N.)	not limed	41·9	8·9	50·8	27·6	12·3	39·9	39·2	13·4	52·6	20
		limed (2772 lbs.)	—	—	—	—	—	—	41·7	14·7	56·4	
		limed (570 lbs.)	—	—	—	—	—	—	44·5	11·3	55·8	

Ground lime was applied to the Southern portion (limed) of the plots at the rate of 2,000 lb. to the acre in the Winter of 1903, 1907, 1915, and at the rate of 2,500 lbs. to the acre in the Winter of 1920, except where otherwise stated.

In 1918 all Sulphate of Potash and Sulphate of Magnesia were omitted from the Mineral Manures in plots 6, 7, 9, 11-1, 11-2, 14, 15, 16, and 18; also Potash was omitted from plot 5-2, and Magnesia from plots 8 and 10.

1919. instead of Sulphate of Potash, an equivalent amount of Muriate of Potash was used.

In 1919 and 1920 an equivalent amount of Sulphate of Ammonia was used instead of Muriate of Ammonia.

Up to 1914 the limed and unlimed plot results were not separately given in the Annual Report, but the mean of the two was given. From 1915 onwards the separate figures are given.

In the reports for 1913, 1914, 1915-17 the manuring of plot 5-2 was incorrectly given as complete Mineral Manure. instead of as Superphosphate and Sulphate of Potash.

The Park Grass Plots.

BOTANICAL COMPOSITION, PER CENT.

Plot.	Manuring.	Liming.	Crop.	1918. Gramineæ.	1918. Leguminosæ.	1918. Other Orders.	1919. Gramineæ.	1919. Leguminosæ.	1919. Other Orders.	"Other Orders" consist largely of	Plot.
1	Single Amm. Salts, (with Dung 8 years, 1856-63)	Limed ...	1st	—	—	—	77·71	·68	21·62	Rumex acetosa and Centaurea nigra	1
		,, ...	2nd	—	—	—	82·66	·27	17·07		
1	,, ,, ...	Not limed	1st	—	—	—	86·36	—	13·65	Rumex acetosa	1
		,,	2nd	—	—	—	93·70	—	6·30		
2	Unmanured: (after Dung 8 years, 1856-63)	Limed ...	1st	—	—	—	61·13	5·65	33·22	Plantago lanceolata, Ranunculus spp., and Centaurea nigra	2
		,, ...	2nd	—	—	—	62·55	7·16	30·30		
2	,, ,, ...	Not limed	1st	—	—	—	57·94	4·38	37·68	Plantago lanceolata, Centaurea nigra, Conopodium denudatum	2
		,,	2nd	—	—	—	55·99	4·27	39·74		
3	Unmanured	Limed ...	1st	52·67	10·88	36·44	58·59	5·51	35·90	Plantago lanceolata and Centaurea nigra	3
		,, ...	2nd	50·00	7·16	42·84	50·80	7·89	41·31		
3	,, ...	Not limed	1st	45·04	6·30	48·65	47·62	4·55	47·82	Plantago lanceolata, Leontodon hispidus and Poterium sanguisorba ...	3
		,,	2nd	44·27	2·51	53 21	54·40	4·13	41·50		
4-1	Superphosphate of Lime	Limed ...	1st	41·30	10 82	47·90	53·63	9·66	36·71	Plantago lanceolata, Rumex acetosa, and Centaurea nigra	4-1
		,, ...	2nd	43·20	6·05	50·65	54 17	6·19	39·64		
4-1	,, ,, ...	Not limed	1st	49·17	3·48	47·35	52·77	2·76	44·47	Plantago lanceolata and Rumex acetosa	4-1
		,,	2nd	50·36	1·86	47·77	46·74	2·67	50·60		
4-2	Super. of Lime and double Amm. Salts	Limed ...	1st	96·51	—	3·48	98·17	—	1·82	Rumex acetosa	4-2
		,, ...	2nd	98·77	—	1·23	98·81	—	1·18		
4-2	,, ,, ...	Not limed	1st	88·94	·12	10·96	91·94	—	8·05	Rumex acetosa	4-2
		,,	2nd	96·96	·28	2·74	97·74	—	2·26		
5-1	Unmanured, following double Amm. Salts, 1856-97	Whole plot	1st	—	—	—	77·81	·39	21·80	Rumex acetosa and Centaurea nigra	5-1
		,,	2nd	—	—	—	67·70	1·98	30·31		
5-2	Super. and Sulph. Potash following double Amm. Salts, 1856-97 ...	Whole plot	1st	65·69	7·10	27·20	63·19	4·54	32·27	Rumex acetosa and Luzula campestris	5-2
		,,	2nd	57·31	8·87	33·82	60·33	12·22	27·46		
6	Complete Mineral Manure following double Amm. Salts, 1856-68 ...	Whole plot	1st	57·63	16·29	26·08	57·18	11·46	31·37	Rumex acetosa and Conopodium denudatum	6
		,,	2nd	70·78	4·32	24·90	69·01	13·48	17·52		
7	Complete Mineral Manure	Limed ...	1st	70·75	16·04	13·19	59·10	19·62	21·28	Rumex acetosa, Ranunculus spp. and Conopodium denudatum	7
		,, ...	2nd	74·30	13·68	12·03	62·62	25·23	12·15		
7	,, ,, ...	Not limed	1st	57·12	11·11	31·79	52 05	8·77	39·18	Rumex acetosa, Conopodium denudatum, and Achillea millefolium	7
		,,	2nd	58·33	5·20	36·46	56·32	18·61	25 08		
8	Mineral Manure (without Potash) ...	Limed ...	1st	55·29	6·23	38·50	58·46	7·51	34·02	Rumex acetosa and Plantago lanceolata	8
		,,	2nd	49·79	5·80	44·40	53·01	7·97	39·02		
8	,, ,, ,, ...	Not limed	1st	37·68	6·32	56·01	46·62	10·55	42·82	Plantago lanceolata and Rumex acetosa	8
		,,	2nd	34·88	7·49	57·63	52 03	9·19	38·77		

