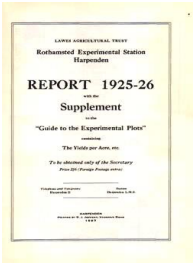
Report 1925-26 With the Supplement to the Guide to the Experimental Plots



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Rothamsted Experimental Plots

Rothamsted Research

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THE FARM & CROP RESULTS

OCTOBER, 1924 TO SEPTEMBER, 1925.

The outstanding features of the season under review were the wetness of the autumn and winter, and the long and practically unbroken drought, from the beginning of June till mid July.

Following an exceptionally wet season, October turned out mild, dull and wet; the rainfall of 4.28 inches, being 1.19 inches in excess of the average. Wheat and winter oats were drilled under fairly good conditions on such land as was ready. Elsewhere, cultivations were greatly hindered by the weather, ploughing was frequently stopped, and potato harvest was slow and difficult. By the end of the month the land was so sodden that the Broadbalk drains ran after every shower. Similar conditions continued in November, when the rainfall was again above average. The weather was generally mild, but a few frosts helped to condition the land, and, taking advantage of this Broadbalk was drilled on the 6th. December was unusually warm, the mean temperature being 3.7° above normal, and the rainfall again exceeded the average, so that in the first quarter of the farm year the rainfall was 3.21 inches in excess. During the latter part of the month, cultivation became impossible, and water stood on the land after rain. January remained mild, and brought drier weather, and the winter cereals began to improve. Stubble ploughing was pushed forward, but the land came up very sticky, and needed frost badly. The improvement was only temporary, for February, with 3.94 inches of rain, doubled the normal rainfall.

Oats were drilled under rather wet conditions on 10th, and beans were sown in a better seed bed on 19th. Work then came to a standstill, and surface water stood on the land on 25th and 26th. In spite of the rain, corn and young seeds had come through the winter better than might have been expected, possibly owing to the fact that the weather had practically always been mild.

The change came in March. A dry month, with frosty nights and periods of biting winds, made a marvellous change in the sodden furrows. Spring corn was drilled under conditions which had seemed impossible a month before. Similar conditions persisted with April, which was late, and cold, but fairly dry, and enabled the sowing of spring corn and clover to be completed. The cold, sunless weather of the last two months, however, had given no stimulus to winter cereals or grass, which were still backward.

The biting weather of March and April continued for the first week in May, and was followed by the first hot weather of the year. By the 19th, the ground had become so dry that the young clover began to suffer, but the last week of the month was cooler and showery; the growth of all crops was rapid, and wheat made a wonderful recovery where it had wintered badly. June brought in a drought which lasted for about 7 weeks, only .12 inch of rain fell in the month and the ground was never wet. Winter corn did well, although oats showed a tendency to ripen prematurely. Barley was rather short in the straw, but otherwise unharmed. Hay was secured in excellent order without a check, but undersown crops and swedes were at a standstill. Much cleaning was done in the roots and fallows. The drought con-

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tinued for the first half of July, but the last fortnight of the month brought no less than 4.08 inches of rain, an amount which exceeded the whole month's rainfall at any of the crop reporting stations of the Ministry of Agriculture. The rain came just in time to save most of the undersown crops. Mangolds had, by this time, received a definite check when grown without dung, and swedes were a failure. Winter oats cut immediately before the rain, sprouted in the shocks in four days, and the ripening of the other cereals was delayed. August was dull and showery, and straightforward harvesting was never possible, although the bulk of the corn was got in during the month. The last week of the month was particularly wet, and carting and stubble ploughing were stopped. The conditions of August were intensified in September, there being more rain and less sunshine.

A trying harvest was completed on the 12th. Owing to the nature of the weather, a good deal of damage to the corn occurred in the field. Oats suffered most, wheat was rather soft, and barley only in fair condition. Yields were satisfactory; early sown winter oats and wheat yielded 68 and 40 bushels per acre, respectively, the barley on Foster's field and spring oats on Stackyard, gave 48 and 40 bushels per acre. Late sown swedes made more leaf than bulbs, aftermaths grew rapidly, but conditions for making the second cut hay were bad. An extraordinary germination of weeds took place on the stubbles, but the increasing wetness at the end of the month, gave no immediate prospect for clearing operations. Owing to the long drought, the season had been a bad one for roots, but lifting was favoured by the dry, hard weather of October and November, and the crop was got up and stored in good condition, and with no damage to the land. Swedes on West Barnfield failed completely over some of the area, mangolds, grown without dung, yielded a poor crop, but, on Stackyard field, dunged mangolds gave 25 tons per acre, and turnips, 17 tons.

OCTOBER, 1925, TO SEPTEMBER, 1926.

A hard winter, late spring, and an unusual amount of lodged corn at harvest time were the outstanding points of the season. The farm year opened well, with a warm, dry fortnight, giving excellent conditions for stubble cleaning and handling the second cut hay. Winter oats and a soiling mixture were got in well. The weather then became rather unsettled, so that the wheat was drilled under wetter conditions, but work in the root fields was not seriously hindered.

By the beginning of November, wheat was being ploughed in on Gt. Harpenden field, in order to push on with the sowing on land too sticky to drill. Hard conditions soon set in, however, and the month was unusually frosty. Ground frosts were recorded on 18 occasions, and on the 14th, and 17th, there were 12 and 13 degrees of frost respectively. Broadbalk, the sowed area reduced to four acres this season on account of fallowing operations, was drilled in a favourable period on 25th, and then snow fell and stopped work on the land for the rest of the month. Like the previous month, December turned out colder, drier and brighter than usual. The first half was a continuation of the frosty

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weather of November, and from the 2nd to the 6th inclusive, the grass minimum ranged from 22° to 17° F. During this period little could be done, and when rain came with the thaw in the middle of the month, work was confined to stubble ploughing. A brief period of frost set in again at Christmas, and the month finished warm, damp and muggy. January was a wet month with an exceedingly severe mid-period. The rainfall was 1.11in. in excess of the average, while the air minimum of 4° F. registered on the 17th was the lowest recorded at any of the crop weather stations of the Ministry of Agriculture during the month. When the air temperature was 4° F., the grass minimum under the snow was only 20° F. Ploughing continued till the snow came on the 13th, when no further work was possible till the 29th. The outstanding feature of February was its mildness, the mean temperature of 44°F. being no less than 5.5°F. above the normal. The month was unusually dull, only 41 hours of sunshine being recorded. The rainfall was also rather above the average. The first three weeks were too wet for seed bed preparation, wheat was yellowing, and grass and clover made no growth.

In the drier period of the last week, spring oats were got in under fairly good conditions. Winter oats which had made no headway for the past three months began to show definite signs of improvement by the end of the month.

March, like the same month of last year, was very favourable for spring work. The rainfall of .21in. was 1.77in. below the average, and the lowest recorded by any of the crop reporting stations. The period was also warmer and sunnier than usual, but the nights were very cold and 16 ground frosts were registered.

The drying winds and general conditions were highly favourable to spring cleaning, and much work was put into Stackyard field during the month. New Zealand field and West Barnfield were ploughed for the second time and drilled with barley on a rather rough tilth, the rest of the barley being held back in order that rain might soften the clods. The drought of March continued into April, and began to be felt, especially by germinating seeds. It was broken by ½in. of rain on 8th of the month, but the weather remained dry for a further week. The last fortnight of April was wet, and work began to be hindered at the end of the month, for by this time the rainfall was 1in. in excess of normal. Great Hoos was drilled, Great Harpenden undersown, and potatoes were planted under excellent conditions during the month. Winter corn began to improve and answer to top dressings, the rather uneven plant of March barley filled up by later germinations and young clover made a very good plant. May was an unusually cold late month, and provided a fortnight of biting winds which caused the corn to yellow; a milder period followed, but without any summer weather. Barley was injured by the cold, but spring oats seemed more resistant. Root tilths were difficult owing to the heavy rains of late April. Cold showery weather persisted for the first half of June. Conditions were bad for hoeing and all crops needed sun. An attack of spring tails on Barnfield mangolds was favoured by the showery weather, and was only controlled by energetic sweeping with tarred sacks. An early start was made with the hay, but progress was slow. The second half of June was drier and warmer. All the wheat, except that on Little Hoos, showed

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bad attacks of yellow rust. On the whole in spite of rather unpleasant weather, the crops had made favourable progress during the month. The first fortnight of July brought some real summer weather which was badly needed for hoeing and hay-making, but dull wet conditions set in for the second half of the month, and the heavy rains and gusts at this period were responsible for the widespread lodging of corn which was a feature of the season. Winter oats on Long Hoos and the barley on West Barn and New Zealand fields were badly laid. Wheat and spring oats made standing crops. Prospects were good for roots, but mangolds wanted sun. A feature of the past four months had been their extraordinary dullness, the period April—July inclusive showed a sunshine deficit of no less than 180 hours.

August did nothing to redress the balance of sunshine, but was remarkable for its dryness. Only 1.19in. of rain fell, which was the lowest figure registered at any of the crop reporting stations for the month. Had it not been for the lodged crops, harvest would have been secured in record time. As it was, some of the barley was not carted by the end of the month. September opened with 1½in. rain in the first week and caught the dead ripe barley in shock, and some of the corn sprouted in the moist, warm period which ensued. The remainder of the month was hot and bright, and harvest was completed by the 15th. Potato digging and stubble cleaning commenced under very good conditions, and some second cut hay was made. Wheat was the best cereal crop of the year. Rye was satisfactory. Oats and barley, although they had the appearance of good crops in the field, threshed out badly. Potatoes started late and were checked by the dry spell in August, but they yielded well, 10-11 tons per acre, where they were completely manured. The crop was free from disease, but was only about one-half ware. Swedes did well, but mangolds, although fairly good, never seemed really to do justice to the generous treatment they received. Meadow hay responded well to spring cultivation and nitrogenous top-dressing, and gave a satisfactory crop.

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WOBURN EXPERIMENTAL FARM

REPORTS FOR 1925 & 1926 BY Dr. J. A. VOELCKER.

Season 1924-5.

The season 1924-5 was very abnormal. The autumn and winter were wet, and the spring markedly deficient in sunshine. Crops struggling against these adverse influences were not able to withstand the drought that came later in June and July. This period, however, helped in making the hay crop. The weather broke before harvest, which was conducted under difficulties, some of the grain sprouting in the sheaves. The wheat crop never recovered from its early bad start, and, although the barley was sown in better conditions, it could not withstand the drought, and was especially short in the straw. Of the roots, mangolds and potatoes did fairly well, but swedes, that could not be drilled until the end of July, were naturally a failure.

The wet winter markedly affected the soil conditions. On Stackyard Field in January, 1925, the nitrate of soda plots (3, 6, 9) and the farmyard manure plot (11b) were wet and sticky, while the sulphate of ammonia series (2, 5, 8) were comparatively dry and friable. Differences were also observed in the young plants, those on the sulphate of ammonia being much superior. Later on these differences were reversed as the familiar effects of soil acidity began to show. The abnormal soil conditions were also evident on the area of Stackyard Field intended for swedes. Although the land is a light sandy loam, the ploughed land dried into clods that became hardened in the June drought, and no satisfactory seed bed could be prepared.

Season 1925-6.

The season 1926 was one of a distinctly mild character, with an average rainfall, but a deficiency of sunshine.

The period of autumn sowing was quite favourable; there was a little frost in December, 1925; March, 1926, was a singularly dry month, but April, May and June were all very unsettled, with prolonged cold periods and absence of warmth. July and August were fair and warm, and the early harvest was got in in good condition. Intervals of fine and wet weather followed, and the rest of the harvest was gathered with difficulty.

RAINFALL.

	1924–25. Inches.	No. of days on which rain fell.	1925–26. Inches.	No. of days on which rain fell.
October	4·03	16	2·99	9
November	2·58	10	1·50	7
December	3·65	13	1·89	11
January	1·41	9	2·74	12
February	2·39	15	2·67	15
March	·82	7	·17	3
April	1·59	15	2·59	16
May	2·26	16	2·38	17
June	·05	2	2·47	12
July	2·85	10	1·99	12
August	2·33	17	1·19	8
September	2·68	13	1·84	10
	26·64	143	24·42	132

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FIELD EXPERIMENTS.

1. *Continuous Growing of Wheat (Stackyard Field).*

1925 (*49th Season*).

