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## Report for 1930

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## Woburn Experimental Farm

### Rothamsted Research

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## WOBURN EXPERIMENTAL FARM

Report for 1929-30

By DR. J. A. VOELCKER, C.I.E., M.A.

The summer drought of 1929 ended early in October and, from then, on to the end of January, 1930, there was much rain rendering cultivation difficult in spite of mild weather.

Spring was cold and dull, and not until May could the corn begin to grow or the land be prepared for roots. Meantime, much grass had grown. A prolonged drought in June and July enabled a good hay crop to be harvested, but killed the young swedes and they had to be resown. The dry "spell" broke on July 15th, the corn crops were ready about the second week in August, and were gathered in fair condition; those from the smaller experimental plots, were threshed in the field.

The rainfall for the harvest year was 30.92 inches, compared with 16.5 inches in 1928-29 and 23.5 inches in 1927-28, the average being 24.0 inches. The period October, 1929—January, 1930, was very wet.

*Woburn Meteorological Records, October, 1929-December, 1930.*

	<i>Rain.</i>			<i>Temperature (Mean).</i>			
	Total Fall	No. of Rainy Days (0.01 in. or more).	Bright Sun- shine.	Max.	Min.	1 ft. in Ground.	Grass Min.
	Inches.	No.	Hours.	°F	°F	°F	°F
1929—							
Oct. ..	3.19	15	113.1	56.3	42.6	50.9	37.3
Nov. ..	5.78	22	70.5	50.3	37.3	43.2	31.2
Dec. ..	4.56	23	50.4	47.4	36.8	41.5	30.6
1930—							
Jan. ..	2.69	19	54.3	47.2	36.2	41.5	34.7
Feb. ..	0.62	12	48.6	40.5	31.6	37.9	27.6
Mar. ..	1.65	10	115.1	48.1	34.1	41.4	30.2
April ..	1.60	19	100.4	52.9	39.6	47.2	36.9
May ..	2.91	19	145.0	58.8	43.3	54.1	40.3
June ..	0.45	7	209.9	68.9	50.2	64.1	46.5
July ..	2.43	17	176.5	66.7	51.4	64.3	47.8
Aug. ..	2.45	16	206.0	69.3	52.5	61.7	48.3
Sept. ..	2.59	21	118.4	63.0	49.7	59.3	46.6
Oct. ..	1.00	14	126.5	57.2	44.3	50.8	39.2
Nov. ..	3.75	19	64.8	50.0	35.7	43.5	32.4
Dec. ..	2.28	19	18.9	43.8	34.1	40.0	32.1
<b>Total or Mean 1930 ..</b>	<b>24.42</b>	<b>192</b>	<b>1384.4</b>	<b>55.5</b>	<b>41.9</b>	<b>50.5</b>	<b>38.5</b>

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FIELD EXPERIMENTS

1.—CONTINUOUS GROWING OF WHEAT AND BARLEY  
(STACKYARD FIELD), 54<sup>TH</sup> YEAR

*Wheat.*

“ Million ” wheat at the rate of 3 bushels per acre of seed, dressed with formalin, was drilled on November 1st, 1929. It came up well, but was so severely damaged by pheasants that resowing was necessary in December. The new crop failed and was ploughed up again ; “ Little Joss ” was sown on March 3rd, 1930. This being better watched, came fairly, but accompanied by much weed. In spite of some hand-hoeing the plant was thin and the crop cut on September 1st. was miserable. It was spring-sown wheat and the land had received no manure since 1926, though it was fallowed in both 1927 and 1928.

The crops were threshed in the field and the results are given in Table I.

Table I.—CONTINUOUS GROWING OF WHEAT, 1930  
Stackyard Field—Produce per acre.