9	Complete Mineral Manure, and double Amm. Salts	Limed ...	1st	97·81	—	2·18	95·85	·09	4·05	Rumex acetosa	9
		,,	2nd	99·26	—	·73	98·40	·97	·61		
9	,, ,, ,, ...	Not limed	1st	79·91	—	20·10	85·00	—	15·00	Rumex acetosa	9
		,,	2nd	97·34	—	2·65	94·75	—	5·24		
10	Mineral Manure (without Potash) and double Amm. Salts	Limed ...	1st	99·68	—	·31	99·59	—	·41	Rumex acetosa	10
		,,	2nd	100·00	—	—	99·77	—	·23		
10	,, ,, ,, ...	Not limed	1st	87·86	—	12·13	92·60	—	7·40	Rumex acetosa	10
		,,	2nd	99·59	—	·41	97·36	—	2·63		
11-1	Complete Mineral Manure and treble Amm. Salts	Limed ...	1st	99·63	—	·37	99·84	—	·16	Rumex acetosa	11-1
		,,	2nd	100·00	—	—	99·49	—	·52		
11-1	,, ,, ,, ...	Not limed	1st	97·50	—	2·50	98·86	—	1·14	Rumex acetosa	11-1
		,,	2nd	100·00	—	—	99·56	—	·43		
11-2	As plot 11-1 and Silicate of Soda ...	Limed ...	1st	99·59	·06	·35	100·00	—	—		11-2
		,,	2nd	100·00	—	—	99·86	—	·13		
11-2	,, ,, ,, ...	Not limed	1st	98·54	—	1·47	99·62	—	·38	Rumex acetosa	11-2
		,,	2nd	99·82	—	·18	99·75	—	·25		
12	Unmanured	Whole plot	1st	—	—	—	54·80	5·34	39·87	Plantago lanceolata and Conopodium denudatum	12
		,,	2nd	—	—	—	50·56	8·19	41·24		
13	Dung in 1905 and every 4th year since (omitted in 1917); Fish Guano	Limed ...	1st	—	—	—	86·89	·82	12·28	Rumex acetosa and Conopodium denudatum	13
		,,	2nd	—	—	—	92·12	2·51	5·37		
13	in 1907 and every 4th year since ...	Not limed	1st	—	—	—	79·83	·07	20·09	Rumex acetosa and Conopodium denudatum	13
		,,	2nd	—	—	—	96·23	·26	3·51		
14	Complete Mineral Manure and double Nitrate of Soda	Whole plot	1st	—	—	—	92·92	2·41	4·68	Anthriscus sylvestris	14
		,,	2nd	—	—	—	95·29	·74	3·97		
15	As plot 7, following double Nitrate of Soda, 1858-75	Whole plot	1st	75·32	6·99	17·70	69·25	5·39	25·35	Rumex acetosa and Achillea millefolium	15
		,,	2nd	73·26	3·15	23·58	77·14	6·54	16·31		
16	As plot 7, and single Nitrate of Soda	Limed ...	1st	—	—	—	89·60	·78	9·62	Anthriscus sylvestris	16
		,,	2nd	—	—	—	90·69	·89	8·42		
16	,, ,, ,, ...	Not limed	1st	—	—	—	85·98	1·17	12·84	Taraxacum vulgare and Plantago lanceolata	16
		,,	2nd	—	—	—	86·60	1·26	12·14		
17	Single Nitrate of Soda	Whole plot	1st	—	—	—	58·53	·43	41·04	Plantago lanceolata and Centaurea nigra	17
		,,	2nd	—	—	—	66·55	·24	33·21		
18	Potash, Sulph. Soda, Magnesia and double Sulph. Amm., 1905 and since	Whole plot	1st	—	—	—	68·93	—	31·07	Rumex acetosa and Conopodium denudatum	18
		,,	2nd	—	—	—	80·04	—	19·95		
19	Farmyard Dung, 1905, and every 4th year since (omitted in 1917) ...	Whole plot	1st	72·80	6·59	20·61	75·21	6·17	18·61	Rumex acetosa and Ranunculus spp.	19
		,,	2nd	83·97	7·54	8·50	83·43	9·34	7·22		
20	Dung in 1905 and every 4th year since (omitted in 1917). Each intervening year Sulph. Potash, Super. and Nitrate of Soda	Whole plot	1st	78·44	9.26	12·29	81·85	4·72	13·44	Rumex acetosa, Anthriscus sylvestris, Ranunculus spp.	20
		,,	2nd	88·10	4·29	7·61	91·93	4·13	3·94		

WHEAT. BROADBALK FIELD, 1918, 1919, 1920.

Manures.	1918. Top portion. Dressed Grain. Yield per Acre.	1918. Top portion. Dressed Grain. Weight per Bushel.	1918. Top portion. Straw per Acre.	1918. Bottom portion. Dressed Grain. Yield per Acre.	1918. Bottom portion. Dressed Grain. Weight per Bushel.	1918. Bottom portion. Straw per Acre.	1919. Top portion. Dressed Grain. Yield per Acre.	1919. Top portion. Dressed Grain. Weight per Bushel.	1919. Top portion. Straw per Acre.	1919. Bottom portion. Dressed Grain. Yield per Acre.	1919. Bottom portion. Dressed Grain. Weight per Bushel.	1919. Bottom portion. Straw per Acre.	1920. Top portion. Dressed Grain. Yield per Acre.	1920. Top portion. Dressed Grain. Weight per Bushel.	1920. Top portion. Straw per Acre.	1920. Bottom portion. Dressed Grain. Yield per Acre.	1920. Bottom portion. Dressed Grain. Weight per Bushel.	1920. Bottom portion. Straw per Acre.	Average for 61 years, 1852-1912. Dressed Grain per Acre.	Average for 61 years, 1852-1912. Straw per Acre.
	Bushels	lb.	cwt.	Bushels	lb.	cwt.	Bushels	lb.	cwt.	Bushels	lb.	cwt.	Bushels	lb.	cwt.	Bushels	lb.	cwt.	Bushels	cwt.
Farmyard Manure	30·8	65·3	38·8	36·1	65·1	39·9	22·8	62·7	19·0	27·1	62·3	21·6	28 3	61·5	38·4	33·2	62·0	42·6	35·2	34·8
Unmanured	11·5	64·1	9·9	10·0	64·6	9·1	9·2	61·0	7·0	9·8	60·4	7·4	9·4	61·0	8·8	8·1	60·9	7·8	12·6	10·3
Complete Mineral Manure ...	9·1	64·6	10·0	9·0	64·9	10·1	9·8	60·3	7·8	10·0	61·5	7·0	8·2	61·3	8·3	8·2	62·1	8 0	14·5	12·1
As 5, and Single Amm. Salts ...	16·5	64·8	23·5	13·2	64·9	15·4	19·5	61·1	15·7	18·4	61·6	13·9	15·3	61·5	16·1	15·1	61·2	14·9	23·2	21·4
As 5, and Double Amm. Salts	25·2	64·6	35·1	23·0	65·0	33·8	27·6	61·4	21·4	33·3	61·6	24·7	21·6	61·3	25·7	30·9	60·9	36·5	32·1	32·9
As 5, and Treble Amm. Salts	27·7	65·1	45·6	27·5	65·3	44·2	29·6	61·7	29·3	37·4	61·7	29·6	27·1	61·8	45·4	28·8	60·4	42·3	36·6	41·1
As 5, and Single Nitrate of Soda	21·5	64·9	30·7	21·6	65·4	25·9	21·0	60·2	17·5	23·9	61·0	18·8	23·6	61·1	25·7	26·8	61·6	27·4	—	—
Double Amm. Salts alone ...	13·8	64·5	16·9	15·9	64·7	18·8	16·4	59·8	13·6	15·2	58·9	13·1	15·7	59·5	19·0	13·0	60·0	18·0	20·0	18·4
As 10, and Superphosphate ...	17·9	64·5	21·7	16·5	64·7	21·1	10·7	57·6	16·1	12·4	57·0	15·7	13·6	59·7	19·1	9·6	58·9	21·5	22·9	22·3
As 10, and Super. and Sulph. Soda	20·8	64·6	25·8	24·3	63·9	27·4	17·3	58·2	16·2	18·5	57·8	19·9	19·3	60·3	27·9	18·4	60·8	28·1	29·1	28·0
As 10, and Super. and Sulph. Potash	20·3	65·0	27·2	22·9	64·7	31·6	29·3	60·6	25·9	27·4	60 8	24·8	24·9	61·4	29·6	28·9	61·1	39·0	31·0	31·5
As 10, and Super. and Sulph. Magnesia	21·4	64·9	24·2	24·8	64·7	32·1	17·7	58·3	19·2	27·5	59·3	23·6	15·5	59·8	26·1	18·2	59·7	28·8	28·8	28·0
Double Amm. Salts in Autumn and Minerals	25·9	65·0	33·0	22·3	65·1	31·5	22·5	60·3	18·3	20·7	60·4	15·8	17·6	61·1	24·3	16·1	61·1	23·0	29·9	29·7
Double Nitrate and Minerals...	29·7	65·4	41·8	25·4	65·5	41·6	32·8	60·9	29·6	32·6	61·3	29·7	25 2	61·4	30·8	25·5	61·2	35·0	—	—
Minerals alone, or double Amm. Salts alone in alternate years	17·5	65·0	20·3	21·8	65·1	28·8	11·7	62·9	8·1	13·8	62·4	9·4	19·1	61·3	19·6	20·0	61·5	21·1	29·9	29·5
	12·4	65·0	10·1	16·6	65·4	12·6	30·2	60·6	21·9	30·0	61·0	25·3	6·3	58·4	6·9	6·4	59·9	7·7	14·9	13·0
Rape Cake alone	17·0	65·0	13·7	15·4	64·9	16·8	13·5	61·5	9·5	12·0	61·6	11·2	11·8	60·3	10·9	13·0	60·4	14·3	*25·4	*25·7
Mineral Manure (without Super.) and Amm. Salts	17·3	65·3	19·8	—	—	—	21·7	61·5	18·6	—	—	—	15·4	59·6	18·7	—	—	—	—	—