Farmyard manure (giving 100 lb. ammonia per acre) was spread and ploughed in (plot 11b), November 7th, 1924, and " Yeoman " wheat—12 pecks per acre—was drilled on November 18th, 1924. Rape Dust was given to plot 10b and the mineral manures to the several plots on the same day. A fair plant of wheat came up, and displayed in January the marked appearance already described.

Coltsfoot appeared thickly on the nitrate plots, and by the middle of March the crop began to fail on the sulphate of ammonia plots. By May the farmyard manure plot had to some extent recovered. The first top-dressings of sulphate of ammonia and nitrate of soda were given on June 9th, and the second dressings on July 16th. The crop was cut August 11th—14th, carted and stacked August 16th, and threshed early in December. The results are given in Table I.

The yield was a very miserable one, and worse than the poor crop of 1924, which was the previous lowest record. The unmanured produce was only 2 bushels per acre, and the highest yield 6.8 bushels per acre, whereas in 1924 it was 18 bushels.

With results so low as those shown in Table I, there is little point in discussing the figures in detail. Despite their bad start, the nitrate of soda plots turned out superior to the sulphate of ammonia ones. The highest crop was 6.8 bushels of corn per acre with nitrate of soda (50 lbs. ammonia per acre) alone, the farmyard manure (5.9 bushels) coming next; these two plots also gave the highest yields of straw.

1926 (*50th Season*).

Farmyard manure, as in the previous year, was spread, and ploughed in, October 13th, the quantity being 4 t. 12 c. 2 qr. 20 lb. to the acre. Mineral manures and rape dust (403.2 lb. per acre) were applied October 16th, " Yeoman " wheat—12 pecks to the acre—having been drilled October 14th—15th. The wheat came up well, and even the usually " weak " plots (such as 8a, 8b) looked better than usual. The plot 2b (last limed in 1897) still continued to show clearly the influence of lime; on the other hand, the expected failure of 5a (where no lime had been given) did not materialise. The farmyard manure plot (11b) was the best of the series, and the rape plot (10b) not greatly inferior.

The first top-dressings of nitrogenous salts were applied on March 27th, the second on June 10th. Through an error the whole amount for plot 6 was put on one half of it only, while the top-dressings were applied to the " a " instead of the " b " series of plots 8 and 9.

The same mistakes were, at the same time, made in the case of the continuous barley plots. To remedy the error as far as possible, the second half of plot 6 was subsequently given, in each case, the proper dressing of 25 lb. per acre of nitrate of soda, and the two halves were reaped separately.

By the middle of July the crop had become very uneven, and weeds made their appearance in quantity, notably on the nitrate

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plots—a species of Vicia (*Vicia hirsuta*) and of Convolvulus were the chief pests, in addition to coltsfoot, wild oats and *Holcus mollis*—but it was noticeable that on the sulphate of ammonia plots there was no Vicia.

The wheat was cut on August 25th, but, owing to bad harvest weather, could not be carted until September 13th. In the case of a few sheaves there was some sprouting of the grain.

After the wheat had been carried, the stubble was found to be in a very dirty condition, and this, together with the fact that the 50 years' period of continuous wheat cultivation had been concluded, led to the determination to fallow the land and give it a thorough cleaning before embarking on a new series.

The harvest results are given in Table I.

The rapid growth of weeds, and of *Vicia hirsuta* in particular, was responsible, in great measure, for the extremely high amounts of tail corn recorded, it being almost impossible to separate the corn and the tares.

The produce in general was much like that of 1923. The unmanured plots gave an average yield of 4.3 bushels with 10 cwt. 3 qr. of straw per acre.

On plot 2b (sulphate of ammonia), which received 2 tons of lime applied in 1897, the yield was 8.7 bushels, double that on the unmanured. On plot 2a (sulphate of ammonia), where no lime was added, no weighable crop has been recorded for the past thirty years.

Nitrate of soda gave, all round, higher results than sulphate of ammonia, the addition of minerals to it showing no benefit this season.

The farmyard manure plot looked about the best of all earlier in the season, but fell off towards the close. The weight per bushel of the corn was generally low, and the tail corn exceptionally high.

2. *Continuous Growing of Barley (Stackyard Field).*

1925 (*49th Season*).

The land, after ploughing in March, 1925, was in better and drier condition than the corresponding wheat area. Nevertheless, the difference between the nitrate plots and those treated continuously with sulphate of ammonia was very observable, the former being of darker colour and closer texture.

Farmyard manure (giving 100 lb. ammonia per acre) was spread on plot 11b on March 19th—the quantity being at the rate of 3 tons 13 cwt. 3 qr. 9 lb. per acre.

" Plumage Archer " barley was drilled on April 17th at the rate of 12 pecks per acre. Mineral manures and rape dust were put on the respective plots the same day. The land, at this period, was still somewhat lumpy.

The barley came up well, and the land was rolled about the middle of May. At this time the crop looked very promising. The sulphate of ammonia plots that had had no lime soon began to go off, as usual, those receiving lime keeping quite good. Coltsfoot was particularly noticeable in the nitrate of soda plots. The first top-dressings of sulphate of ammonia and nitrate of

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TABLE I.

Continuous Growing of Wheat, 1925 (49th Season) and 1926 (50th Season).

Wheat grown year after year on the same land, the manures being applied every year.

Stackyard Field—Produce per acre.

Plot.	Manures per acre.	1925. Head Corn. No. of bushels.	1925. Head Corn. Weight per bushel.	1925. Tail Corn. Weight.	1925. Straw, Chaff, &c.	1926. Head Corn. No. of bushels.	1926. Head Corn. Weight per bushel.	1926. Tail Corn. Weight	1926. Straw, Chaff, &c.
			lb.	lb.	cwt. q. lb.		lb.	lb.	cwt. q. lb.
1	Unmanured	2.0	56.0	2	1 1 26	4.0	58.0	95	10 1 8
2a	Sulphate of Ammonia (=25 lb. Ammonia)	—	—	—	—	—	—	28	5 3 24
2aa	As 2a, with 5 cwt. Lime, Jan., 1905, repeated 1909, 1910, and 1911	—	—	—	—	3.4	58.0	64	10 3 13
2b	As 2a, with 2 tons Lime, Dec., 1897	1.4	58.0	2	1 0 24	8.7	60.9	120	17 1 16
2bb	As 2b, with 2 tons Lime, repeated Jan., 1905	1.2	58.0	2	1 12	6.4	58.0	104	11 1 5
3a	Nitrate of Soda (=50 lb. Ammonia)	6.8	58.5	8	4 2 20	13.7	53.7	192	22 0 6
3b	Nitrate of Soda (=25 lb. Ammonia)	5.6	59.0	8	2 2 16	7.2	62.0	103	15 1 18
4	Mineral Manures (Superphosphate 3 cwt., Sulphate of Potash ½ cwt.)	1.0	56.0	6	2 0 26	5.1	56.7	65	9 3 13
5a	Mineral Manures and Sulphate of Ammonia (=25 lb. Ammonia)	—	—	—	—	9.6	56.7	99	25 0 20
5b	As 5a, with 1 ton Lime, Jan., 1905	1.2	56.0	2	3 3 4	10.8	55.2	320	22 3 6
6	Mineral Manures and Nitrate of Soda (=25 lb. Ammonia)	3.2	58.0	4	2 2 26	8.1	53.7	173	17 0 1
7	Unmanured	2.0	56.0	2	1 0 18	4.6	56.2	57	11 0 6
8a	Mineral Manures and, in alternate years, Sulphate of Ammonia (=50 lb. Ammonia)	2.1	59.0	12	2 2 8	—	—	8	4 2 8
8aa	As 8a, with 10 cwt. Lime, Jan., 1905, repeated Jan., 1918	5.3	60.0	16	3 0 16	4.8	60.0	88	17 1 18
8b	Mineral Manures, Sulphate of Ammonia (=50 lb. Ammonia) omitted in alternate years	—	—	—	—	—	—	32	6 0 9
8bb	As 8b, with 10 cwt. Lime, Jan., 1905, repeated Jan., 1918	—	—	—	—	1.2	60.0	24	2 0 26
9a	Mineral Manures and, in alternate years, Nitrate of Soda (=50 lb. Ammonia)	4.0	58.0	8	1 1 4	4.8	62.0	140	28 2 12
9b	Mineral Manures, Nitrate of Soda (=50 lb. Ammonia) omitted in alternate years	2.2	59.0	4	1 1 24	5.4	58.0	95	12 1 18
10a	Superphosphate 3 cwt., Nitrate of Soda (=25 lb. Ammonia)	2.2	58.0	6	1 2 20	8.7	55.7	102	21 2 11
10b	Rape dust (=25 lb. Ammonia)	5.2	58.0	8	2 0 20	4.7	60.0	60	6 2 16
11a	Sulphate of Potash 1 cwt., Nitrate of Soda (=25 lb. Ammonia)	2.7	59.0	4	2 0 12	8.3	54.0	96	16 3 20
11b	Farmyard Manure (=100 lb. Ammonia)	5.9	59.5	10	4 2 12	5.1	56.0	72	13 1 26

soda were given on June 10th, and the second dressings on July 16th.

Up to June 24th, the crops stood the drought quite well, but, though the ultimate yields were much superior to those of the Wheat series, and also to the Barley crops of 1924, they were well below the average. In particular the straw was very short, and there were many weeds cut with the straw and retained in the sheaves. As a result, the stack heated, and the contents (which included the produce from the Malting Barley experimental plots), were seriously damaged.

The barley was threshed and weighed December 1—5, and the results are given in Table II.

The unmanured produce averaged 7.4 bushels of corn, with 7 cwt. 1 qr. of straw per acre—minerals alone giving practically the same, and showing little further benefit from addition of lime, except for an increase in the straw.

Sulphate of Ammonia without lime gave no crop to record (2a, 5a, 8a, 8b), but where lime was given as well (2aa, 2b, 2bb, 5aa, 5b, 8aa, 8bb), in every case the crop was more or less restored. Nitrate of soda, on the whole, gave crops rather better than those from Sulphate of Ammonia, but the addition of lime to it (plots 3aa and 3bb) proved, as in the two previous years, the reverse of beneficial.

Rape-dust gave but a small crop compared with farmyard manure, which latter produced much the highest yield of the series, viz., 17.6 bushels with 15 cwt. of straw per acre. The next highest yield, 12 bushels per acre, was from Sulphate of Ammonia with minerals and lime (plot 8aa).

1926. (*50th Season*).

Farmyard manure (6 tons, 4 cwt. per acre), was applied April 8th, and ploughed in, Barley (" Plumage Archer "—10 pecks per acre) being drilled on April 9th. Mineral manures and Rape dust (364 lbs. per acre) were put on at the same time.

The first top-dressings of nitrogenous salts were given, as for the wheat, on May 27th, the second on June 16th, the same mistakes as in the wheat series being made with plots 6, 8a, 8aa, 9a, and subsequently partially rectified.

The barley grew distinctly better than the wheat. Weeds were not so troublesome, though both *Vicia hirsuta* and convolvulus were to be seen on the weaker plots. The barley was cut on August 24, and not carted until September 13th, but did not suffer nearly as much as the wheat. As the 50 years period was over, it was decided to fallow this land also, although it was not so weedy as the continuous wheat plots.

The harvest results for 1926 are given in Table II.

The crop generally was light. The unmanured produce was 2.6 bushels of corn with 3 cwt. 1 qr. of straw per acre. Mineral manures alone gave an increase of 5.5 bushels of corn, but the addition of lime to this showed no benefit.

The Sulphate of Ammonia plot (2a), which generally is quite bare, now gave 3.5 bushels of corn per acre. The corresponding plot (5a), with minerals added, showed the same feature, giving 10 bushels of corn per acre, though no lime had been applied to

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TABLE II.

Continuous Growing of Barley, 1925 (49th Season), and 1926 (50th Season).

Barley grown year after year on the same land, the manures being applied every year.

Stackyard Field—Produce per acre.