Plot.	Manures Applied Annually to 1926 (before the two years Fallow 1926-28). For amounts see Report 1927-28. No Manures in 1929 or 1930.	Dressed Corn per acre.	Total Corn per acre.	Weight per bushel.	Straw, Chaff etc., per acre.
		bushel.	cwt.	lb.	cwt.
1	Unmanured .. .. .	1.0*	0.56	55.5*	4.11
2a	Sulphate of Ammonia .. .. .	—	—	—	0.22
2aa	As 2a, with Lime, Jan., 1905, repeated 1909, 1910, 1911 .. .. .	—	0.01	—	0.23
2b	As 2a, with Lime, December, 1897 .. .. .	—	0.05	—	1.47
2bb	As 2b, with Lime, repeated Jan., 1905 .. .. .	—	0.11	—	3.57
3a	Nitrate of Soda .. .. .	3.1	1.59	54.0	4.95
3b	Nitrate of Soda .. .. .	3.2	1.75	58.0	4.66
4	Mineral Manures (Superphosphate and Sulphate of Potash) .. .. .	3.0	1.44	52.0	9.46
5a	Mineral Manures and Sulphate of Ammonia .. .. .	—	0.22	—	1.57
5b	As 5a, with Lime, Jan., 1905 .. .. .	—	0.76	—	4.20
6	Mineral Manures and Nitrate of Soda .. .. .	5.3	2.68	55.5	5.19
7	Unmanured .. .. .	0.5*	0.25	55.5*	1.68
8a	Mineral Manures and, in alternate years, Sulphate of Ammonia .. .. .	—	0.07	—	3.11
8aa	As 8a, with Lime, Jan., 1905, repeated Jan., 1918 .. .. .	—	0.06	—	1.36
8b	Mineral Manures and Sulphate of Ammonia (omitted in alternate years) .. .. .	—	0.07	—	1.82
8bb	As 8b, with Lime, Jan., 1905, repeated Jan., 1918 .. .. .	—	0.04	—	1.20
9a	Mineral Manures and, in alternate years, Nitrate of Soda .. .. .	4.0	2.09	56.0	4.68
9b	Mineral Manures and Nitrate of Soda (omitted in alternate years) .. .. .	3.2	1.63	54.0	4.45
10a	Superphosphate and Nitrate of Soda .. .. .	3.6	1.93	58.0	5.57
10b	Rape Dust .. .. .	2.9	1.52	56.0	4.57
11a	Sulphate of Potash and Nitrate of Soda .. .. .	5.3	2.79	57.0	7.00
11b	Farmyard Manure .. .. .	8.0	3.93	54.0	10.86

\* Estimated

*Barley.*

“ Plumage Archer ” at the rate of 3 bushels per acre was drilled on March 3rd, 1930 ; it came up well, and by April was far ahead of the wheat and free from weeds. It was harvested on August 25th and threshed in the field. The results are given in Table II.