* Average for 20 years, 1893-1912.

1918, 1919, Sulphate of Potash omitted from plots 5, 6, 7, 8, 9, 13, 15, 16, 17 or 18, 20. Sulphate of Soda omitted from plot 12. Sulphate of Magnesia omitted from plot 14.

1918, 1919, 1920. Rape Cake omitted from plot 19.

Plot 17 received Mineral dressing in 1919. Amm. Salts in 1918, 1920.

Plot 18 ,, ,, ,, 1918, 1920. ,, ,, 1919.

From 1917 onwards, Muriate of Ammonia has been replaced by an equivalent amount of Sulphate of Ammonia.

Hoos Field (formerly Potato Plots).

No Manure since 1901.

Plot.	Manuring given prior to 1901.	1918. BARLEY. Dressed Grain. Yield per Acre.	Weight per Bush.	Straw per Acre.	Total Produce per Acre.	1919. BARLEY. Dressed Grain. Yield per Acre.	Weight per Bush.	Straw per Acre.	Total Produce per Acre.
	Previous Cropping: Potatoes, 1876-1901; Barley, 1902 and 1903; Oats, 1904; Barley, 1905-1911; Oats, 1912; Barley, 1913 and 1914; Oats, 1915; Barley, 1916-17.								
		Bush.	lb.	cwt.	lb.	Bush.	lb.	cwt.	lb.
1	Unmanured	8·4	52·4	4·0	912	4·7	52·3	3·2	645
2	Unmanured 1882 to 1901, previously Dung only	11·1	51·8	5·7	1243	7·5	53·1	4·6	964
3	Dung 1883 to 1901	16·2	54·8	8·6	1878	11·5	53·1	6·4	1379
4	Dung 1883 to 1901	16·3	53·1	7·5	1728	12·7	52·9	6·7	1475
	Previous Cropping: Potatoes, 1876-1901; Barley, 1902-1903; Oats, 1904; Plots 5, 7, 9, Cow Peas (failed), 1905; Plots 6, 8, 10, Red Clover, 1905; Red Clover, 1906-1911; Oats, 1912; Barley, 1913 and 1914; Oats, 1915; Barley, 1916-17.								
5	Ammonium Salts	11·6	54·5	7·0	1440	7·6	51·3	5·1	1004
6	Nitrate of Soda	15·8	54·1	7·0	1723	7·7	51·8	5·1	1014
7	Ammonium Salts and Mixed Minerals	21·0	54·1	11·1	2422	12·1	53·1	5·9	1339
8	Nitrate of Soda and Mixed Minerals ...	19·2	53·5	8·2	1973	9·3	53·0	5·5	1150
9	Superphosphate	14·4	54·1	7·6	1660	8·8	53·6	4·1	965
10	Mixed Minerals	14·8	53·4	6·7	1561	10·7	53·5	5·3	1278

NOTE.—In 1920 these plots were fallowed.

Permanent Barley Plots. Hoos Field, 1918, 1919, 1920.