Plot.	Manures per acre.	1925. Head Corn. No. of bushels.	1925. Head Corn. Weight per bushel.	1925. Tail Corn. Weight.	1925. Straw, Chaff, &c.	1926. Head Corn. No. of bushels.	1926. Head Corn. Weight per bushel.	1926. Tail Corn. Weight.	1926. Straw, Chaff, &c.
			lb.	lb.	cwt. q. lb.		lb.	lb.	cwt. q. lb.
1	Unmanured	8.4	50.5	18	7 0 4	3.1	52.0	16	3 0 25
2a	Sulphate of Ammonia (=25 lb. Ammonia)	—	—	—	—	3.5	54.0	32	1 3 4
2aa	As 2a, with 5 cwt. Lime, Mar., 1905, repeated 1909, 1910 and 1912, and 10 cwt. Lime applied Jan., 1923	6.2	51.0	32	5 1 12	4.8	54.0	28	8 3 0
2b	As 2a, with 2 tons Lime, Dec., 1897, repeated 1912	5.7	52.5	24	6 0 8	4.1	56.0	24	8 0 20
2bb	As 2a, with 2 tons Lime, Dec., 1897, repeated Mar., 1905	4.1	51.7	16	3 0 8	8.8	52.0	80	10 3 16
3a	Nitrate of Soda (=50 lb. Ammonia)	8.3	52.0	24	7 1 4	12.1	56.0	80	10 0 20
3aa	As 3a, with 2 tons Lime, Jan., 1921	4·1	51.0	16	3 3 4	6.3	52.0	40	7 3 24
3b	Nitrate of Soda (=25 lb. Ammonia)	7·3	52.5	18	7 2 24	5.8	52.0	44	7 3 24
3bb	As 3b, with 2 tons Lime, Jan., 1921	4·7	51.5	8	2 1 12	6.9	50.9	40	8 3 24
4a	Mineral Manures[1]	6·9	52.0	20	4 1 14	4.5	52.0	18	5 2 18
4b	As 4a, with 1 ton Lime, 1915	7.2	53.0	28	6 2 20	7.7	52.0	50	11 0 4
5a	Mineral Manures and Sulphate of Ammonia (=25 lb. Ammonia)	—	—	—	—	10.0	56.0	72	10 3 8
5aa	As 5a, with 1 ton Lime, Mar., 1905, repeated 1916	7.6	52.5	16	8 2 8	18.7	48.5	88	10 1 8
5b	As 5a, with 2 tons Lime, Dec., 1897, repeated 1912	10.0	52.8	18	7 3 20	10.2	50.2	36	8 2 6
6	Mineral Manures and Nitrate of Soda (=25 lb. Ammonia)	8.6	52.2	15	6 0 8	15.1	49.7	69	11 3 0
7	Unmanured	6.3	52.2	8	7 2 20	2.1	52	10	3 1 4
8a	Mineral Manures and, in alternate years, Sulphate of Ammonia (=50 lb. Ammonia)	—	—	—	—	3.0	44.0	24	2 1 14
8aa	As 8a, with 2 tons Lime, Dec., 1897, repeated 1912	12.0	52.0	16	10 3 4	4.2	56.0	24	7 3 12
8b	Mineral Manures, Sulphate of Ammonia (=50 lb. Ammonia) omitted in alternate years	—	—	—	—	2.2	52.0	24	2 0 7
8bb	As 8b, with 2 tons Lime, Dec., 1897, repeated 1912	7.4	51.5	20	6 0 16	9.5	52.0	56	11 1 0
9a	Mineral Manures and, in alternate years, Nitrate of Soda (=50 lb. Ammonia)	11.7	51.7	10	12 0 24	22.9	49.9	87	15 3 16
9b	Mineral Manures, Nitrate of Soda (=50 lb. Ammonia) omitted in alternate years	10.4	52.1	12	8 2 10	9.9	52.2	54	13 1 2
10a	Superphosphate 3 cwt., Nitrate of Soda (=25 lb. Ammonia)	6.4	52.0	18	6 3 20	6.0	50.7	41	8 2 12
10b	Rape dust (=25 lb. Ammonia)	3.8	52.0	8	3 2 8	7.1	52.0	24	9 3 10
11a	Sulphate of Potash 1 cwt., Nitrate of Soda (=25 lb. Ammonia)	7.4	51.7	14	6 3 12	10.9	50.7	38	9 1 0
11b	Farmyard Manure (=100 lb. Ammonia)	17.6	52.2	22	15 0 0	24.5	51.2	118	23 1 26

[1] Superphosphate 3 cwt., Sulphate of Potash ½ cwt.

either. Where lime had been put on additionally (plot 5aa), however, the produce was increased to 18.7 bushels of barley per acre.

In the case of Nitrate of Soda, the higher amounts, whether alone or with minerals, produced a considerable increase, but the addition of lime had no further benefit.

As between phosphate and potash, the comparison of plots 10a and 11a, shows a decided advantage to attend the inclusion of potash. Farmyard manure (plot 11b) gave the highest crop of all, viz., 24.5 bushels of corn per acre, it being greatly superior to the rape dust plot (10b) which, however, yielded this year better than usual.

The quality of grain was fair for the season, with the tail corn somewhat higher than usual.

3. *Rotation Experiments.*

The Unexhausted Manure Value of Cake and Corn (Stackyard Field).

(*a*) Series C.

1925. *Wheat.*

After the clover ley of 1924 had been ploughed in, "Yeoman" wheat, at the rate of 10 pecks per acre, was drilled on Nov. 4—5, 1924. It came up well, and, though it looked inferior to the wheat on the green-manuring plots (Series A), after April it became distinctly superior; the "cake" plots, moreover, were darker-coloured and seemed much better than the corresponding "corn" plots. The crop was cut August 8th, 10th, 11th, carted and stacked August 17th, and threshed and weighed December 1st—5th. The results were as follows :—

TABLE III.

Rotation Experiments—Series C (Stackyard Field), 1925. Wheat after Clover. Produce per Acre.

Plot		Head Corn		Tail Corn Weight	Straw, Chaff, etc.			
		Bushels	Weight per Bushel					
			lb.	lb.	Tons	cwts.	qrs.	lb.
1	Corn-fed Plot ...	24·6	60·2	204	1	1	1	14
2	Cake-fed Plot ...	25·8	60·2	225	1	3	2	14

The weighings did not bear out the appearances noted during growth, for there were only 1.2 bushels more corn and 2 cwt. 1 qr. more straw per acre on the "cake" fed plot than on the "corn" one. At the same time the yields were much higher than with the continuous wheat plots and the green-manure plots on the same field. It will be noted that the tail corn was much higher than usual.

This wheat crop concluded the four-course rotation begun with swedes in 1922 and, as this rotation has been carried on practically since the commencement in 1876, it will be convenient to summarise briefly the conclusions to be drawn from the last two rotations.

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In the previous rotation (beginning 1918), on this particular area (series C), the growing of clover had been resumed, and the swedes of 1918 were fed on the land by sheep which consumed, in the one case, 4 cwt. of corn (barley and oats) per acre, and supplying about 7.25 lbs. of Nitrogen per acre, and in the other case, 4 cwt. of cake (Linseed and Cotton) per acre, supplying about 18 lbs. per acre of Nitrogen. A little clover-chaff was given as well to all the sheep. Barley, clover and wheat followed as the crops of 1919, 1920, and 1921.

In the new rotation, beginning with 1923 (swedes), it was decided to increase the difference between the Nitrogen applied in the two cases. Accordingly, the amounts were now increased from 4 cwt. of corn, and of cake, to 16 cwt. per acre of corn and 14 cwt. per acre (all that the sheep would eat) of mixed cake.

The corresponding nitrogen figures were, corn plot, 29.25 lb., and cake plot, 67 lb. per acre.

In Table IV. are given the results in either rotation. It will be remembered that in each case when swedes were grown (1918-1922), the amount of roots fed on the land by the sheep was the same on the corn-fed and cake-fed plots, the quantity so fed being supplemented—when necessary—by mangels, and the same amount of clover-chaff given to the two lots.

TABLE IV. ROTATION EXPERIMENTS.

(*a*) 1918–1921. RESULTS PER ACRE.

4 cwt. per acre Corn (7·25 lbs. Nitrogen per acre), or 4 cwt. per acre. Cake (18 lbs. Nitrogen per acre) fed with the root-crop.

	1918	1919. Barley	1920 Red Clover Hay				1921 Wheat
	Swedes	Bushels	Tons	cwts.	qrs.	lb.	Bushels
Corn-fed Plot ...	about	17·4	2	16	2	21	37·4
Cake-fed Plot ...	11 tons	18·2	2	16	2	11	31·2

(*b*) 1922–1925. RESULTS PER ACRE.

16 cwt. per acre Corn (29·25 lbs. Nitrogen per acre), or 14 cwt. per acre Cake (67 lbs. Nitrogen per acre) fed with the root-crop.

	1922. Swedes	1923 Barley	1924 Clover (Mixed) Hay				1925 Wheat
		Bushels	Tons	cwts.	qrs.	lb.	Bushels
Corn-fed Plot ...	small	14·2	1	18	2	22	24·6
Cake-fed Plot ...	crop	16·2	1	17	0	11	25·8

The results show that in both rotations, corn-feeding gave results equal to cake-feeding.

Even on the first crop (Barley) immediately succeeding the feeding of the roots, there was no significant difference in favour of the cake-feeding.

The whole subject is a very perplexing one, requiring much further study, as the result has been obtained so often that its accuracy can hardly be doubted.

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1926. *Roots.*

The root crop (Swedes) began a new rotation in 1926, the intention being to use the increased amounts of food, first adopted in 1922, when feeding off the roots. This was in order, before coming to a definite conclusion, to test once more the seemingly abnormal results recorded in the last rotation.

The land after preparation for swedes was sown on June 16th with " Up to date " Swede seed at the rate of 3 lbs. per acre. Three cwt. of mineral Superphosphate and 1 cwt. of Sulphate of Potash were given per acre, June 16th and 17th, and on August 10th a top-dressing of 1 cwt. per acre Nitrate of Soda.

Quite a good plant was obtained, but the swedes were sown too late, planted too wide, and singled too late to give a really good crop even for this land, to which, because of its distance from the farm buildings, no dung can be carted out.

It was, however, a very even plant all over, and the roots were sound.

The yields were :—

	Tons	Cwt.	
Plot 1. Corn-fed plot	13	18	per acre
Plot 2. Cake-fed plot	13	0	,,

Feeding-off the roots on the land with sheep (70) began on December 31st, and barley will follow.

(*b*) Series D.

1925. *Swedes.*

After the close of the last rotation (wheat, 1924), the land was ploughed and prepared, as far as possible, for swedes. As already explained, the land set into large hard blocks under the influence of the June drought. Nothing could be done with the land until rain came on July 20th, when the area was prepared, and swede seed was ultimately drilled on July 24th—25th, at the rate of 5 lbs. per acre. Quite a good plant came up, but the late-sowing prevented any chance of the roots attaining any size, and, with the early frosts of October, growth ceased, and there was nothing to do but to run sheep over the land to eat the roots. Portions were weighed and gave :—

	Swedes per Acre.			
	Tons	cwt.	qrs.	lb.
Corn-fed plot	1	8	2	8
Cake-fed plot	1	8	2	7

The whole crop was fed off by sheep towards the end of January, 1926, the land then ploughed and got ready for Barley.

1926. *Barley.*

The failure of swedes in 1925 prevented the usual feeding of the root crop with cake and corn, so that the barley crop of 1926 was practically unaffected by any manurial difference between corn-feeding and cake-feeding. Much the same happened in 1921, hence this area has not had corn or cake-feeding since 1916. This fact must be remembered when comparing C. and D.

" Plumage Archer " barley, at the rate of 12 pecks per acre, was drilled, March 29th—30th, 1926, a manuring of 3 cwt. Superphosphate, ½ cwt. Sulphate of Potash, and 1 cwt. Sulphate of

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Ammonia being given at the same time. A good plant was obtained, and on May 27th, mixed clovers (red clover 7 lb., alsike 3 lb., and trefoil 3 lb. per acre) were sown in the barley.

A capital and level crop of barley was grown; this was cut August 23rd, and carted August 28th, in good condition. The harvest results were :—

Produce per Acre.

Plot		Head Corn		Tail Corn Weight	Straw, Chaff, etc.			
		Bushels	Weight per Bushel					
			lb.	lb.	Tons	cwts.	qrs.	lb.
1	Corn-fed Plot ...	26·4	54·3	191	2	10	1	8
2	Cake-fed Plot ...	28·0	53·4	78	2	14	2	23

The differences between the two plots are not significant.

4. *Green-manuring Experiments.*

(*a*) Stackyard Field. Series A.