**Table II.—CONTINUOUS GROWING OF BARLEY, 1930**  
**Stackyard Field—Produce per acre.**

Plot.	Manures Applied Annually to 1926 (before the two years Fallow 1926-28). For amounts see Report 1927-28. No Manures in 1929 or 1930.	Dressed	Total	Weight	Straw,
		Corn per acre. bushel.	Corn per acre. cwt.	per bushel. lb.	Chaff, etc., per acre. cwt.
1	Unmanured .. .. .	13.8	6.09	48.3	6.89
2a	Sulphate of Ammonia .. .. .	—	0.56	—	0.98
2aa	As 2a, with Lime, Mar., 1905, repeated 1909, 1910, 1912 and 1923 .. .. .	14.2	6.39	47.7	6.47
2b	As 2a, with Lime, Dec., 1897, repeated 1912 .. .. .	15.0	6.32	46.0	6.43
2bb	As 2a, with Lime, Dec., 1897, repeated Mar., 1905 .. .. .	9.9	4.68	50.5	4.97
3a	Nitrate of Soda .. .. .	14.6	5.93	43.3	6.32
3aa	As 3a, with Lime, Jan., 1921 .. .. .	11.2	4.57	43.5	4.47
3b	Nitrate of Soda .. .. .	12.9	5.29	44.0	6.00
3bb	As 3b, with Lime, Jan., 1921 .. .. .	9.5	3.86	40.5	3.89
4a	Mineral Manures (Superphosphate and Sulphate of Potash) .. .. .	14.0	6.32	50.0	7.00
4b	As 4a, with Lime, 1915 .. .. .	14.8	6.72	48.0	6.68
5a	Mineral Manures and Sulphate of Ammonia .. .. .	—	1.14	—	2.05
5aa	As 5a, with Lime, Mar., 1905, repeated 1916 .. .. .	18.9	8.29	47.5	8.29
5b	As 5a, with Lime, Dec., 1897, repeated 1912 .. .. .	18.1	7.77	46.5	7.18
6	Mineral Manures and Nitrate of Soda .. .. .	18.3	7.84	47.0	9.05
7	Unmanured .. .. .	11.8	5.13	47.5	5.55
8a	Mineral Manures and, in alternate years, Sulphate of Ammonia .. .. .	—	0.29	—	0.97
8aa	As 8a, with Lime, Dec., 1897, repeated 1912 .. .. .	15.3	6.64	48.0	6.43
8b	Mineral Manures and Sulphate of Ammonia (omitted in alternate years) .. .. .	—	0.36	—	0.82
8bb	As 8b, with Lime, Dec., 1897, repeated 1912 .. .. .	17.0	7.43	47.0	7.00
9a	Mineral Manures and, in alternate years, Nitrate of Soda .. .. .	17.8	7.98	48.2	7.59
9b	Mineral Manures and Nitrate of Soda (omitted in alternate years) .. .. .	18.5	8.00	47.7	7.93
10a	Superphosphate and Nitrate of Soda .. .. .	9.1	3.89	46.0	6.63
10b	Rape Dust .. .. .	3.1	1.38	47.0	1.66
11a	Sulphate of Potash and Nitrate of Soda .. .. .	16.2	7.07	47.0	9.20
11b	Farmyard Manure .. .. .	21.7	9.50	47.5	8.77

The always-unmanured plots gave 12.8 bushels of corn per acre as against the 20.3 bushels of 1929; mineral manures gave more, sulphate of potash being superior to superphosphate; the residues from farmyard manure gave the highest yield. The residues from rape dust and from sulphate of ammonia without lime gave practically no crop.

2.—ROTATION EXPERIMENTS

THE UNEXHAUSTED MANURIAL VALUE OF CAKE AND CORN

(STACKYARD FIELD)

Series C.

Swede seed ("Garton's Magnificent") was sown on May 30th, but the first sowing was taken by "fly." The second sowing suffered from drought, but gave a very even plant of small roots. The weights were as follows:

**Table III.—SWEDES (AFTER WHEAT) Stackyard Field, Series C, 1930.**

Produce per acre.

Plot.		Roots.	Tops.
		Tons	Tons
1.	Corn-fed .. .. .	11.55	1.30
2.	Cake-fed .. .. .	12.80	0.95



The swedes will be fed off by sheep, receiving, on one half, corn, and, on the other half, cake, after which barley will follow as the crop of 1931.

*Series D.*

Barley followed the swedes of 1929, which had yielded from 4.1 tons (cake plot) to 7.25 tons (corn plot) per acre, and which had been fed off by sheep receiving, respectively, cake and corn.

“Plumage Archer” barley—3 bushels per acre—was drilled on March 28th; it came up well and was undersown in May with red clover. From June onwards the “cake” plot looked decidedly the better, and gave the larger yield. The crop was harvested on August 14th.

**Table IV.—BARLEY (AFTER SWEDES, 1929). Stackyard Field, Series D, 1930. Produce per acre.**

Plot.	Head Corn.		Tail Corn. Weight.	Straw, Chaff, etc.
	Bushels.	Wt. per Bushel.		
No. 1—Corn-fed ..	24.7	52.6	12	15.5
No. 2—Cake-fed ..	33.6	52.1	20	20.0

The history of the plots is as follows :

Prior to 1923 the respective amounts of nitrogen fed on the two plots had been : corn-fed plot, 7.25 lb. ; and cake-fed plot, 18 lb. nitrogen per acre, but from 1923 onwards the nitrogen fed was to be 24.6 lb. per acre on the corn plot, and 56.5 lb. per acre on the cake plot. For Series D this should have begun with the root crop of 1925 ; but, as the roots failed, no cake or corn was fed. The root crop of 1929 was therefore the first to come under the new treatment, and the barley of 1930 shows that the higher nitrogen has increased the yield by 9 bushels of corn per acre.