PRODUCE PER ACRE

Plot.	MANURING.	1918			1919			1920			Average 60 years, 1852—1911.	
		Dressed Grain.	Weight per Bushel.	Straw.	Dressed Grain.	Weight per Bushel.	Straw.	Dressed Grain.	Weight per Bushel.	Straw.	Dressed Grain.	Straw.
		Bush.	lb.	cwt.	Bush.	lb.	cwt.	Bush.	lb.	cwt.	Bush.	cwt.
1 O	Unmanured	18·3	52·1	7·9	5·5	52·0	3·6	6·4	55·4	3·2	14·3	8·4
2 O	Superphosphate only	27·7	51·7	11·0	11·6	54·8	5·7	13·2	53·4	7·5	19·7	10·0
3 O	Alkali Salts only	16·9	51·7	7·9	9·0	54·4	5·8	9·1	52·9	4·7	15·2	8·8
4 O	Complete Minerals	24·9	52·2	11·5	14·6	54·1	8·4	13·7	52·6	6·3	19·7	11·1
5 O	Potash and Superphosphate	14·7	51·5	7·3	9·4	55·0	6·1	5·2	54·5	3·4		
1 A	Ammonium Salts only	25·1	50·7	11·5	11·2	52·5	6·5	17·3	51·2	8·1	25·5	14·7
2 A	Superphosphate and Amm. Salts	41·4	50·6	17·7	18·1	51·4	9·1	22·8	51·7	10·7	38·2	22·0
3 A	Alkali Salts and Amm. Salts	23·4	52·1	11·2	15·7	53·4	9·1	16·1	53·1	9·6	28·0	16·9
4 A	Complete Minerals and Amm. Salts	34·9	51·7	15·7	24·5	54·6	12·5	38·5	52·7	14·9	41·5	25·0
5 A	Potash, Super. and Amm. Salts	38·6	52·1	20·3	23·5	54·6	14·0	30·4	53·4	16·3		
1 AA	Nitrate of Soda only	26·7	51·3	14·7	16·1	53·3	9·7	20·2	53·3	12·1	29·3	17·8
2 AA	Super. and Nitrate of Soda	46·4	52·5	22·6	30·1	54·1	14·4	37·3	53·3	16·1	43·1	26·3
3 AA	Alkali Salts and Nitrate of Soda	21·1	52·0	13·3	16·7	54·1	11·3	14·7	53·1	12·3	30·0	19·3
4 AA	Complete Minerals and Nitrate of Soda	43·3	50·6	16·9	28·0	54·1	15·1	31·8	54·1	15·3	42·7	27·3
1 AAS	As Plot 1 AA and Silicate of Soda	29·2	51·6	14·5	20·3	54·0	12·9	27·7	53·8	14·8	32·8 (1)	19·7 (1)
2 AAS	,, ,, 2 AA ,, ,,	45·1	52·7	21·7	27·8	52·9	12·0	39·4	53·7	15·7	42·3 (1)	26·0 (1)
3 AAS	,, ,, 3 AA ,, ,,	24·0	52·7	16·1	19·8	54·0	12·6	23·9	52·8	15·8	35·2 (1)	21·7 (1)
4 AAS	,, ,, 4 AA ,, ,,	39·5	51·3	20·3	20·5	54·8	12·2	30·5	54·3	15·5	43·6 (1)	27·7 (1)
1 C	Rape Cake only	18·7	52·5	9·3	10·7	53·9	5·6	11·9	53·9	5·8	38·3	22·1
2 C	Superphosphate and Rape Cake	21·9	52·0	11·1	11·7	54·6	6·7	12·1	53·4	5·6	40·5	23·6
3 C	Alkali Salts and Rape Cake	16·6	51·3	9·2	8·5	54·5	5·3	9·7	54·0	4·8	36·9	22·3
4 C	Complete Minerals and Rape Cake	17·3	52·6	8·9	10·0	54·1	6·2	10·2	54·5	4·5	40·5	24·5
7—1	Unmanured (after dung 20 years, 1852—71)	26·7	52·4	12·0	12·1	54·5	6·5	17·5	53·6	8·0	24·8 (2) 47·1	14·8 (2) 29·6
7—2	Farmyard Manure	58·8	53·0	28·7	32·1	55·2	18·2	48·3	54·3	27·3		
6—1	Unmanured	20·9	52·3	9·2	7·6	53·5	4·3	13·3	53·5	7·3		
6—2	Ashes from Laboratory Furnace	19·5	50·6	8·5	6·8	53·5	3·9	10·2	53·8	5·7		
1 N	Nitrate of Soda only	26·3	50·6	14·0	12·5	53·0	8·6	10·3	53·3	6·4		
2 N	,, ,, ,,	27·8	52·1	15·9	19·5	54·9	11·4	20·3	53·0	10·5		

(1) 48 years, 1864—1911. (2) 40 years, 1872—1911.

NOTES:— 1918. Sulphate of Potash, Sulphate of Magnesia and Rape Cake omitted in all cases.
1919 and 1920. Rake Cake omitted in all cases. Also since 1917 Muriate of Ammonia replaced by equivalent amount of Sulphate of Ammonia.

Little Hoos Field

PLAN OF ROTATION PLOTS

Arranged to test the RESIDUAL VALUE of VARIOUS MANURES in one, two, three, and four years after their application. Produce per acre.

Plot.	Manure per Acre.	Year of Last Dressing.	1918 (15th Season). Wheat.			1919 (16th Season). Barley.			1920 (17th Season) Swedes.		
			Dress'd Grain Bush. per Acre.	Straw cwt. per Acre.	Total Pr'd'ce lb. per Acre.	Dr'ss'd Grain Bush. per Acre.	Straw cwt. per Acre.	Total Pr'd'ce lb. per Acre.	Roots tons per Acre.	Leav's tons per Acre.	Total tons per Acre.
A 1	Control	—	*36·3*	*36·7*	*6613*	*10·8*	*8·7*	*1669*	*9·43*	*2·60*	*12·03*
2		1920	42·5	45·7	8129	27·9	17·2	3554	**18 38**	**3 10**	**21 48**
3	Ordinary Dung, 16 tons	1913	44·3	42·9	7921	27·4	16·1	3390	12·02	2·45	14·47
4		1914	43·2	42·8	7812	25·8	14·7	3128	10·43	2·17	12·60
5		1915	42·1	41·8	7685	29·3	18·0	3758	13·40	2·84	16·24
B 1	Cake fed dung, 16 tons	1920	44·8	46·3	8288	28·6	16·9	3519	**21 74**	**3 73**	**25 47**
2	Control	—	*38·2*	*36·7*	*6831*	*11·7*	*10·5*	*2075*	*8·42*	*2·32*	*10·74*
3	Cake fed dung, 16 tons	1913	46·8	47·3	8550	28·8	15·9	3462	15·20	3·00	18·20
4		1914	44·2	43·5	7974	29·8	16·7	3546	16·89	3·39	20·28
5		1915	44·6	44·0	8024	29·6	17·1	3553	14·80	2·88	17·68
C 1	Shoddy, 308 lb.; Super. 292 lb.; Sulph. of	1920	33·6	32·6	6071	11·4	9·0	1715	**11·93**	**3·62**	**15·55**
2	Potash 110 lb. ...	1913	32·9	32·9	6097	14·3	9·8	1985	10·54	3·58	14·12
3	Control	—	*36·5*	*33·5*	*6344*	*13·4*	*8·4*	*1756*	*13·66*	*3·65*	*17·31*
4	Shoddy 308 lb.; Super. 292 lb.; Sulph. of	1914	34·9	36·6	6635	17·2	10·5	2194	12·62	3·33	15·95
5	Potash 110 lb. ...	1919	37·5	37·2	6765	**23·3**	**14·5**	**2996**	14·57	3·50	18·07
D 1	Guano 352 lb.; Sulph. Amm. 44 lb. ...	1920	38·3	39·2	7119	14·9	10·0	1968	**14 44**	**4·25**	**18·69**
2	Sulph. of Potash 86 lb.	1913	34·8	31·8	6041	12·9	8·4	1735	12·71	3 47	16·18
3		1914	35·5	37·9	6839	17·1	10·4	2171	14·43	4·18	18·61
4	Control	—	*37·2*	*41·2*	*7258*	*13·6*	*8·6*	*1809*	*9·61*	*2·99*	*12·60*
5	Guano 352 lb.; Sulph. Amm. 44 lb.; Sulph. of Potash 86 lb. ...	1919	37·4	38·5	7004	**24·3**	**17·0**	**3412**	5·80	2·22	8·02
E 1	Rape Dust 844 lb.; Super. 240 lb. ...	1920	38·1	38·2	7003	13·7	9·5	1911	**13·33**	**4·14**	**17 47**
2	Sulph. of Potash 80 lb.	1913	37·1	40·3	7166	15·7	10·5	2162	14·05	3·13	17·18
3		1914	34·3	34·7	6309	14·5	8·7	1881	14·17	3·42	17·59
4		1919	34·4	37·3	6609	**22·4**	**13·5**	**2871**	10·90	2·78	13·68
5	Control	—	*39·3*	*39·5*	*7207*	*15·7*	*11·0*	*2161*	*6·43*	*2·31*	*8·74*
F 1	Control	—	*35·6*	*37·3*	*6703*	*10·8*	*8·4*	*1629*	*3·32*	*1·46*	*4·78*
2	Super. 292 lb.; Sulph.	1920	36·7	36·2	6675	12·3	8·9	1805	**16·30**	**3 46**	**19 76**
3	Amm. 196 lb.; Sulph.	1913	31·8	33·0	5995	11·7	8·1	1673	9·31	2·55	11·86
4	of Potash 110 lb. ...	1914	35·5	37·5	6751	12·4	8·2	1696	7·84	2·15	9·99
5		1919	36·1	37·7	6788	**23·9**	**16·3**	**3276**	9·23	2·75	11·98
G 1	Bone Meal 160 lb.; Super. 110 lb.; Sulph.	1920	34·9	33·9	6321	14·8	9·6	1952	**8 63**	**3 10**	**11 73**
2	Amm. 188 lb. ...	1913	33·0	32·7	6025	16·5	9·9	2060	6·27	2·01	8·28
3	Control	—	*34·6*	*35·2*	*6374*	*17·6*	*9·6*	*2118*	*3·60*	*1·11*	*4·71*
4	Bone Meal 160 lb.; Super. 110 lb.; Sulph.	1914	37·5	36·8	6714	16·9	10·2	2131	6·00	1·74	7·74
5	Amm. 188 lb. ...	1919	36·0	37·7	6780	**23·2**	**14·6**	**3022**	7·12	2·31	9·43
H 1	Basic Slag 520 lb.; Super. 110 lb.; Sulph.	1920	41·6	37·4	7016	24·4	13·3	2867	**15·77**	**3 58**	**19 35**
2	Amm. 196 lb. ...	1913	42·3	41·1	7485	24·0	13·0	2816	11·48	2·87	14·35
3		1914	39·6	40·6	7303	23·2	12·8	2741	11·48	2·85	14·33
4		1919	40·6	37·0	6934	**31·2**	**17·4**	**3750**	10·72	2·58	13·30
5	Control	—	*36·8*	*38·0*	*6837*	*19·8*	*11·3*	*2431*	*4·87*	*1·54*	*6·41*