Upper Half.

1925.

After the green crops—Tares and Mustard (both quite good crops)—of 1924 had been fed off by sheep, which received also 3 cwt. per acre of cake (linseed cake and cotton cake), they were ploughed up, and on November 6th, 10 pecks per acre of "Yeoman" wheat were drilled over the two-acre area.

The wheat came up well, and during the winter the Tares plot looked rather the better of the two. The soil of the Mustard plot seemed looser in texture; on the other hand, there was more weed on the Tares plot. In April, 1925, the wheat on these green-manuring plots was decidedly the best on the whole farm. From May onwards, the crops, however, fell back, and in June were distinctly inferior to the wheat on adjoining land in the same field (Rotation Experiment, Series C). By the end of June both crops (after Tares or after Mustard) were very poor and so continued until harvest time. The wheat was cut on August 10th, carted and stacked on August 17th, and threshed and weighed, December 1st—4th.

The results are given in Table V. It will be remembered that one half of each of the acre plots (upper half of field) had been limed in autumn, 1923.

TABLE V.

Green-manuring Experiment. Stackyard Field. Series A (upper half). 1925. Wheat after Green Crops fed off with Cake :—

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Produce per Acre.

Plot		Head Corn		Tail Corn	Straw, Chaff, etc.		
		Bushels	Weight per Bushel				
			lb.	lb.	cwts.	qrs.	lb.
1	After Tares fed off ...	7·4	58·7	27	8	1	4
2	After Tares fed off, limed 1923	5·4	59·2	22	6	2	21
3	After Mustard fed off ...	6·4	59·7	32	4	2	24
4	After Mustard fed off, limed 1923	5·0	59·0	22	4	0	6

The crops were very poor, averaging 6.4 bushels per acre only for the Tares plot and 5.7 bushels for the Mustard plot. This slight advantage to the Tares was increased in the case of the straw. The liming of the land, however, exercised no benefit, and seems to offer no solution of the problem. These limed plots were, however, to some extent damaged by hares.

Along with the above results might be taken those of the Wheat (Series C) grown in Rotation (see Table IV.) in the same field, only a short distance off, and where wheat had followed clover made into hay (1924) and carted off the land. Up to May, 1925, these crops had looked decidedly inferior to the green-manure set, but now, at harvest, they yielded, on the average, 25.2 bushels of corn with 1 ton 2½ cwt. of straw per acre, as against 6 bushels of corn and 6 cwt. of straw per acre only on the green-manure plots.

That the growing of really good crops of Tares and Mustard and feeding off these on the land with 3 cwt. per acre of cake, should have resulted in the production of only 6 bushels of wheat per acre, whilst wheat after clover removed as hay gave 25 bushels per acre on similar land, is at present inexplicable, but repetition of the experiment year after year has confirmed the fact. Further, there is the invariable observation that the wheat crop looks excellent right through to early summer, and then unaccountably drops off.

1926.

The wheat stubble was ploughed in September, 1925, and it was noticeable that there was more weed—mostly thistles—on the Tares portion than on the Mustard. The land was ploughed rather deeper than usual.

On April 10th, Tares were drilled at the rate of 2 bushels per acre, 3 cwt. Superphosphate and 1 cwt. Sulphate of Potash per acre being given to them and also to the Mustard land. An excellent crop of Tares was grown. Mustard was sown on June 8th at the rate of 20 lbs. per acre, and this, too, came very well. The green crops were ready to feed off towards the end of July, and sheep and lambs were put on them, beginning on July 30th with the Mustard. When this was finished, the sheep passed on to the Tares. Between July 30th and August 10th, they consumed on each acre plot, 3 cwt. cake (half Linseed, half Cotton). The land was ploughed after the sheep, and wheat sown.

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Lower Half.

1925.

After removal of the wheat crop of 1924, lime, at the rate of 2 tons per acre, was spread on the 2 acres that were to be put into green-crops for 1925. This was done on October 8th, 1924, and the land ploughed and got ready. Tares, at the rate of 2 bushels per acre, were drilled on April 24th, 1925, and Mustard—20 lbs. per acre—on June 4th. Owing to the drought, the crops had a very hard time of it, but came up and held out better perhaps than could have been expected, the Tares being much the superior crop. The Mustard plot was then partly re-seeded in the hope of getting a crop sufficient to feed off. Ultimately 12 ewes and 100 lambs were put on early in September, and they fed off, first the Mustard, and then the Tares. On the Tares plot it was found possible to consume the requisite amount of cake—3 cwt. per acre (Linseed and Cotton cake mixed), but on the Mustard plot the full amount could not be consumed and the balance (after deduction for live-weight increase) was spread on the land in the form of meal, (96 lb. half linseed, half cotton cake, was so spread). The land was then ploughed and put into wheat.

1926.

On October 15th, " Yeoman " wheat—12 pecks per acre—was drilled. The wheat came up well, both after Tares and after Mustard. Then, as usual, from June onwards, a progressive failure set in. It was noticed that the wheat fell off unaccountably after the flowering stage; up to then it had been quite good. The wheat was cut on August 24th, and carted September 13th. The harvest results are given in Table VI.

TABLE VI.

Green-manuring Experiment. Stackyard Field—Series A (lower half) 1926. *Wheat after green crops fed off with cake.*

Produce per Acre.

Plot		Head Corn		Tail Corn	Straw, Chaff, etc.		
		Bushels	Weight per Bushel				
			lb.	lb.	cwts.	qrs.	lb.
1	After Tares fed off ...	4·5	52·6	66	8	2	9
2	After Tares fed off, limed 1924	4·7	54·1	80	8	2	22
3	After Mustard fed off ...	3·2	56·2	40	6	2	7
4	After Mustard fed off, limed 1924	2·3	56·7	30	4	0	11

The plots gave, as will be seen, very miserable crops.

The following table shows the low yields of corn for the last five seasons.

Plot		1922 Bushels	1923 Bushels	1924 Bushels	1925 Bushels	1926 Bushels
1	After Tares fed off ...	6·9	8·0	7·3	6·4	4·6
2	After Mustard fed off	7·5	5·6	9·1	5·7	2·8

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(*b*) LANSOME FIELD.

1925.

On these plots, which had been limed in autumn, 1923, wheat followed the green crops of 1924, which, as usual, had been ploughed in. "Yeoman" wheat—at the rate of 12 pecks per acre—was drilled on October 28th, 1924. The plant, however, was a very uneven one, owing to the adverse weather conditions. In January, 1925, the plant was so reduced in places that re-sowing had to be resorted to.

Subsequently the crops recovered to some extent as the ground got drier, but the drought of June and July caused them to go back and to favour the growth of a quantity of weed—mainly may-weed. As a consequence, the crops never attained to any evenness, and the results recorded were obtained in most cases by weighing a portion only of each plot. The limed halves suffered so badly that the returns are not included.

Ultimately the wheat was cut August 6th—7th, carted and stacked August 17th, and threshed and weighed December 1st—4th. The produce is given in Table VII.

TABLE VII.

Green-manuring Experiment. Lansome Field, 1925. *Wheat after Green Crops ploughed in.*

Produce per Acre.

	Plot		Head Corn		Tail Corn	Straw, Chaff, etc.		
			Yield per Acre	Weight per Bushel	Weight			
			Bushels	lb.	lb.	cwts.	qrs.	lb.
Old Plots	1	After Mustard ploughed in	6·9	59·6	23	13	0	16
Old Plots	2	After Tares ploughed in ...	4·5	59·0	17	11	1	20
New Plots	3	After Mustard ploughed in	4·8	59·0	12	13	1	4
New Plots	4	After Tares ploughed in ...	4·5	59·5	19	11	3	4
New Plots	5	Control (no green crop) ...	4·0	59·5	16	13	2	24

Here, as in former years, and also as in Stackyard Field, the yields were unaccountably small, and that no larger crops than these should follow the ploughing-in of two successive green-crops in the previous year points to the existence of some disturbing factor, such as has been suspected in the case of Stackyard Field. Owing to the uneven crop, no fair comparison between Mustard and Tares can be made. The average of all plots was 4.9 bushels per acre only, as against 6.8 bushels in 1923—the last corn year on this land.

1926.

The plots were ploughed after the wheat crop of 1925, and on April 13th, 1926, Tares were sown at the rate of 2 bushels per acre, 3 cwt. of Superphosphate and 1 cwt. of Sulphate of Potash per acre being given at the same time to both the Tares and the Mustard land.

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The Tares came up quite well, and on June 7th, Mustard was sown, and this, too, came up well. A good deal of weed, however—mostly may-weed—appeared on these plots, chiefly on the Tares area. The green crops were ploughed in, July 20th—24th, and second crops sown on August 18th, which again were ploughed in, October 13th—15th, the land being then got ready for wheat.

Supplementary Experiment on the ploughing-in of Mustard.

In the autumn of 1924, although the season was late, it was decided to compare Oats grown after a crop of Mustard ploughed-in as against the same without a green crop. Four plots of 1 acre each were set out on Road Piece field. Mustard was sown on August 19th, 1924, on two plots, and the crop was ploughed in, October 2nd, 3rd, 4th, grey Winter Oats being sown on October 24th, at the rate of 4 bushels per acre, over the whole four plots. The Oats came up very well, but suffered much from the subsequent drought. Owing to unfavourable weather, although the Oats were cut on July 15th, it was not possible to cart and stack them until August 17th, and they suffered much through the delay, ultimately giving, on threshing, but poor returns. The results suggest a small benefit attaching to the ploughing-in of the green crop. The produce was :—

Oats with or without previous green-crop.

1925. *Road Piece.*

Plot		Head Corn		Tail Corn	Straw, Chaff, etc.		
		Yield per Acre	Weight per Bushel				
		Bushels	lb.	lb.	cwts.	qrs.	lb.
1	Mustard ploughed in ...	10·4	40·1	20	15	2	18
2	Control (no green crop) ...	9·9	39·8	14	12	3	16
3	Mustard ploughed in ...	10·7	40·0	17	14	0	16
4	Control (no green crop) ...	8·9	40·2	22	11	3	22

5. *The Relative Values of Lime and Chalk for Liming Purposes. Stackyard Field—Series B.* 1924 *Swedes.* 1925 *Barley.* 1926 *Seeds.*

1925.

The sheep began feeding the swedes on the land on February 25th, 1925, and went on until April 5th. They had about 1 lb. per head daily of mixed cake (half Linseed, half Cotton) given to them, the same amount being fed on each plot, and the total consumed during the period being 11 cwt. of mixed cake per acre.

When the swedes were finished, the land was ploughed and sown, April 17th—18th, with " Plumage Archer " Barley, at the rate of 12 pecks per acre.

It was very noticeable that the land after the sheep-feeding was in much superior condition to that of the continuous barley plots adjacent, and a much better barley crop resulted. " Seeds " (mixed grasses and clovers) were drilled in the barley on May 19th. At a later period (September 9th), after removal of the

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TABLE VIII.

Lime and Chalk Experiment—Stackyard Field—Series B.
Produce of Swedes, 1924, of Barley, 1925, and of Hay, 1926.

Produce per Acre.

Plot	Applications per Acre in 1919	1924 Swedes				1925 Barley: Head Corn: Bushels	1925 Barley: Head Corn: Weight per Bushel	1925 Barley: Tail Corn	1925 Barley: Straw, Chaff, etc.			1926 Hay (Per Acre)			
		Tons	cwts.	qrs.	lb.		lb.	lb.	cwts.	qrs.	lb.	Tons	cwts.	qrs.	lb.
1	No Chalk	*2	0	1	17	*10·9	53·2	19	†12	0	10	1	18	1	0
2	Chalk = 10 cwt. of Lime ...	†4	2	3	6	20·8	52·9	27	15	1	20	1	15	1	18
3	„ = 1 ton „ ...	6	18	1	26	19·0	53·0	23	13	1	22	1	16	0	24
4	„ = 2 tons „ ...	7	8	2	6	25·6	53·3	21	15	3	12	1	16	3	24
5	„ = 3 „ „ ...	8	18	3	12	25·6	53·6	25	18	2	19	1	19	2	10
6	„ = 4 „ „ ...	8	8	2	22	29·6	53·0	31	20	3	14	1	18	2	20
7	No Lime	6	8	1	18	20·0	52·9	17	18	0	0	1	12	0	10
8	Lime 10 cwt.	8	8	2	22	22·7	52·8	25	17	3	10	2	0	2	0
9	„ 1 ton	6	15	3	24	24·0	53·0	29	18	1	8	1	10	0	12
10	„ 2 tons	7	3	2	2	23·8	52·9	21	21	1	2	2	1	1	18
11	„ 3 „	7	13	2	10	22·1	53·2	22	18	0	24	1	10	3	0
12	„ 4 „	8	11	0	24	23·0	53·0	26	17	3	7	2	0	0	26

* This plot, being on the headland, was badly damaged by hares and rabbits.