### 3.—GREEN CROP AND GREEN-MANURING EXPERIMENTS

(a) *Stackyard Field—Series A.*

Upper Half : 1930 Green Crops fed off by sheep.

Tares—3 bushels per acre—were drilled April 15th, 1930, and mustard, 28 lb. per acre on April 30th. Both received 3 cwt. of superphosphate and 1 cwt. of sulphate of potash per acre. Both came up very fairly, especially the tares. On June 25th sheep were put on the plots and given also  $\frac{3}{4}$  cwt. per acre of mixed linseed and cotton cake ; they remained for 13 days (to July 8th). Second green crops were then sown, August 1st and 2nd, and the produce fed off with cake towards the close of September. The land was then ploughed and prepared for wheat. This was the first time that two green crops could be grown and fed off in one season.



The analysis of the crops was as follows :

Plot.	Dry Matter lb. per acre. 1st. crop	Dry matter lb. per acre. 2nd crop.	Total dry matter. lb. per acre.	Nitrogen 1st crop per cent.	lb. per acre.	Nitrogen 2nd crop per cent.	lb. per acre.	Total Nitro- gen lb. per acre.
3. Mustard (unlimed) . .	368	534	902	2.07	7.62	3.00	16.0	23.62
4. Mustard (limed)	309	555	864	2.09	6.45	2.74	15.2	21.65
1. Tares (unlimed)	1543	1472	3015	3.57	55.09	4.30	63.4	118.13
2. Tares (limed) . .	1365	1180	2546	3.69	50.35	4.30	50.8	101.15

About five times as much nitrogen is supplied in the tares as in the mustard, and yet it has not benefited the succeeding crop.

Lower Half, 1930 : Wheat after Green Crops fed off by sheep.

The half on which green crops (tares and mustard) had been grown in 1929, was ploughed up after the sheep-feeding, and wheat (" Million "—3 bushels per acre) was drilled, November 2nd, 1929. This came up fairly, but was somewhat damaged by pheasants ; it was, however, a fair plant and throve more or less until June, when, as in most former years, it began to fail. Meantime, early in April, a number of small plots had been marked out, alike on the mustard and the tares area, and dressed with nitrate of soda at different periods ; these made much better growth.

The crop was cut on August 25th, and threshed out in the field. The yields were :

Wheat after Green Crops fed off by Sheep. Produce per acre, 1930

Plot.	<i>Head Corn.</i>		Tail Corn.	Straw, Chaff, etc.
	No. of Bushels.	Weight per Bushel.		
1. After Tares fed off	1.8	lb. 56.3	lb. 3	Cwt. 3.2
3. After Mustard fed off .. ..		56.6	3	5.8

The limed plots (2 and 4) were damaged by sheep breaking in when the green crops were being fed on the upper half, and the produce was not weighed.

(b) *Lansome Piece.*

Here the green crops are not fed off by sheep, but ploughed in, and wheat follows in the next season. In 1930 two successive green crops were grown. Tares were drilled on April 15th—3 bushels per acre—and mustard on April 30th—28 lb. per acre—each with 3 cwt. of superphosphate, and 1 cwt. of sulphate of potash per acre. The crops grew well and were ploughed in on July 14th and 15th. Second crops were sown in early August, and these in turn were ploughed in : " Red Standard " wheat—3 bushels per acre—was then drilled on October 17th.



The results for dry matter and nitrogen in the green crops of 1930 were as follows :

Plot.	Weight of Green Matter per acre. crops.		Weight of Dry matter per acre. crops.			Nitrogen per cent. crops.		Weight of Nitrogen per acre. crops.		
	1st	2nd	1st	2nd	Total	1st	2nd	1st	2nd	Total
	lb.	lb.	lb.	lb.	lb.			lb.	lb.	lb.
1. Mustard plot : old series ..	3050	2362	868	368	1236	1.17	2.50	10.2	9.2	19.4
2. Tares plot : old series ..	9500	7950	2482	961	3443	2.44	4.05	60.6	39.0	99.6
3. Mustard plot : new series ..	4775	3163	1094	437	1531	1.35	2.76	14.8	12.1	26.9
4. Tares plot : new series ..	12450	8338	3064	1082	4146	2.16	4.03	66.2	43.6	109.8
5. Control : new series (Weeds only) ..	4350	2400	993	324	1317	1.73	3.28	17.2	10.6	27.8