NOTES AS TO MANURES.

In 1919 a new system of manuring was begun. The manure for each plot (except of series A and B) was rationed at 40 lbs. Nitrogen, 100 lbs. Calcium Phosphate, and 50 lbs. Potash per acre. Each plot was supplied with as much of its particular manure (shoddy, guano, &c.) as possible without exceeding the receipt in any of the three rationed ingredients. Any deficit in either of these three was then made good by adding the necessary quantity of Sulphate of Amm., Superphosphate, or Sulphate of Potash. Series A and B left as before.

No manure was applied in 1917 or 1918. For manures 1904-17 see Report for 1915-16-17.

Figures in italics denote unmanured plots. The yields on the plots to which the manure was applied in a given year are printed in heavy type.

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RED CLOVER grown year after year on rich Garden Soil, Rothamsted Garden.

Hay, Dry Matter, and Nitrogen per Acre, 1913 to 1920.

Year.	No. of Cuttings.	As Hay.	Dry Matter.	Nitrogen.	Seed Sown.
		lbs.	lbs.	lbs.	
1913	2	4211	3509	98	1912, April, mended
1914	2	2041	1701	46	,, ,, ,,
1915	1	1304	1087	26	,, ,, ,,
1916	1	1724	1437	51	1916, April 21st, re-sown
1917	3	3351	2793	81	1917, April 23rd, mended
1918	2	2262	1885	50	1918, April 6th, re-sown
1919	2	898	748	22	1919, April 27th, mended
1920	3	4400	3667	114	1920, May 5th, mended
Averages:					
25 years, 1854—1878		7664	6387	179	
25 years, 1879—1903		3924	3270	101	
50 years, 1854—1903		5794	4829	140	
15 years, 1904—1918		2888	2407	70	

Wheat after Fallow (without Manure 1851, and since). Hoos Field, 1918, 1919, 1920.

		1918.	1919.	1920.	Average 61 years 1856-1916.
Dressed Grain	Yield—Bushels per Acre	15·3	11·8	9·4	15·6
	Weight per Bushel—lbs.	61·7	59·9	62·8	59·5
Straw—cwt. per Acre		14·1	9·6	8·9	13·4
Total Produce—lbs. per Acre		2611	1848	1642	2477

DRESSED SEED EXPERIMENT, 1919.

Barley. Little Hoos Field.

Description of Plot.	Dressed Grain. Yield per Acre. Single Strength.	Dressed Grain. Yield per Acre. Double Strength.	Dressed Grain. Weight per Bushel. Single Strength.	Dressed Grain. Weight per Bushel. Double Strength.	Straw per Acre. Single Strength.	Straw per Acre. Double Strength.	Total Produce per Acre. Single Strength.	Total Produce per Acre. Double Strength.
	Bushels.	Bushels.	lbs.	lbs.	cwt.	cwt.	lbs.	lbs.
Heavy Oil ...	23·5	20·0	54·0	54·5	13·2	11·8	2880	2580
	24·3	—	54·3	—	14·1	—	3055	—
Bone Oil ...	19·3	17·5	54·5	54·0	11·6	10·4	2465	2235
	24·5	—	54·5	—	14·5	—	3110	—
Creosote ...	21·5	11·3	53·3	53·0	12·3	8·8	2695	1750
	22·6	—	53·0	—	14·1	—	2920	—
Acetone Tar	21·1	12·5	54·5	53·0	12·5	9·1	2695	1770
	19·9	—	52·5	—	12·9	—	2605	—
Gas Tar ...	23·0	14·1	53·0	54·0	13·2	7·9	2810	1743
	13·1	—	53·5	—	12·9	—	2260	—
Control ...	22·0	14·7	55·0	53·0	12·9	9·1	2810	1885
	18·9	—	54·0	—	10·0	—	2300	—
	23·7	—	54·0	—	13·8	—	2935	—
	18·4	—	54·5	—	11·8	—	2460	—

Single Strength represents 1 pint of dressing to 4 bushels of seed.

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TOP DRESSING EXPERIMENT.

Oats (Grey Winter). Great Harpenden Field, 1919.