† Much damaged by fly.

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barley crops, more "seeds" were spread over the surface and harrowed in, as the plant had suffered a good deal during the drought. The re-seeding appeared to have been followed with success.

Meantime, the Barley stood the drought better than most of the other barley crops, and was ultimately cut August 14th, carted and stacked August 18th, and threshed and weighed December 1st—6th. The results—along with those of the swede crop of 1924 and the hay crop of 1926—are recorded in Table VIII.

The Swede crop of 1924 was considerably injured by " fly " and the results are, therefore, not strictly comparable.

Omitting plots 1 and 2, the " chalk " plots gave an average of 7 tons 18 cwt. 2 qrs. 11 lb. per acre, and the " lime " plots, 7 tons 14 cwt. 2 qrs. 11 lb. per acre. The increase over the unlimed plots was a marked one.

The Barley crop of 1925 was much superior to that of the continuous barley series; the highest yield in the latter was 17.6 bushels per acre (farmyard manure), while the general average of these limed plots was 23.6 bushels of corn per acre. The " chalk " plots averaged 24.1 bushels of corn per acre, and the " lime " plots 23.1 bushels. The superiority of the " lime " plots shown with the Oat crop of 1923—amounting to nearly 4 bushels per acre—was thus not maintained, the " chalk " series now giving, on the average, 1 bushel more per acre. Again, while with the chalk there was something like a progressive increase as more chalk was used, this was not the case with the " lime " series. The increase over the unlimed (plot 7) produce was, on the average, 4.1 bushels of corn per acre with " chalk," and 3.1 bushels with " lime." On the other hand, the " lime " series gave nearly 2 cwt. more straw per acre than the " chalk."

As previously noticed, spurry grew freely on the unlimed portions, but was absent elsewhere.

1926.

The " seeds " sown in the Barley crop of 1925 stood the winter quite well, but later on in spring appeared rather thin. They made a fresh start, however, in June, and promised quite a fair crop of hay. This was cut on July 19th, and carted July 31st. The results are given in Table VIII.

Putting the plots of each series together, we have an everage of 1 ton 17 cwt. 1 qr. 14 lb. per acre for the Chalk plots, and 1 ton 16 cwt. 2 qrs. 11 lb. for the Lime plots. There was not, however, any regularity in the results, and nothing to indicate that the crop was increased as the lime was increased. Again, as between chalk and lime, the disparity between the two unlimed plots prevented any fair deductions being drawn.

6. *Inoculation of Lucerne—Stackyard Field—Series B.*

1925-1926.

One half (2 acres) of Series B in Stackyard Field was devoted to this trial, eleven plots, sown alternately with inoculated seed and seed not inoculated, being set out.

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The seed was Provence Lucerne, and was drilled on June 3rd, at the rate of 20 lb. per acre.

The drought that ensued and continued to the middle of July proved a most unfortunate starting point for the experiment. Still, the lucerne managed to struggle through, and, despite the plentiful crop of groundsel, a growth of lucerne appeared on all the plots and maintained itself during the following winter.

Improvement followed on hand-picking in autumn, 1925, and horse-hoeing in February, 1926. In practically every case the inoculated plots were better; the experiment did not recover from the difficulties experienced at sowing time, and, ultimately, it was decided to cut and weigh the crop and then plough the plots up, restarting the experiment in 1927 on another field. The Lucerne was cut September 18th, carted September 22nd, and weighed September 28th. The weights as hay were :—

Control Plots					Inoculated Plots				
		cwt.	qrs.	lb.			cwts.	qrs.	lb.
1	... ...	8	1	0	2	... ...	12	1	14
3	... ...	12	1	14	4	... ...	13	3	0
5	... ...	11	2	21	6	... ...	14	1	21
7	... ...	11	2	21	8	... ...	13	0	7
9	... ...	12	1	14	10	... ...	12	1	14
Total	... ...	56	1	14	Total	... ...	66	0	0
Average per Acre		11	1	3	Average per Acre		13	0	22

7. *Manuring and Liming of Grass Land—Broad Mead*—1925.

These experiments were divided into three series :—

(*a*) Manurial Experiments.

(*b*) Experiments on *Varieties* of Lime.

(*c*) Experiments on *Forms* of Lime.

It was decided to renew the different applications in the winter of 1924, and, at the same time, as the position of the plots in series (*c*) was not altogether satisfactory (being alongside a hedge where the cattle generally lay), this series was removed to another part of the same field, and fresh plots, but similarly treated as before, were laid out.

The applications were all put on early in December, 1924, with the exception of Farmyard manure (12 tons per acre), in series (*a*), which was applied on February 18th, 1925. Plot 5 of series (*a*) had 2 tons per acre of lime renewed, but no further minerals.

The whole field was grazed with cattle, receiving a little cake, from October 11th, 1924, to April 1st, 1925, when the stock were removed and the grass was allowed to go for hay. The hay was cut June 29th—30th, and gathered in excellent condition July 2nd—4th, being then stacked.

(*a*) Manurial Experiments—Commenced 1901—Manures applied 1901, 1904, 1906, 1909, 1913, 1920, 1924.

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The results were : —

Plot	Manures per Acre.	Produce of Hay per Acre			
		Tons	cwt.	qrs.	lb.
1	Basic Slag 10 cwt., Kainit 3 cwt.	1	9	1	0
2	Superphosphate 5 cwt., S/Potash 1 cwt. ...	0	10	0	16
3	Basic Slag 10 cwt., S/Potash 1 cwt.	0	17	0	0
4	No Manure	0	18	2	0
5	Lime 2 tons	0	13	0	0
6	Farmyard Manure 12 tons	1	14	0	0

The highest weights of hay were yielded by the Farmyard manure plot and that treated with Basic Slag and Kainit, the next highest yield being that from the unmanured plot. But the weights of hay were no measure of the relative excellence of the individual plots. Indeed, almost the precise opposite might well be urged, for, while plots 1 and 6 were incomparably the roughest, and plot 4 not much better, the appearances of plots 2, 3, and 5 were immeasurably better, these being closely grazed by the cattle and looking—more especially the lime plot (5)—far more like a good pasture. It had been noticed particularly that the lime plot retained, throughout the season, a fresh and bright appearance that marked it from all the others; the cattle were more on it than on the other plots, and when they were taken off, one could almost draw the outlines of this plot from the daisies that were on it.

Series (*b*) Varieties of Lime.
Series (*c*) Forms of Lime.

1925.

The analyses of the different materials used in these series were as follows :—

	Lump Lime	Chalk Lime	Magnesian Lime	Lias Lime
Oxide of Iron and Alumina...	·29	1·57	4·65	10·50
Lime (CaO)	93·64	92·46	47·94	56·94
Magnesia	—	—	29·14	2·00
Carbonic Acid, etc.	2·91	1·74	14·81	9·36
Silica	3·16	4·23	3·46	21·20
	100·00	100·00	100·00	100·00

	Oolite Lime	Ground Lime	Ground Limestone	Ground Chalk
Oxide of Iron and Alumina ...	4·36	·89	·79	·89
Lime (CaO)	87·08	92·59	*53·34	†53·66
Magnesia	—	—	—	—
Carbonic Acid	5·99	2·27	42·42	42·78
Silica	2·57	4·25	3·45	2·67
	100·00	100·00	100·00	100·00

* Equal to Carbonate of Lime, 95·26. † Equal to Carbonate of Lime, 95·83.

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In the case of (*b*) the experiments began in 1910, when the lime applications—2 tons per acre in each case—were given, these being repeated in February, 1916, and in December, 1924.

In (*c*) the plots, as stated, were new ones, and the applications were now applied for the first time.

The weights of hay were :—

Plot		Applications per Acre	Produce of Hay per Acre.			
			Tons	cwts.	qrs.	lb.
Series (*b*)	1	... Derbyshire Lime, 2 tons ...	1	3	1	0
	2	... Chalk Lime, „ ...	0	17	0	0
	3	... Magnesian Lime, „ ...	0	18	3	0
	4	... No Lime	0	18	2	0
	5	... Lias Lime „ ...	0	19	0	0
	6	... Oolite Lime, „ ...	1	0	0	0
Series (*c*)	1	... Lump Lime, „ ...	0	18	3	0
	2	... Ground Lime, „ ...	0	18	0	0
	3	... No Lime...	1	0	0	0
	4	... Ground Limestone, 4 tons ...	0	19	0	0
	5	... Ground Chalk, „ ...	0	18	0	16

Series (*b*).

These plots had not the general coarseness of series (*a*) unlimed plots, but, again, the weights of hay were not indicative of the true benefit, for, while all the limed plots were, in appearance, better than the unlimed one, the best looking was plot 2—chalk lime—then the Derbyshire lime (plot 1), with Magnesian lime (plot 3) inferior to either the Lias or Oolite lime, between which latter two there was little to choose.

Series (*c*).

In these plots the applications had been too recently made to expect any marked result.

In 1926, the experimental plots in this field were all fed by bullocks.

8. *Phosphatic Manures on "Seeds" Hay.*

An experiment was tried in 1924 to test the relative effect of different phosphatic materials on "seeds" cut as hay, and was repeated in 1925. A clover and grass mixture was laid down in Barley on May 14th, 1923. The phosphates used were Mineral Superphosphate, Basic Slag, North African Phosphate, and Steamed Bone Flour, and these were applied on November 30th, 1923, to give, in each case, the same amount of phosphoric acid (75 lb. per acre). The plots were half-acre ones, and the actual quantities given were :—Superphosphate 292 lb. ; Basic Slag 223 lb. ; North African Phosphate 125 lb. ; Steamed Bone Flour 132 lb. per half-acre plot. The "seeds" grew well and were cut for hay, the first crop the first week in July, the second at the end of September, 1924.

The "seeds" were kept down for the following year, when one crop of hay was taken, this being cut on June 16th and carted June 21st, 1925. The results for the two years were as follows :—

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Phosphatic Manures on "Seeds" Hay—Butt Close—1924 & 1925.
Produce of Hay per Acre.

Plot	Manuring	Hay per Acre 1924 1st Crop	Hay per Acre 1924 2nd Crop	Hay per Acre 1925	Total of 2 Years
		T. c. qrs. lb.	T. c. qrs. lb.	T. c. qrs. lb.	T. c. qrs. lb.
1	Control	2 5 1 0	1 0 1 0	1 17 1 0	5 2 3 0
2	Basic Slag ...	2 9 2 16	1 1 3 8	1 19 2 0	5 10 3 24
3	Superphosphate ...	3 5 2 0	1 0 2 6	1 18 2 0	6 4 2 6
4	Steamed Bone Flour	2 19 1 4	1 1 0 0	1 18 1 0	5 18 2 4
5	N. African Phosphate	2 14 1 16	1 0 2 0	1 19 2 0	5 14 1 16

In all cases the phosphatic application did good. In the first year the best return came from the most active form—superphosphate—the next best from steamed bone-flour. In the second year all the plots gave approximately equal yields, so that over the two years, the best return came from superphosphate, followed by steamed bone-flour.

9. *Leucite and Sulphate of Potash compared—on "Seeds" Hay and Pasture.*

(*a*) Butt Close ("seeds" hay)—1924 and 1925.
(*b*) Broad Mead (pasture)—1925.

Work previously done at Woburn on Wheat, Mangels, and Potatoes, as well as in the Pot-culture experiments, had indicated that the new form of potash supply—Leucite—containing its potash in a less soluble form, was, potash for potash, little inferior to Sulphate of Potash. It was decided now to try it on "seeds" hay and on pasture. The Leucite contained 16.2 per cent. of Potash, soluble to a large extent in dilute hydrochloric acid; 3 cwt. of the Leucite contained as much total potash (K_2O) as 1 cwt. of Sulphate of Potash.