5.—MANURING OF GRASS LAND—BROAD MEAD, 1930

No manures had been applied to these plots since 1924. They were redressed in December, 1929, farmyard manure—12 tons per acre—being put on plot 5, and lime—2 tons per acre—on plot 4 ; the mineral manures were given to plots 1, 2 and 4 early in 1930. The plots, along with the rest of the field, were grazed with cattle and sheep. Plot 4 had the freshest and greenest appearance. On May 14th they were then laid in for hay which was cut on June 30th ; the results were as follows :

Plot.	Manures per acre.	Weight of Hay per acre, reckoned on a 15 per cent. Moisture Basis. lb.
1.	Superphosphate 5 cwt., S/Potash 1 cwt. ..	2703
2.	Basic Slag 10 cwt., S/Potash 1 cwt. ..	1615
3.	Nothing .. ..	2361
4.	Lime 2 tons, with Superphosphate 5 cwt. and Sulphate of Potash 1 cwt. .. ..	2314
5.	Farmyard Manure 12 tons .. ..	3622

Analyses.

	Plot 1.	Plot. 2.	Plot. 3.	Plot 4.	Plot 5.
Moisture .. ..	15.00	15.00	15.00	15.00	15.00
Extractive matter (by petroleum ether) .. ..	1.34	1.31	1.32	1.75	1.30
Albuminoids .. ..	10.10	9.82	9.61	9.33	8.58
Digestible Carbohydrates, etc. .. ..	44.42	43.47	43.99	43.55	42.79
Fibre .. ..	22.46	24.22	24.03	23.39	25.80
Ash .. ..	6.68	6.18	6.05	7.18	6.53
	100.00	100.00	100.00	100.00	100.00
Nitrogen .. ..	1.62	1.57	1.54	1.49	1.37
Sand .. ..	1.53	1.55	1.35	1.58	1.00



While there was little difference in composition between the hays of the first four plots, the inferiority of the fifth plot (farm-yard manure) is seen in the higher fibre and the lower albuminoid content.

6.—FORAGE CROPS. WARREN FIELD, 1930

Partly as hay, partly as grain and straw.

Six plots,  $\frac{1}{4}$  acre each, were sown on September 25th, 1929, in duplicate, with three different mixtures, viz. (a) Oats (2 parts), beans (1 part); (b) oats (2 parts), tares (1 part); (c) oats (2 parts), beans (2 parts) and tares (1 part). The mixed seed was sown at the rate of 2 bushels per acre. The crops all grew well, and a part of each plot was cut green on June 30th, 1930, and weighed as hay on July 10th. The yields of hay per acre reckoned on 15 per cent moisture were :\*

Oats and Beans .. .. .	Tons
Oats and Tares .. .. .	3.55
Oats, Beans and Tares .. .. .	3.13
	3.16

The mixture of oats and tares was very difficult to reap, being much "lodged."

\* Actual range 16—18½ per cent.

Analyses of the hay gave the following results :

	Oats and Beans.	Oats and Tares.	Oats, Beans and Tares.
Moisture .. .. .	15.00	15.00	15.00
Extractive matter (by petroleum ether) ..	.81	.81	.86
Albuminoids .. .. .	8.15	6.86	10.32
Digestible Carbohydrates .. .. .	40.17	42.42	40.20
Fibre .. .. .	29.17	29.19	27.37
Ash .. .. .	6.70	5.72	6.25
	100.00	100.00	100.00
Nitrogen .. .. .	1.30	1.09	1.65
Sand .. .. .	.79	1.11	.59

The remainder of the crops were allowed to ripen and were harvested. Difficulty was experienced owing to the crops not ripening together; the beans and oats were over-ripe and suffered loss by shedding and from birds, while the tares were not fully ripe. Wet weather delayed cutting, but ultimately this was done August 7th-8th, the crops being threshed on September 11th. The results were :

	Corn lb. per acre.		Straw per acre. Tons
Oats and Beans .. .. .	1,232	.. ..	2.57
Oats and Tares .. .. .	1,305	.. ..	2.17
Oats, Beans and Tares .. .. .	1,697	.. ..	2.51

The beans held up the crop and reduced the loss by lodging.