Manures per Acre.	Dressed Grain. Yield per Acre. 1st Expt.	2nd Expt.	3rd Expt.	Weight per Bushel. 1st Expt.	2nd Expt.	3rd Expt.	Straw per Acre. 1st Expt.	2nd Expt.	3rd Expt.	Total Produce per Acre. 1st Expt.	2nd Expt.	3rd Expt.
	Bush.	Bush.	Bush.	lbs.	lbs.	lbs.	cwt.	cwt.	cwt.	lbs.	lbs.	lbs.
Sulphate Amm. 1½ cwts., Super 3 cwts. ...	79·9	62·6	62·3	42·0	42·8	41 8	40·4	34·2	32·4	8206	6850	6675
Nitrate Soda 2 cwts., Super. 3 cwts. ...	71·9	68·9	67·6	42·8	41·9	42·1	41·7	38·0	37·5	8169	7500	7284
Nitrate Amm. ¾ cwt., Super. 3 cwts. ...	74·1	68·9	57·4	42·5	42·4	44·0	37 7	34·4	32·6	7700	7119	6544
Nitrolim 2 cwts., Super. 3 cwts.	67·1	58·4	60·3	42·0	42·6	42·0	33·9	29·0	30·1	6900	6069	6706
Guandine Nitrate 84 lbs., Super. 3 cwts. ...	75·7	—	63·1	41·4	—	42·9	37·3	—	32·6	7547	—	6678
Guandine Sulphate 94 lbs., Super. 3 cwts. ...	73·3	56·7	53·0	41·3	45·0	43·5	32·4	27·7	27·0	6900	5972	5706
Guandine Carb. 75 lbs., Super. 3 cwts. ...	68·2	61·5	52·5	42·1	42·8	43·3	30·6	28·4	26·6	6638	6200	5547
Super 3 cwts.	64·1	49·0	—	42·0	42·9	—	30 4	25·5	—	6388	5269	—
Control	68·1	49·7	48·6	42·9	44·3	43·0	33·3	24·3	26·3	6981	5238	5444
	58·9	47·8	47·4	43·6	41·6	43·0	28·4	23·4	23·7	6056	4781	4975
	—	48·1	39·0	—	46·8	42·5	—	24·3	22·8	—	5256	4637

Wheat (Red Standard). Great Harpenden Field, 1920.

Date of Applying Dressing.	Dressed Grain. Yield per Acre. Single Dressing.	Double Dressing.	Wght per Bush Single Dressing.	Double Dressing.	Straw per Acre. Single Dressing.	Double Dressing.	Total Produce per Acre. Single Dressing.	Double Dressing.
	Bush.	Bush.	lbs.	lbs.	cwt.	cwt.	lbs.	lbs.
Early: Feb. 10th	28·7	35·9	63·6	63·6	26·9	35·9	4960	6456
Medium: March 16th ...	29·8	—	63·8	—	31 1	—	5522	—
Late: May 10th	31 6	32·6	62·9	62·7	33·6	36·9	6020	6490
Control	28·9		63·9		24·2		4683	

Single dressing represents 100 lbs. Sulphate Amm. and 100 lbs Super.

SUBSOILING EXPERIMENT.

Potatoes (King Edward). West Barnfield, 1918.

Treatment of Plots.	Yield per Acre. East. cwt.	West. cwt.
Subsoiled in 1914	75·1	127·3
Not Subsoiled	90·7	133·7

VARIETY EXPERIMENT.

Wheat. Great Harpenden Field, 1920.

Variety.	Dressed Grain. Yield per Acre. Bushels.	Weig't per Bush lbs.	Straw per Acre. cwt.	Total Produce per Acre. lbs.
Red Standard	26·2	63·6	32·2	5475
Yeoman	27·0	63·3	29·7	5333
Fenman	28·6	62·8	34·3	5845

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FLUE DUST EXPERIMENTS.

Mangolds. Stackyard Field, 1918.

Plot.	Manures per Acre.	Weight of Roots per Acre. Tons.	"Best Rows." Number of Rows.	"Best Rows." Weight per Acre. Tons.
10	Superphosphate 4 cwt., Salt 2 cwt ...	16·7	8	19·6
12A		16·9	7	25·1
14		17·9	5	21·9
1	Superphosphate 4 cwt., Salt 2 cwt., Sulphate	19·3	5	26·8
9	Ammonia 2 cwt.	17·9	9	20·9
11	Superphosphate 4 cwt., Salt 2 cwt., Nitrate	20·7	8	25·2
15	Ammonia 145 lbs.	25·9	all	25·9
2	Super. 4 cwt., Salt 2 cwt., Sulphate Amm. 2 cwt., Flue Dust, grade 1, 3·1 cwt ...	14·2	4	22·2
3	Ditto, Flue Dust, grade 2, 7·5 cwt. ...	11·9	2	23·6
4	Ditto, Flue Dust, grade 3, 5 cwt.	15·5	4	21·4
5	Ditto, Extracted Flue Dust, 6·5 cwt. ...	19·9	all	19·9
6	Ditto, Sulphate of Potash, 1 cwt.	18·6	7	20·2
7	Ditto, Flue Dust, grade 2, 7·5 cwt. (Intermediate application)	15·5	4	28·9
8	Ditto, Flue Dust, grade 2, 7·5 cwt. (late application)	17·3	5	23·1
12	Super. 4 cwt., Salt 2 cwt., Dried Sewage Sludge 2 tons	20·2	8	24·4
13	Super. 4 cwt., Salt 2 cwt., Cordite 12 cwt.	21·5	7	23·9
16	No Artificials and no Chalk	18·3	10	21·3
17		18·4	9	19·9
19	No Chalk, Manure as for farm	18·3	7	20·2
20	Chalked, but no Artificials	15·8	all	15·8
21		15·8	all	15·8

[1] There were gaps in these plots. "Best Rows" are rows of full length with all plants growing.

Potatoes. West Barnfield, 1918.

Plot.	Manures per Acre.	Weight per Acre Tons.
1	Superphosphate 4 cwt., Sulphate of Ammonia 2 cwt.	7·5
2	Super. 4 cwt., Sulphate Amm. 2 cwt., Flue Dust, grade 1, 20·7 cwt.	7·5
3	Ditto ditto Flue Dust, grade 2, 7·4 cwt.	8·4
4	Ditto ditto Flue Dust, grade 3, 3·7 cwt.	8·2
5	Ditto ditto Flue Dust extracted, 6·4 cwt.	8·3
6	Ditto ditto Sulphate of Potash, 1 cwt.	8·4
7	Ditto ditto Flue Dust, grade 2, 7·4 cwt. (Intermediate application)	8·4
8	Ditto ditto Flue Dust, grade 2, 7 cwt. (Late application)	9·0
9	Ditto ditto	8·8
10	Ditto	8·7
11	Ditto, Nitrate of Amm. 145 lbs.	8·9
12	Ditto, Sewage Sludge, 2 tons	8·6
12A	Ditto	7·8
13	Ditto	7·3
14	Ditto, Nitrate Amm. 145 lbs.	8·5
15	No Artificials	7·2

Flue Dust, grade 1, contains 2·21 p.c. Potash. Flue Dust, grade 3, contains 8·90 p.c. Potash.
" " 2, " 5·85 " " extracted, " 7·37 "
Sulphate of Potash contains 50·24 p.c. Potash.
The quantities applied were calculated on the basis of 1 cwt. Sulphate of Potash (49 p.c. Potash) per Acre.
NOTE.—All Plots received a dressing of Dung at the rate of 10 tons per acre.