The experiment with "seeds" hay was in Butt Close, a seed mixture being put down in the barley crop of 1923. Leucite and Sulphate of Potash were applied on April 24th, 1924. Two crops of hay were taken in 1924 and one in 1925.

The experiment on pasture was in Broad Mead, the applications being given in April, 1924, and the one hay crop of 1925 weighed.

The results were as follows:—

Produce of Hay from (a) "seeds"—Butt Close—1924 and 1925.
Produce of Hay from (b) pasture—Broad Mead—1925.

"Seeds" Hay.

Plot	Manuring	1924 1st Crop	1924 2nd Crop	1925	Total of 2 Years	Pasture 1925
		T. C. qrs. lb.	T. C. qrs. lb.	T. C. qrs. lb.	T. C. qrs. lb.	T. C. qrs. lb.
1	Leucite 5 cwt.*	2 0 2 0	1 4 1 0	1 19 2 0	5 4 1 0	0 19 0 0
2	Sulphate of Potash 1⅔ cwt.*	2 0 0 0	1 3 2 14	1 16 0 0	4 19 2 14	0 19 2 16
3	Control	—	—	—	—	0 18 2 0

* Being equivalent amounts of K_2O.

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The differences between the two materials were not very marked; in the "seeds" hay the Leucite was rather more effective, but in the pasture land in 1925 the Sulphate of Potash plot, though hardly yielding more hay, was undoubtedly the nicer pasture and showed more clover.

10. *Potash Salts for Mangels and Potatoes.*

(*a*) Mangels—Road Piece—1925.
(*b*) Potatoes—Great Hill—1925.

These experiments were planned to provide a comparison between Sulphate of Potash, Muriate of Potash and Kainit.

(*a*) MANGELS—ROAD PIECE.

On Road Piece, where Mangels were grown in 1925, the seed "Giant Model Windsor" was drilled at the rate of 7 lb. per acre on May 12th, 13th, the general manuring per acre being Farmyard manure 9 tons; Superphosphate 3 cwt.; Sulphate of Ammonia 1 cwt. Potash Salts were given additionally according to the plan. Two cwt. per acre of Sulphate of Potash was taken as the standard, and the other salts were used in quantity to supply as much potash as this gave. The Sulphate of Ammonia was given subsequently as a top-dressing, the other artificials being applied at the time of sowing.

An excellent plant was obtained, and, by dint of careful cultivation and constant stirring of the land, a really good crop on this light land was obtained, despite the prolonged drought. On July 13th an additional top-dressing of 1 cwt. per acre of Nitrate of Soda was given.

The potash applications increased the growth of leaf; Sulphate of Potash gave dark green leaves, while Muriate of Potash and Kainit turned these more yellow. The Muriate of Potash seemed to give the larger bulbs. The crop was lifted October 17th, and the Mangels were weighed and pitted by October 30th.

The respective weights were:—

Potash Manures on Mangels. Road Piece. 1925.

Plot	Manuring	Roots per Acre			
		Tons	cwts.	qrs.	lb.
1	No Potash	19	3	2	24
2	Muriate of Potash	23	5	0	0
3	Sulphate of Potash	22	11	3	16
4	French Kainit	23	2	1	24

The results show that the potash applications materially increased the crop, the differences in yield between the three forms being within the experimental error.

(*b*) POTATOES—GREAT HILL.

On Great Hill, potatoes ("Red King") were planted, at the rate of 18 cwt. per acre from May 22nd onwards, the general manuring per acre being Farmyard manure 6 tons; Superphosphate 3 cwt.; Sulphate of Ammonia 1 cwt.

Potash salts, according to the plan set out, and supplying

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the same amount of potash as contained in 2 cwt. of Sulphate of Potash, were applied May 21st, 22nd. The crop grew well and, as with the Mangels, in the early periods the potash additions gave the bigger tops, the Kainit and Muriate giving lighter coloured tops than the Sulphate.

The potatoes were lifted from October 30th onwards, early frosts, however, affected some of the tubers.

The weights were :—

Potash Manures on Potatoes—Great Hill—1925.

Plot	Manuring	Tubers per Acre			
		Tons	cwts.	qrs.	lb
1	No Potash	10	16	1	0
2	Muriate of Potash	15	4	1	14
3	Sulphate of Potash	12	11	2	0
4	French Kainit	13	9	3	0

Here, as in the Mangel experiment, the addition of potash in any form produced a marked increase in crop. Much the best return (an increase of nearly 4½ tons per acre over no potash) was obtained from Muriate of Potash, the Kainit following next, and giving nearly a ton per acre more than Sulphate of Potash.

11. *"Bolting" of Mangels and Sugar-Beet.*

"Bolted" roots were analysed and compared with normal roots.

The following analyses were made to measure, with special reference to Sugar Content, the changes occurring in bolted roots :—

	Mangels		Sugar-Beet	
	Sound Roots per cent.	"Bolted" Roots per cent.	Sound Roots per cent.	"Bolted" Roots per cent.
Water	90·07	90·27	75·40	77·65
Sugar	6·20	4·80	17·50	16·50
Fibre	·60	·74	·96	1·16
Mineral Matter	1·22	1·30	·69	·88
Weight of Roots (washed & trimmed)	lb. oz. 15 6	lb. oz. 16 3	lb. oz. 6 4	lb. oz. 7 6

POT CULTURE EXPERIMENTS.

1. *The Hills' Experiments.*

The Influence of Titanium Compounds.

The selected materials were Titanium Oxide (pure) and the minerals Rutile (titanium oxide) and Ilmenite (Titaniferous iron ore). These were used in quantities to supply .05 per cent. and .10 per cent. of Titanium respectively in the soil (from Stackyard

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Field), and the applications were made to the whole of the soil before sowing.

The crop grown was wheat, sown on December 14th, 1924.

Because of the poverty of the soil in lime, 2 tons per acre was added and also mineral superphosphate (3 cwt. per acre); later on (June) a top-dressing of Nitrate of Soda (1½ cwts. per acre) was given. Each treatment was in duplicate.

No abnormal appearances were noted during growth. The crop was cut on July 25th.

The following Table gives the treatment and results :—

Plot	Treatment	% Ti.	Weight of Corn	Weight of Straw	Percentage of Untreated Corn	Percentage of Untreated Straw
			grammes	grammes		
1	Control		19·2	33·8	100	100
2	Titanium Oxide (pure)	·05	20·8	33·3	108	98
3	„ „	·10	21·9	33·3	113	98
4	Rutile (crude Titanium Oxide)	·05	24·4	36·0	127	106
5	„ „	·10	23·7	34·8	123	103
6	Ilmenite	·05	22·9	34·1	118	101
7	„	·10	23·4	33·0	122	98

It will be seen that all the compounds exercised some benefit, more marked with the Rutile than with the other compounds. At the same time the larger quantities of Titanium used did not show any general advantage over the smaller ones. It is probable that Titanium compounds exercise a slight stimulating effect.

2. *Aluminium Compounds—with and without Potash—on Wheat.*

(*a*) 1st Year, 1923-4.

This experiment was started in 1924 to ascertain whether the presence of soluble compounds of aluminium in conjunction with potash exercises an influence on the acidity of the soil, or has some effect on liberating potash from the soil.

The soil used was that from Stackyard Field, one very deficient in Lime, and also poor in Potash.

The compounds of aluminium tried were the sulphate, the chloride, the oxide, and the silicate, each of these being used at the rate of 2 cwt. per acre with the exception of the silicate, of which 5 cwt. per acre was given. Two such sets were put up, one being given no potash, and the other being supplied with 1 cwt. per acre of sulphate of potash. The materials were mixed with the whole of the soil in each pot, and wheat was sown on December 17th, 1923. Until March, 1924, no differences were noted, but, subsequently, the potash set appeared superior. Towards the end of July the oxide and the silicate of the potash series stood out as the best.

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The wheat was cut on August 18th, and the comparative results recorded were :—

	Without Potash		With Potash	
	Corn	Straw	Corn	Straw
Aluminium Sulphate	98	108	97	39
Aluminium Chloride	93	96	104	102
Aluminium Oxide	100	104	132	159
Aluminium Silicate	108	103	125	151
No Aluminium	100	100	98	104

The results showed, in the first place, no practical benefit to follow the use of Aluminium compounds by themselves. When, however, potash in addition was supplied, increase of crop above that given by potash alone resulted in the case of the oxide and the silicate of Alumina, in both corn and straw.

(*b*) 2nd Year. 1924-5.

The experiment was carried on for a second year, no further additions being given, but wheat being sown again (November 20th) after removal of the old stubble and roots.

In June a top-dressing of Nitrate of Soda (1½ cwt. per acre) was given to all the pots.

Again the potash set showed a manifest improvement on that without potash.

The crop was cut July 25th, and the subsequent weighings showed the following comparative figures :—

	Without Potash		With Potash	
	Corn	Straw	Corn	Straw
Aluminium Sulphate	102	98	104	104
Aluminium Chloride	111	103	119	107
Aluminium Oxide	110	106	128	112
Aluminium Silicate	103	101	112	116
No Aluminium	100	100	101	118

The duplicates, with the exception of the Chloride of Aluminium used with the potash, were in good agreement. Here, as in the first year, the Potash set was the better, and again a benefit was shown from the oxide and silicate of Alumina.

Taking the two seasons together, it appears that the oxide and the silicate, when used in conjunction with potash exercise a beneficial action, though Aluminium compounds by themselves are of no avail in setting potash free. The action of the sulphate and chloride of Aluminium is doubtful.

3. *Green-manuring Experiment.*

The experiment of 1923 and 1924 was repeated in 1925 and will be continued. The object was to ascertain whether any addition of lime or other materials would succeed in producing more

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satisfactory corn crops on the land of Stackyard Field and of Lansome Field, where green-manuring with Tares and Mustard had been carried on for a number of years, but where the corn crops following the green crops (whether fed off or ploughed in) had always been very inferior.

Fresh soil was in each case taken from the respective plots of the two fields, and the whole contents of a pot were mixed with the several applications given in the accompanying Table, these being the same as formerly.

Wheat was sown on November 20th, 1924. During the growth of the crop the effects of adding lime were clearly visible in several instances, though not as marked as in the experiments of 1923 and 1924. Further, it was seen more in the Tares soil than in the Mustard soil, and more so in Stackyard Field than in Lansome Field, though the crops of the latter were, on the whole, the heavier. The wheat was cut on July 25th, and the comparative yields are set out in the following Table :—

Green-manuring Experiment—Wheat after green crops, 1925.

	(*a*) Stackyard Field Soil		(*b*) Lansome Field Soil	
	Corn	Straw	Corn	Straw
i. Wheat after Tares.				
Untreated	100	100	100	100
Lime—2 tons per acre	120	150	160	125
Superphosphate—3 cwt. per acre ...	93	108	130	112
Sulphate of Potash—1 cwt. per acre	94	96	114	103
Lime, Superphosphate and S/Potash	160	167	111	134
ii. Wheat after Mustard.				
Untreated	100	100	100	100
Lime—2 tons per acre	102	120	116	136
Superphosphate—3 cwt. per acre ...	96	78	113	105
Sulphate of Potash—1 cwt. per acre	94	93	107	107
Lime, Superphosphate and S/Potash	92	100	105	122

The results were not nearly as marked as in the former experiment; still, the beneficial influence of lime was clearly seen in the case of the Tares soil on either field, though not appreciably so on the Mustard soil of either. It was shown, however, that none of the other applications were likely to do any good without lime.

4. *The Relative Values of Lime and Chalk,* 1925.

The experiments begun afresh in 1924—and in which, contrary to earlier practice, phosphates and potash were used additionally—were continued in 1925, the same soil (from Stackyard Field) without further additions being used, and wheat being sown on November 20th, 1924.

In June, 1925, a top-dressing of Nitrate of Soda (1½ cwt. per acre) was given to all the pots.

The plant grew very fairly throughout and there was not the difference in germination noted with the higher amounts of lime

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and chalk when applied in the first year; the marked differences in growth between the lime series and the chalk series previously recorded, were also absent.

The wheat was cut on July 25th and the following comparative results were recorded, the figures for 1924 being repeated for convenience of reference :—

Lime and Chalk upon Wheat—Stackyard Field Soil, 1924 *and* 1925.