## The Woburn Farm

REPORT BY H. G. MILLER ON THE WOBURN FARM

(For dates, yields and other information, see Table on pp. 105-8.)

So far Woburn has been mainly an arable farm, but this is a highly unprofitable policy at present. Some of it is, therefore, being laid down to grass.

In March, 1930, 8 acres of Warren Field—consisting of a heavier soil and unlike the light soil of the rest of the farm—were sown down under barley with the following seeds mixtures, in duplicate, all except II being of indigenous strains.

	lb. per acre.				
	I.	II.	III.	IV.	V.
Italian rye grass ..	—	As I but	—	—	4
Perennial rye grass ..	10	commer-	24	—	14
Cocksfoot .. ..	8	cial	10	6	—
Timothy .. ..	3	strains.	9	4	—
Meadow fescue .. ..	—		—	10	—
Rough stalked meadow grass	2		—	2	4
Late flowering red clover ..	3		—	3	—
Alsike clover .. ..	1		—	1	—
Wild white clover .. ..	2		1	1	2

(Order from N. end of field—I, II, III, IV, V, II, I, V, IV, III.)

All mixtures looked very well by September, although the clover had failed in some places. The whole field was limed in the autumn at the rate of 2 tons burnt agricultural lime per acre.

Road Piece produced a surprisingly good crop of kale, and Great Hill a good crop of sugar beet. These are the poorest fields on the farm, and will be sown to grass, lucerne and lucerne grass mixtures in the spring of 1931.

The division of the farm will then be :	Acres
Classical experiments .. ..	28
Arable and modern experiments .. ..	25
Permanent grassland and lucerne .. ..	76
Buildings, etc. .. ..	2
	<hr/>
	131

The arable land consists of Lansome Field, Warren Field (6 acres nearest farm), Butt Close and Butt Furlong. These last two are no longer separated by a hedge, and 3 acres of the latter round the sand pit, have been laid down to permanent grass for pig runs.

The light soil of Woburn must be continuously covered with crops; any available land is sown with rye in the autumn, as at Rothamsted. The crops grown are given on pp. 105-108; there is no fixed rotation.

The principal stock are sheep (half-bred ewes) and large black pigs. Lambing in 1930 commenced on March 22nd, and the lambs, the last of which are now (June 1931) being fattened, have done very well.

The seven intensive grazing plots: Broad Mead (4), Honey Pot (1) and Great Hill Bottom (2), produced abundant keep throughout the year, with only two applications of nitrate of soda (see p. 108). This treatment is producing marked improvement in the herbage, and so far the clovers have not visibly suffered.