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SLUDGE EXPERIMENTS, 1920.

Hay. Great Field Pasture, 1920.

Plot.	Manures per Acre.	Yield per Acre.
		cwt.
1 North	Wet Sludge, 61·7 cwt.	29·3
2	Control	22·0
3 South	Wet Sludge, 61·7 cwt.	22·6
4 North	Sulphate of Ammonia, 1⅓ cwt.	35·4
5	Control	22·2
6 South	Sulphate of Ammonia, 1½ cwt.	31·0
7 North	Slag, 10 cwt.	25·0
8	Control	21·2
9 South	Slag, 10 cwt.	26·3
10 North	Superphosphate, 6 cwt.	26·3
11	Control	22·9
12 South	Superphosphate, 6 cwt.	22·7
13 North	Nitrate of Ammonia, 114 lbs.	39·6
14	Control	24·9
15 South	Nitrate of Ammonia, 114 lbs.	36·5
16	Nitrolim, 234 lbs.	34·6
17	Control	26·6
18	Nitrolim, 234 lbs.	30·1

Potatoes. Long Hoos Field, 1920.

		tons
1	Activated Sewage Sludge, 13·3 tons; Super., 6 cwt.	11·8
4	Nitrate of Ammonia, 1 cwt	8·8
3	Farmyard Dung, 15 tons; Super., 6 cwt.; Nitrate	10·8
6	of Ammonia, 1 cwt.	9·6
2		7·8
5	Control; Super., 6 cwt.; Nitrate of Ammonia, 1 cwt.	8·3
7		8·9
8		7·9

Barley. Long Hoos Field, 1920.

Plot.	Manures per Acre.	Dressed Grain.		Straw per Acre.	Total Produce per Acre.
		Yield per Acre.	Weight per Bushel.		
		Bushels	lbs.	cwt.	lbs.
1	Activated Sewage Sludge,	36·2	55·5	20·4	4363
4	2·7 tons	26·3	56·5	21·1	3897
7		46·3	55·8	28·7	5894
2	Sulphate of Ammonia, 1·45	45·1	56·3	25·1	5444
5	cwt.	38·8	56·3	29·1	5513
3		37·0	55·8	21·8	4557
6	Control	36·5	55·5	23·1	4701
8		39·3	55·5	24·7	5057

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METHOD OF SOWING EXPERIMENT.

Wheat. Little Knott Wood, 1918.

Plot.	Treatment.	Dressed Grain. Yield per Acre. Bushels	Dressed Grain. Weight per Bushel. lbs.	Straw per Acre. cwts.	Total Produce per Acre. lbs.
1	Wheat ploughed in after being broadcasted	42·7	61·5	42·5	7543
2	Wheat ploughed in after being drilled	38·6	62·3	40·0	7006
3	Land ploughed, then seed drilled ...	41·9	64·2	43·6	7869

These plots were top dressed on March 12th with 1¼ cwt. Super. and 1 cwt. Sulphate Amm. per Acre.

CHALKING EXPERIMENT.

Barley. Stackyard Field, 1919.

Description of Plot.	Dressed Grain. Yield per Acre. Bushels	Dressed Grain. Weight per Bushel. lbs.	Straw per Acre. cwts.	Total Produce per Acre. lbs.
1. Chalked, Autumn, 1912	35·6	55·0	18·7	4150
2. ,, ,, ,, ...	34·8	54·9	18·9	4123
3. } Unchalked ... ... {	28·9	54·8	15·9	3434
4. } {	33·9	55·0	17·0	3850

STRAW EXPERIMENTS.

Treatment.	Yield per Acre in Tons. Arran Chief	Yield per Acre in Tons. King Edward.
Potatoes. West Barnfield, 1918.		
Raw Straw	7·3	4·9
	7·3	—
Treated Straw	7·3	5·2
	7·4	—
Control	6·8	4·5
	7·0	—
Potatoes. New Zealand Field, 1919.		
Raw Straw	4·7	—
	4·6	—
"Nitrogen" Treated Straw	6·0	—
	6·3	—
"Water" Treated Straw	5·7	—
	5·4	—
Control	6·6	—
	5·9	—

NOTE.—Manures as follows were applied to the West Barnfield potato plots viz., 2½ cwt. Super., 1½ cwt. Sulphate of Amm., and ¾ bush. Bone Meal per acre.

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PROFESSOR BLACKMAN'S ELECTRO CULTURE EXPERIMENTS, 1919-20.

Clover. Foster's Field.

Description of Plots.	1919			1920.
	1st Crop. Weight per Acre.	2nd Crop. Weight per Acre.	1st and 2nd Crops. Weight per Acre.	1st Crop. Weight per Acre.
	cwts.	cwts.	cwts.	cwts.
Electro Plot ...	34·8	17·1	51·9	23·9
Control 1* ...	23·1	14·0	37·1	24·1
Control 2* ...	36·5	—	48·1	23·0
Control 3 ...	—	11·6	—	—

* Control 2 could not be used for second crop of 1919; Control 3 was therefore added. Control 1 is the same for both 1919 crops, but was wired off for the second crop. Controls 1 and 2 both different in 1920 from 1919.
NOTE.—2nd crop 1920 was ploughed in.

WHEAT AND BARLEY.

Description of Plots.	Dressed Grain. Yield per Acre. Bushels.	Dressed Grain. Weight per Bushel. lbs.	Straw. Yield per Acre. cwts.	Total Produce. Yield per Acre. lbs.
Winter Wheat. Great Knott Wood Field, 1919.				
Electro Plots ... E 1	21·2	60·4	15·6	3210
Electro Plots ... E 2	21·9	61·0	18·1	3596
Control Plots ... C 1	13·9	61·9	11·6	2338
Control Plots ... C 2	16·8	62.3	13.5	2833
Cage Plot	8·6	60·5	12·0	2108
Spring Wheat. Great Knott Wood Field, 1919.				
Electro Plots ... E 3	8·2	56·0	10·7	1845
Electro Plots ... E 4	8·2	56·2	11·3	1988
Control Plots ... C 3	10·6	56·6	10·3	1951
Control Plots ... C 4	8·7	55·0	11·4	1978
Control Plots ... C 5	6·9	55·1	9·8	1676
Wheat (Yeoman). Foster's Field, 1920.				
Electro Plots ... E 1	18·8	62·2	19·0	3448
Electro Plots ... E 2	18·4	62·2	19·7	3536
Control Plots ... C 1	20·4	62·5	20·5	3697
Control Plots ... C 2	18·2	62·1	17·4	3245
Barley. Foster's Field, 1918.				
Electro Plots ... E 1	44·7	51·5	22·4	4890
Electro Plots ... E 2	47·4	54·0	25·1	5458
Electro Plots ... E 3	46·4	53·4	24·4	5284
Control Plots ... C 1	36·4	52·6	22·1	4456
Control Plots ... C 2	52·7	53·5	29·1	6162
Control Plots ... C 3	36·3	54·0	22·3	4525
Cage Plot ... ... C 4	44·0	54·9	26·3	5453
Barley. Great Knott Wood Field, 1920.				
Electro Plots ... E 3	31·7	53·1	17·3	3672
Electro Plots ... E 4	33·0	53·2	18·5	3889
Control Plots ... C 3	29·5	53·4	16·0	3410
Control Plots ... C 4	25·2	53·3	12·5	2779

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SOIL STERILISING EXPERIMENT.