Treatment	1924		1925	
	Corn	Straw	Corn	Straw
No Lime	100	100	100	100
Lime (CaO) 10 cwt. per acre	113	100	105	118
„ „ 1 ton „	136	133	126	130
„ „ 2 tons „	145	167	109	119
„ „ 3 „ „	168	196	113	117
„ „ 4 „ „	179	194	121	116
Chalk=10 cwt. CaO „	94	88	111	123
„ = 1 ton „ „	94	79	114	131
„ = 2 tons „ „	101	94	116	116
„ = 3 „ „ „	99	93	117	124
„ = 4 „ „ „	92	78	127	118
Ground Limestone, 1 ton per acre ...	84	72	130	124
„ „ 2 tons „	85	76	137	119

It will be seen that in the second year the increase due to lime was less than before, while chalk, that showed no effect in the first year, was not equal in its results to lime. A similar result was noticed in a corresponding set of experiments carried on over the 4 years 1919-22 (see report of 1922, p. 72).

Further, it would appear that ground limestone—which had shown no benefit at all the first year—was now beginning to come into action, it giving the highest results of all.

This experiment will be continued.

5. *Magnesia and Magnesium Carbonate on Wheat,* 1925.

This series, also started afresh in 1924 on Stackyard Field soil and with addition of phosphate and potash, was continued in 1925, the same soil, without further additions, being used and wheat being sown on November 20th.

This year only the two highest amounts of magnesia (3 and 4 tons per acre) affected the plant or reduced the produce. A partial explanation is that in the first year the magnesia applications were given to the top 6 inches of soil only, whereas the soil was turned out and mixed before the second crop was sown. Magnesium carbonate in the higher amounts of 3 tons and 4 tons per acre seemed also to exert some toxic effect.

A top-dressing of Nitrate of Soda (1½ cwt. per acre) was given to all the pots in June, 1925.

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The wheat was cut on July 25th, and the comparative results are recorded, along with those of 1924, in the following Table :—

Magnesia and Magnesium Carbonate upon Wheat—Stackyard Field Soil, 1924 and 1925.

Treatment	1924		1925	
	Corn	Straw	Corn	Straw
No Magnesia	100	100	100	100
Magnesia (MgO) 10 cwt. per acre	185	189	183	122
„ „ 1 ton „	180	216	152	104
„ „ 2 tons „	—	—	155	133
„ „ 3 „ „	—	—	6·1	90
„ „ 4 „ „	—	—	—	32·4
Magnesium Carbonate = 10 cwt. MgO per acre	148	158	147	125
„ „ = 1 ton	191	199	119	114
„ „ = 2 tons	201	230	113	77
„ „ = 3 „	226	240	13·4	53
„ „ = 4 „	191	235	17·3	55
Ground Magnesian Limestone = 1 ton per acre	108	108	138 (?)	107
„ „ „ 2 tons ...	108	108	131(?)	97

The more potent action of Magnesia over Magnesium carbonate, both in improving the crop when used in small amount, and in injuring it when used in large amounts, is well brought out this second year.

Similarly, 10 cwt. of Magnesium carbonate per acre gave quite a marked increase, one shared to lesser extent with 1 ton and 2 tons, but, as with Magnesia, failure came with the 3 tons and 4 tons applications. This, however, had not been the case in 1924.

The results as regards ground Magnesian limestone are somewhat uncertain owing to irregularities of the duplicates. As yet no injurious effects have shown.

These experiments, which are quite in line with those of former years, will be continued.

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YIELDS OF EXPERIMENTAL PLOTS

1925, 1926

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THE USE OF THE STANDARD ERROR IN FIELD EXPERIMENTS.

With the present report the departure is made of giving in the summaries of the results of replicated experiments a standard error by which the precision of the results may be judged; a practice which, originating in astronomy, has for several years been applied in various ways in scientific agriculture, but not hitherto in the Rothamsted reports. This caution has in fact been justified by recent investigations in statistical theory, which show that only when special precautions are taken in the design of the experiment can we be certain that the estimate of error made represents with validity the actual errors to which the results are exposed. Systematic methods of arrangement, into which no element of chance is admitted, are in fact liable to components of real error which find no place in the estimate, and it is only where the relative position of the individual treatments are deliberately assigned by appropriate chance operations, that the standard error as estimated can claim to represent the experimental errors actually present. All the replicated experiments of 1926 and all but a few in 1925 conform to this condition; for the sake of comparison estimates have been made for some of the 1925 experiments which do not admit of strictly valid estimation, the uncertainty arising from this cause being noted in each case.

The statistical procedure by which the standard errors have been obtained is in all cases that known as the Analysis of Variance. In this method the whole of the variation exhibited by the experimental yields is divided into the parts appropriate to the different components of which it is composed; in consequence it is possible to be sure that differences in yield due to causes, such as the different fertility of different blocks of land, which have no influence on the experimental comparisons, have been completely separated from that portion of the variation which is ascribable solely to experimental error.

Of the two measures of error in common use, the " probable error " and the " standard error," the latter has been adopted, as the more readily calculated and in other ways the more conformable to modern practice. The probable error is in fact obtained from the standard error merely by multiplying by a constant factor, 0.6745, or approximately 2/3. The standard error is therefore the larger measure, but in respect of all considerations arising out of the theory of estimation the two measures are on precisely the same footing.

The practical use of the standard error is to discriminate between cases in which a particular difference in yield can be reasonably set aside as accidental, and cases in which such an explanation requires that an improbable coincidence should be postulated, and in which therefore we have a sound basis for interpreting the difference as a real response to the treatments applied. As a working rule differences between treatments exceeding three times the standard error may be accepted as significant. Full and precise tests of significance have, however, been applied to all tables.

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DATES OF SOWING AND HARVESTING (Harvest 1925).

Field.	Crop.	Variety.	Sowing began.	Sowing finished.	Cutting began.	*Carting began.	*Carting finished.	Yield per Acre.
Great Knott, east ...	Forage Mixture	Beans, Peas, Vetches, Oats, Wheat	Mar. 12, '25	Mar. 16, '25	June 29	July 5	July 6	21 cwt.
,, west ...	Fallow	—	—	—	—	—	—	—
Little Knott	Grass	Mixture‡	May 19, '25	May 20, '25	—	—	—	— §
Foster's, east ...	Barley	Plumage Archer	Mar. 19, '25	Mar. 20, '25	Aug. 18	Aug. 28	Aug. 31	48 bush.
,, west ...								
West Barnfield ...	Swedes	Webb's Purple	June 3, '25	June 8, '25	—	Nov. 11	Nov. 16	11 tons
	Potatoes	Kerr's Pink, King Edward, Great Scott	April 29, '25	May 4, '25	—	Oct. 6	Oct. 29	see p. 139
	Mangolds ...	Red Intermediate	May 11, '25	May 11, '25	—	Oct. 16	Oct. 24	see p. 144
Long Hoos, east ...	Oats	Grey Winter	Oct. 3, '24	Oct. 4, '24	July 20	Aug. 8	Aug. 17	68 bush.
,, west ...	Wheat	Red Standard	Oct. 17, '24	Oct. 17, '24	Aug. 11	Aug. 17	Aug. 18	40 bush.
New Zealand ...	Mangolds ...	Sutton's Prizewinner, Red Intermediate	May 14, '25	May 15, '25	—	Sept. 17	Oct. 15	25 tons
	Turnips ...	Mammoth Green Top	June 2, '25	June 2, '25	—	July 16	July 20	17 tons
Stackyard	Oats	Giant Eliza	Mar. 6, '25	Mar. 6, '25	Aug. 1	Aug. 15	Aug. 15	40 bush.
Great Harpenden ...	Clover	Broad Red	Mar. 18. '24	Mar. 21, '24	Aug. 15	Aug. 28	Oct. 15	Failed
	Beans	Spring	Feb. 19, '25	Feb. 21, '25	June 23	June 24	June 26	2 tons†
Sawpit	Clover	Broad Red ... {1st Crop / 2nd Crop}	April 4, '24	April 5, '24	June 15 / Sept. 26	June 19 / Oct. 10	June 20 / Oct. 15	30 cwt.
Sawyers	Wheat	Red Standard	Nov. 10, '24	Nov. 11, '24	Aug. 14	Aug. 31	Sept. 2	32 bush.
	Oats ...	Grey Winter	Nov. 24, '24	Nov. 26, '24	July 20	Aug. 6	Aug. 8	48 bush.
		Svalof Victory	Mar. 30, '25	Mar. 30, '25	Aug. 26	Sept. 7	Sept. 8	40 bush.
Broadbalk	Wheat	Red Standard	Oct. 24, '24	Oct. 24, '24	Aug. 17	Aug. 29	Aug. 29	see p. 132
Little Hoos	Fallow	—	—	—	—	---	—	~~see p.~~
Great Hoos	Barley	Plumage Archer	Mar. 19, '25	Mar. 19, '25	Aug. 29	Sept. 7	Sept. 8	see p. 135
Barnfield	Mangolds ...	Sutton's Prizewinner	May 15, '25	May 15, '25	Oct. 27	Oct. 27	Nov. 21	see p. 127
Agdell	Barley	Plumage Archer	April 3, '25	April 3, '25	Sept. 3	Sept. 22	Sept. 22	see p. 125
Great Field	Hay	—	—	—	June 18	June 22	June 23	25 cwt.
Park	Grass	—	—	—	June 12	June 17	June 18	see p. 128

* In the case of roots, the dates given are those on which lifting began and finished.
† Crop cut green for silage.
‡ The mixture consisted of Broad Red Clover; Wild White Clover: Indigenous Cocksfoot; Meadow Fescue; Timothy; Perennial Rye; Wild Perennial Rye; Rough-stalked Meadow Grass.
§ No yield. First year of permanent grass.

DATES OF SOWING AND HARVESTING (Harvest 1926).

Field.	Crop.	Variety.	Sowing began.	Sowing finished.	Cutting began.	*Carting began.	*Carting finished.	†Yield per acre.
Great Knott, west ...	Wheat	Red Standard Cambridge, Browick, Little Joss, Midlothian III	Oct. 26, '25	Oct. 29, '25	Aug. 20	Aug. 26	—	—
,, east	Fallow							
	Oats	Svalof Victory	—	—	—	—	—	—
Little Knott... ...	Grass	Permanent Grass	—	—	June 21	June 29	July 1	40 cwt.
Foster's, east ...	Clover	Broad Red, late flowering ...	—	—	June 22	July 1	July 2	37 cwt.
,, west ...	Clover	—	—	—	—	—	—	—
West Barnfield ...	Barley	Plumage Archer	Mar. 17, '26	Mar. 18, '26	Aug. 30	Sept. 11	—	—
Long Hoos, east ...	Winter Oats ...	Grey Winter	Oct. 9, '25	Oct. 10, '25	July 28	Aug. 16	Aug. 18	8 qrs.
,, west ...	Forage Crop ...	Beans, Peas, Vetches and Cereals	Oct. 14, '25	Oct. 15, '25	Sept. 9	Sept. 13	—	4 qrs.
Stackyard	Potatoes	Kerr's Pink	April 23, '26	—	Sept. 21	—	—	Av. 10 tn.
	Mangolds	Cannells QQ	April 14, '26	April 24, '26	Oct. 6	Oct. 13	Oct. 19	Av. 22 tn.
New Zealand ...	Barley	Plumage Archer	Mar. 16, '26	Mar. 16, '26	Aug. 23	Aug. 31	Sept. 10	—
Great Harpenden ...	Rye	Swedish	Oct. 29, '25	—	Aug. 11	Aug. 19	Aug. 20	5 qrs.
	Wheat	Red Standard	Oct. 30, '25	Nov. 11, '25	Aug. 16	Aug. 26	—	2½ qrs.
Sawpit	Grass	Permanent seeding	April 17, '25	April 19, '25	June 30	July 8	July 9	15 cwt.
Sawyers	Swedes	Dreadnought	June 14, '26	—	Dec. 1	Dec. 1	Dec. 20	19 tons
	Fallow	(White Mustard ploughed down)	July 2, '26	Ploughed down Sept. 2 to Sept. 20				
Broadbalk	Wheat	Red Standard	Nov. 25, '25	—	—	Sept. 1	Sept. 2	—
	Fallow							
Little Hoos ...	Swedes	Purple King	June 3, '26	—	Oct. 20	—	—	—
	Barley	Plumage Archer	April 7, '26	April 8, '26	Aug. 25	Sept. 10	Sept. 11	—
Hoos	Oats	Svalof Victory	—	—	Aug. 16	Aug. 30	—	6 qrs.
	Wheat and Fallow	Red Standard	—	—	—	—	—	—
Agdell	Clover (failed) ...	Broad Red	—	—	June 28	July 6	—	10 cwt.
	Mixed Legumes ...	Vetches, Oats, Italian Clover, etc.	April 16, '26	—	Ploughed down after math.			—
Great Field ...	Grazing Plots							
	Hay	—	—	—	June 21	June 28	July 7	33 cwt.
Park	Hay	—	—	—	June 15			
					,, 22	June 31	July 5	—
					,, 24			

* In the case of roots, the dates given are those on which lifting began and finished. † Estimates of standing crops.