DATES OF SOWING AND HARVESTING, AND YIELD PER ACRE, 1930

Field.	Crop.	Variety.	Principal Cultivations and Dates.	Manuring cwt. per acre.	Sowing Dates.	Cutting Dates.	Carting Dates.	Yield per acre.
<i>I—Arable and Replicated Experiments—</i> Warren Field	Barley undersown	{ Plumage { Archer	Feb. 25-26 tractor plough. Mar. 13-22 drag harrow 3 times, harrow and roll. Mar. 25-26 sow manures and grass seeds. 1 horse harrow	1 S/Amm. 3 Super 2 M/Pot.	Mar. 24	Aug. 12	Aug. 27	14 cwt.
	Forage	—	Sept. 25, 1929 sow forage mixtures and harrow. Mar. 14 graze with sheep. Mar. 26 sow manures and cross harrow. Part as hay and part left for harvest	1½ S/Amm. 3 Super 1 M/Pot.	Sept. 25, 1929	June 30 Aug. 7	July 10 Aug. 19	see p. 103
	Mangolds	{ Carton's { Lemon Globe	Mar. 29-31 three horse drag harrow. Bout up 27in. ridges. Apply dung	20 tons F. Y. M.	April 29	Oct. 23	Oct. 30 Nov. 4	25-30 tons
	Potatoes	Ally	April 10-11 apply artificial manures and set potatoes. April 28, split back ridges for mangolds. April 29 sow mangolds. June 11-12, single and top dress.	1 S/Amm. 3 Super 1½ M/Pot.	April 11	Oct. 1-15	Oct 13-16	10 tons
Butt Close	Winter Oats	Grey	Oct. 2, 1929 cross cultivate and harrow. Oct. 3-5 cross drill. Mar. 25-26 cross harrow	1 S/Amm. 2 Super 1 M/Pot. ½ S/Amm top dressing	Oct. 3-5	July 31	Aug. 20	12 cwt.
Butt Furlong	Barley undersown	{ Plumage { Archer	Plough Feb. 27-28. Mar. 6-7 harrow and drill. Mar. 19 sow grass seeds and harrow. Mar. 25-26, Cambridge roll	1½ S/Amm. 3 Super 1 M/Pot.	April 22	Aug. 17	Aug. 26	14 cwt.
Road Piece	Hay	—	Mar. 16 harrow and roll	2 S/Amm. 3 Super 1 M/Pot.	—	June 23	June 27	50 cwt.
	Kale	Marrow Stem	April 24-29 plough. May 5 harrow and roll. 1st sowing failed owing to fly. June 6 cultivate and roll. July 3 horse hoe. Aug. 15-16 horse hoe	1 S/Amm. 3 Super 1 M/Pot. 1 N/Soda (top dressing)	May 9- June 10	—	—	Estimated over 20 tons.



**DATES OF SOWING AND HARVESTING, AND YIELD PER ACRE, 1930 (Contd.)**

Field.	Crop.	Variety.	Principal Cultivations and Dates.	Manuring cwt. per acre.	Sowing Dates.	Cutting Dates.	Carting Dates.	Yield per acre.
Great Hill	Kale	{ Thousand Head	May 16 plough in rye after sheep. May 20 3 times harrow and roll. June 25 cultivate and roll. 1st sowing taken by fly. July 28 horse hoe. Aug. 16 horse hoe	1 S/Amm. 5 Super. 1 M/Pot. 1 N/Soda (top dressing)	May 22 July 3	—	—	—
	Rye	—	—	1 S/Amm. 3 Super. 1 M/Pot.	End Sept., 1929	Aug. 2	Aug. 20	—
Lansome Piece	Sugar Beet	Johnson's P.	Feb. 21-Mar. 10 plough. April 1-10 plough back. April 22 drag harrow and roll. June 2 singling. Continual hand hoeing	20 tons FYM 1 S/Amm. 4 Super. 1½ Potash Salts. 1 N/Soda (TD).	April 23 April 30 May 9	Oct. 17 Nov. 10	—	9½ tons.
	Potatoes	Ally	April 11-14 plough after rye grazed off, and harrow. April 13-30 3 times harrowed and cultivated, May 2-5 ridged. June 16-17 horse hoe. July 9-10, Aug. 14 hand hoe	—	May 5	Sept. 30-31	—	see pp. 152-3
	Barley after Sugar Beet	{ Plumage Archer	Sept. 8-26, plough. Feb. 5 plough back and harrow. Mar. 13 drill and harrow	2 tons lime 1 S/Amm. 3 Super. 1 M/Pot.	Mar. 13	Aug. 12	Aug. 28	12 cwt.
	Wheat	—	Nov. 5-7 plough and harrow. Drill and harrow	—	Nov. 6	Aug. 9	—	—
	Sugar Beet	Johnson's P.	April 11-14 plough after rye grazed off, and harrow. April 13-30 3 times harrow and cultivate. May 1 harrow and roll. May 27-28 flat hoe. June 10, 11, 12 single and horse hoe	—	May 3	Oct. 8	—	see p. 154



DATES OF SOWING AND HARVESTING, AND YIELD PER ACRE, 1930 (Contd.)