Wheat after Barley. Long Hoos Field, 1918.

Plot.	Treatment.	Dressed Grain. Yield per Acre. Bushels.	Dressed Grain. Weight per Bushel. lbs.	Straw per Acre. cwts.	Total Produce per Acre. lbs.
1	Cresylic Acid	35·0	63·5	37·9	6745
2	Control	27·7	63·0	30·4	5387
3	Naphthaline	34·5	62·5	38·1	6645

NOTE.—Dressings on sawdust applied November 2nd, 1917, on Barley Stubble and ploughed in at once. These plots were top dressed as farm, viz. 1 cwt. Sulph. Amm., 1½ cwt. Super. per acre.

MISCELLANEOUS EXPERIMENTS.

Barley. Hoos Field. Leguminous Strips, 1918, 1919, 1920.

Description of Plot.	Manuring per Acre.	1918. Dressed Grain. Bush. per Acre.	1918. Dressed Grain. Weight per Bushel lbs.	1918. Straw per Acre. cwts.	1918. Total Pr'duce per Acre. lbs.	1919. Dressed Grain. Bush. per Acre.	1919. Dressed Grain. Weight per Bushel lbs.	1919. Straw per Acre. cwts.	1919. Total Pr'duce per Acre. lbs.	1920. Dressed Grain. Bush. per Acre.	1920. Dressed Grain. Weight per Bushel lbs.	1920. Straw per Acre. cwts.	1920. Total Pr'duc per Acre. lbs.
After Lucerne ...	Sulphate Amm. 1½ cwt. ...	20·1	55·3	10·7	2340	15·8	53·1	7·9	1790	27·3	52·8	20·5	3837
	S. Amm. 1½ cwt. Super. 3 cwt.	27·4	54·8	11·1	2777	18·4	54·1	8·0	1939	46·3	53 2	20·0	4799
After Red Clover	Sulphate Amm. 1½ cwt. ...	19·4	54·8	9·6	2170	12·5	53 3	6·9	1493	16·3	53·1	15·9	2719
	S.Amm. 1½ cwt.; Super. 3 cwt.	22·9	54·4	9·1	2282	16·1	54·6	6·6	1651	33·5	52·3	16·1	3630
After Alsike ...	Sulphate Amm. 1½ cwt. ...	17·5	54·2	8·5	1930	10·6	53·6	6·7	1375	15 5	53·4	15·8	2657
	S.Amm. 1½ cwt.; Super. 3 cwt.	21·4	53·8	8·7	2185	15·4	54·0	6·8	1621	38·0	52·1	18·6	4116

Leguminous crops ploughed in November, 1911. For crop yields, see previous Reports. In 1915 the land was fallow; in 1916 and 1917, barley with clover: no separate weighings were kept, however.

Mangolds. Long Hoos Field, 1919.

Plot.	Description of Plot.	Manuring per Acre.	Weight of Roots per Acre. Tons.
A	Bouted	20 tons of Dung, 3 cwt. Super., 1½ cwt. Sulphate Ammonia, applied on May 23 and a further 2 cwt. Sulphate Ammonia, applied July 28 ...	11·0
B	Flat		6·5
C	Bouted		9·0

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Hoos Field. Barley sown with Clover, 1920.

(Formerly Barley after Alsike, p. 84). Clover cut with Barley and weighed

Plot.	Manures per Acre.	Clover. Yield per Acre. cwts.	Barley. Yield per Acre. cwts.	Total Produce per Acre. cwts.
1	8 cwt. Slag, 10 cwt. Lime	6·7	31·7	38·4
2	5 cwt. Super., 10 cwt. Lime, 14 tons Dung	15·2	31·2	46·4
3	10 cwt. Lime	4·9	27·7	32·6
4	5 cwt. Super., 1·5 cwt. Sulph. Potash, 10 cwt. Lime	9·8	28·1	37·9
5	5 cwt. Super., 10 cwt. Lime	7·1	28·6	35·7
6	10 cwt. Lime	4·5	30·4	34·8
7	10 cwt. Lime, 14 tons Farmyard Dung ...	8·5	41·5	50·0
8	8 cwt. Slag	5·4	21·9	27·3
9	5 cwt. Super., 14 tons Farmyard Dung ...	14·7	21·9	36·6
10	*Control*	*3·6*	*21·9*	*25·5*
11	5 cwt. Super., 1·5 cwt. Sulph. Potash ...	12·5	24·1	36·6
12	5 cwt. Super.	9·4	24·1	33·5
13	*Control*	*6·3*	*22·3*	*28·6*
14	14 tons Farmyard Dung	13.0	27·2	40·2
15	10 cwt. Lime, 14 tons Horse Manure ...	11·2	14·7	25·9
16	*Control*	*4·9*	*14·3*	*19·2*
17	14 tons Horse Manure	11·2	13·8	25·0
18	5 cwt. Super....	4·0	22.8	26·8
19	10 cwt. Lime, 14 tons Cattle Manure ...	8·5	29·5	38·0
20	*Control*	*4·5*	*26·3*	*30·8*
21	14 tons Cattle Manure	7·6	30 4	38·0

Manures sown March 13th, 1920. Horse, Cattle and Farmyard (Mixed) Manure put on Feb. 20th and 21st, 1920. Barley Seed sown March 19th, 1920. Clover Seed drilled between Barley rows, May 1st, 1920.

Wheat after Clover in 1917. Little Hoos Field, 1918.

Plot.	Manures per Acre.	Dressed Grain. Yield per Acre. lbs.	Straw per Acre. cwts.	Total Produce per Acre. lbs.
1	Control	2195	34·9	6323
6		2325	38·7	6937
3	Superphosphate 2 cwt.	2493	39·5	7190
8		2197	39·3	6905
2	Super. 2 cwt., Sulphate Amm. 1 cwt. ...	2630	45·8	8058
5		2585	42·1	7655
4	Super. 2 cwt., Nitrate Amm. 72 lbs. ...	2823	44·2	8000
7		2400	44·0	7710

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