Field.	Crop.	Variety.	Principal Cultivations and Dates.	Manuring cwt. per acre.	Sowing Dates.	Cutting Dates.	Carting Dates.	Yield per acre.
II. Classical and Rotation Experiments—Stackyard Field	Permanent Wheat	Little Joss	Feb. 26 plough in winter wheat ruined by birds, harrow and drill. April 10 roll. May 16 hand hoe	—	Mar. 3	Sept. 1	Sept. 12	see p. 98
	Permanent Barley	Plumage Archer	Oct. 12, 1929 tractor plough. Feb. 18-20, plough and harrow. Mar. 3 harrow and drill. April 10 roll. May 20 hand hoe	—	Mar. 3	Aug. 25	Sept. 11	see p. 99
	Wheat	Million III	Oct. 12-13, 1929, plough and harrow. Nov. 2 harrow and drill. April 10, Cambridge roll. May 29 flat hoe	—	Nov. 2	Aug. 25	Sept. 11	see p. 101
A (b)	Vetches	—	Oct. 12, 1929 plough. Mar. 21 plough. April 15 harrow and drill. July 12 plough and harrow. Aug. 1 drill and harrow	3 Super. 1 S/Pot.	April 15 Aug. 1	Eaten off with sheep July 8 and Sept. 25		
	Mustard	—	Oct. 12, 1929 plough. Mar. 21 plough. April 30 harrow, drill and harrow. July 12 plough and harrow. Aug. 1 drill and harrow	3 Super. 1 S/Pot.	April 30 Aug. 1			
Stackyard Field—Series B (a) (b) (c) (d) (e)	Barley undersown	Plumage Archer	Jan. 20-25 plough. Mar. 27 harrow. Mar. 28 drill and harrow. Undersown with clover	—	Mar. 28 April 22	Aug. 13	Aug. 29	see p. 150
	Barley	Plumage Archer	Cultivation same as (a)	—	Mar. 28	Aug. 13	—	see p. 150
	Sugar Beet	Johnson's P.	Jan. 20-25 plough. April 22 cultivate and harrow. May 1 drill, harrow and roll	—	May 1	Oct. 29	—	see p. 150
	Barley	Plumage Archer	Cultivation same as (a)	—	Mar. 28	Aug. 13	Aug. 29	see p. 150
	Potatoes	Ally	Jan. 20-25 plough. April 10 cultivate and ridge. Sow potatoes and split back. May 21 chain harrow, ridge and hand hoe	—	April 10	Oct. 1	—	see p. 150



**DATES OF SOWING AND HARVESTING, AND YIELD PER ACRE, 1930 (Contd.)**

Field.	Crop.	Variety.	Principal Cultivations and Dates.	Manuring, cwt. per acre.	Sowing Dates.	Cutting Dates.	Carting Dates.	Yield per acre.
Series B (cont.) (f)	Barley	Plumage Archer	Cultivation same as (a)	—	Mar. 28	Aug. 13	Aug. 29	see p. 150
Series C	Swedes	Purple Top	May 12-14 plough. May 28 harrow and drill manures. June 17 redrill and harrow. July 4 horse hoe	3 Super. 1 S/Pot.	May 29 June 17	Fed off with sheep Jan - Mar., 1931		
Series D	Barley under-sown with Clover Mustard	Plumage Archer	Feb. 4 plough after sheep. Mar 4 harrow and drill. May 1 roll	—	Mar. 4 Mar. 27 (clover) April 15 Aug. 2	Aug. 13	Aug. 28	see p. 100
{ Lansome Piece	Mustard	—	Nov. 5, 7, 8, 1929 plough. Mar. 20-21 plough back. April 14 3 times drag harrow. April 15 manure and sow vetches. April 30 sow mustard. May 1 roll. July 10 plough in both crops. Aug. 2 resow both crops. Oct. 7-11 plough in both crops.	3 Super. 1 S/Pot.				
III Grazing— { Broad Mead	Grazing	—	Chain harrow before each dressing of manure. Dressings commenced Feb. 22. Dressings at 7 day intervals. 2nd dressing commenced May 8. Plot 4 mown for hay after grazing till May 16	1 S/Amm. 1st dressing 1 N/Soda 2nd dressing	April 30 Aug. 2			
{ Honey Pot Great Hill Bottom Long Mead	Do. Do.	Do. Do.						