CROP YIELDS ON THE EXPERIMENTAL PLOTS.

NOTES.—In each case the year refers to the harvest, *e.g.*, Wheat harvested in 1926.
In the tables, total straw includes straw, cavings and chaff.

CONVERSION TABLE.

1 acre	=	0.405	Hectare	0.963	Feddan.
1 bushel (Imperial)	=	0.364	Hectolitre (36.364 litres) ...	0.184	Ardeb.
1 lb. (pound avoirdupois)	=	0.453	Kilogramme	1.009	Rotls.
1 cwt. (hundredweight)	=	50.8	Kilogrammes	113.0 1.366	Rotls. Maunds.
1 metric quintal ...	=	100.0 220.46	Kilogrammes ... ... 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 ...	=	125.60 1.256	Kilogrammes per Hectare or 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 & Nitrogenous M'nure	
		5. Fallow.	6. Clover or Beans.	3. Fallow.	4. Clover or Beans.	1. Fallow.	2. Clover or Beans.
AVERAGE OF THE FIRST NINETEEN COURSES, 1848–1923.							
	Roots (Swedes) cwt.*	32.7	11.2	175.7	195.9	355.3	302.0
	Barley—						
	Dressed Grain bush.	22.7	20.9	23.8	27.9	32.2	36.8
	Total Straw ... cwt.	13.9	13.7	14.0	16.0	19.5	22.6
	Beans—						
	Dressed Grain bush.	—	13.1	—	18.2	—	22.3
	Total Straw ... cwt.	—	9.2	—	13.2	—	15.3
	Clover Hay ... cwt.	—	28.3	—	54.1	—	55.0
	Wheat—						
	Dressed Grain bush.	24.2	22.8	28.5	31.2	29.5	31.2
	Total Straw ... cwt.	23.7	21.7	29.0	30.3	31.4	30.4
PRESENT COURSE (20th), 1924, 1925 and 1926.							
1924	Roots (Turnips) ... cwt.	2.9	0.7	42.8	31.5	127.4	104.7
1925	Barley—						
	Dressed Grain bush.	10 86	7.35	10.09	16.70	10.35	8.60
	Offal Grain ... lb.	42.0	49.0	94.0	38.0	53.0	59.0
	Straw ... ... lb.	633.0	678.0	602.0	866 0	626.0	541.0
	Total Straw ... cwt.	7.2	7.5	7.4	9.3	7.0	6.5
	Wt. of Dressed Grain per bush. lb.	52.7	51.6	52.5	53.6	53.3	54.3
	Proportion of Total Grain to 100 of Total Straw	76.3	50.7	75.5	89.2	77.0	72.4
1926	Clover Hay ... cwt.	—	14.2	—	32.2	—	26.3

* Plots 1, 3 and 5 based upon 18 years. Plots 2, 4 and 6 based upon 17 years.

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METEOROLOGICAL RECORDS, 1925 and 1926.

	Rain.		Drainage through soil.			Bright Sunshine.	Temperature (Mean).				
	Total Fall. 1/1000 Acre Gauge.	No. of Rainy Days. (0.01 inch or more) 1/1000 Acre Gauge.	20 ins. deep.	40 ins. deep.	60 ins. deep.		Max.	Min.	1 ft. in ground.	Solar Max.	Grass Min.
1925	Inches.	No.	Inches.	Inches.	Inches.	Hours.	°F.	°F.	°F.	°F.	°F.
Jan. ...	2.053	18	1.804	1.870	1.845	52.7	44.6	34.6	39.6	64.2	32.2
Feb. ...	3.940	16	3.413	3.452	3.457	68.3	45.3	35.7	40.0	83.4	31.7
Mar. ...	1.219	12	0.340	0.442	0.426	89.3	45.0	34.5	39.2	91.8	30.2
April ...	1.703	16	0.149	0.183	0.169	139.6	52.1	37.1	44.3	106.8	32.7
May ...	2.480	18	0.391	0.534	0.486	204.7	60.8	44.7	52.4	121.2	40.7
June ...	0.121	2	0.002	0.033	0.043	259.5	68.0	48.2	59.6	119.4	43.1
July ...	4.428	15	1.573	1.343	1.284	183.6	70.9	53.4	62.4	125.5	48.4
Aug. ...	2.972	15	1.048	1.180	1.095	133.1	65.8	52.8	60.1	116.9	49.1
Sept. ...	3.287	18	1.528	1.605	1.501	124.3	58.6	46.0	53.7	112.0	40.9
Oct. ...	3.013	14	2.078	2.203	2.037	102.9	56.5	44.2	51.0	97.7	39.9
Nov. ...	2.241	15	1.481	1.706	1.616	90.6	43.4	34.1	42.2	76.6	29.8
Dec. ...	2.127	16	1.900	2.052	1.903	57.8	41.3	31.3	36.3	60.6	27.6
Total or Mean	29·584	175	15.707	16.603	15.862	1506.4	54.4	41.4	48.4	98.0	37.2
1926											
Jan. ...	3·511	19	3.169	3.387	3.260	45.7	43.9	32.5	38.4	66.2	29.6
Feb. ...	2·494	17	2.112	2.431	2.298	40.6	48.4	39.5	42.1	72.5	35.4
Mar. ...	0·215	5	0.003	0.049	0.041	119.9	49.4	36.9	42.3	99.3	30.5
April ...	2·963	16	0.861	0.938	0.862	108.2	55.3	40.7	46.4	105.9	35.3
May ...	1·945	18	0.369	0.653	0.581	153.6	57.4	42.9	50.5	117.1	38.3
June ...	3·014	13	0.943	1.258	1.157	180.7	63.3	47.9	57.8	123.9	42.9
July ...	2·787	11	0.291	0.442	0.384	151.5	68.6	54.5	61.5	123.9	50.5
Aug. ...	1·190	9	—	0.035	0.033	195.2	69.0	52.8	60.9	122.8	47.4
Sept. ...	1·788	11	0.576	0.659	0.600	133.2	65.8	51.3	59.3	112.8	46.3
Oct. ...	2·672	14	1.149	1.230	1.135	98.5	52.4	40.3	48.9	95.9	35.7
Nov. ...	5·321	24	4.520	4.840	4.644	45.0	47.7	37.4	43.3	75.8	33.0
Dec. ...	0·477	6	0.329	0.525	0.467	64.5	42.3	33.8	38.8	67.8	29.9
Total or Mean	28.377	163	14.322	16.447	15.462	1336.6	55.3	42.5	49.2	98.7	37.9

RAIN AND DRAINAGE.

MONTHLY MEAN FOR 56 HARVEST YEARS, 1870-1—1925-6.

	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	2.384	0.785	0.753	0.689	32.9	31.6	28.9	1.599	1.631	1.695
October ...	3.161	1.830	1.789	1.662	57.9	56.6	52.6	1.331	1.372	1.499
November	2.725	2.055	2.091	1.971	75.4	76.7	72.3	0.670	0.634	0.754
December	2.857	2.439	2.525	2.411	85.4	88.4	84.4	0.418	0.332	0.446
January ...	2.389	1.942	2.123	2.043	81.3	88.9	85.5	0.447	0.266	0.346
February	2.039	1.515	1.618	1.545	74.3	79.4	75.8	0.524	0.421	0.494
March ...	2.027	1.091	1.221	1.154	53.8	60.2	56.9	0.936	0.806	0.873
April ...	2.053	0.660	0.730	0.696	32.1	35.6	33.9	1.393	1.323	1.357
May ...	2.054	0.484	0.550	0.516	23.6	26.8	25.1	1.570	1.504	1.538
June ...	2.245	0.560	0.588	0.567	24.9	26.2	25.3	1.685	1.657	1.678
July ...	2.746	0.726	0.748	0.696	26.4	27.2	25.3	2.020	1.998	2.050
August ...	2.662	0.699	0.704	0.660	26.3	26.4	24.8	1.963	1.958	2.002
Year ...	29.342	14.786	15.440	14.610	50.4	52.6	49.8	14.556	13.902	14.732

Area of each gauge 1/1000th acre.

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MANGOLDS, BARN FIELD, 1925 and 1926.

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.
	1925.	Tons	Tons	Tons	Tons	Tons
1	Dung only	R. **14.28**	**25.55**	**19.14**	**18.99**	**18.20**
		L. 2.77	5.98	6.35	6.74	5.77
2	Dung, Super., Potash ...	R. **16.19**	**27.13**	**25.21**	**23.22**	**23.25**
		L. 2.98	6.41	6.26	7.28	6.49
4	Complete Minerals ...	R. **3.25**	*a* R.**16.84*** L. 4.98	**14.27**	**22.43**	**16.07**
		L. 0.93	*b* R.**16.90** L. 5.65	3.68	6.05	3.98
5	Superphosphate only ...	R. **3.64**	**14.01**	**6.10**	**6.30**	**6.63**
		L. 1.12	4.32	3.69	4.51	4.26
6	Super. and Potash ...	R. **4.16**	**14.31**	**13.91**	**18.18**	**13.46**
		L. 1.11	4.36	3.59	5.90	3.66
7	Super., Sulphate of Mag., and Sodium Chloride	R. **3.49**	**14.81**	**14.21**	**13.37**	**12.09**
		L. 1.00	3.23	3.05	5.25	3.38
8	None	R. **2.32**	**4.94**	**2.81**	**5.25**	**4.03**
		L. 1.01	3.37	2.23	3.39	2.32
9	Sodium Chloride, Nit. Soda, Sulph. Potash, and Sulph. Mag. ...	R. **17.08**	—	—	—	—
		L. 3.83	—	—	—	—
	1926.					
1	Dung only	R. **21.16**	**31.39**	**21.77**	**18.35**	**19.39**
		L. 3.39	4.58	4.24	3.81	4.88
2	Dung, Super., Potash ...	R. **23.80**	**34.72**	**30.84**	**30.08**	**27.90**
		L. 3.25	4.83	5.22	6.07	5.47
4	Complete Minerals ...	R. **4.75**	*a* R.**24.07*** L. 3.93	**19.52**	**25.77**	**16.39**
		L. 0.85	*b* R.**23.75** L. 4.51	2.92	4.12	2.52
5	Superphosphate only ...	R. **4.81**	**18.39**	**9.25**	**8.29**	**10.28**
		L. 0.86	2.67	2.17	2.25	2.39
6	Super. and Potash ...	R. **5.41**	**20.80**	**17.86**	**21.05**	**13.29**
		L. 0.89	3.02	2.58	4.12	1.94
7	Super., Sulphate of Mag., and Sodium Chloride	R. **5.28**	**21.27**	**18.86**	**20.00**	**11.66**
		L. 0.96	3.24	3.08	3.94	2.36
8	None	R. **3.36**	**13.97**	**7.83**	**7.73**	**8.04**
		L. 0.81	3.72	3.02	2.41	2.57
9	Sodium Chloride, Nit. Soda, Sulph. Potash and Sulph. Mag. ...	R. **25.09**	—	—	—	—
		L. 3.11	—	—	—	—

R.=roots. L.=leaves.

* From 1904 onwards plot 4 N has been divided, 4*a* receiving Sulphate of Potash, Sulphate of Magnesia, Sodium Chloride and Nitrate of Soda; 4*b* receiving Calcium Chloride, Potassium Nitrate and Calcium Nitrate.

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HAY. THE PARK GRASS PLOTS. 1925, 1926.

Plot	Manuring per acre		1925 Yield of Hay per acre 1st Crop	1925 Yield of Hay per acre 2nd Crop	1925 Yield of Hay per acre Total	1925 Dry Matter per acre 1st Crop	1925 Dry Matter per acre 2nd Crop	1925 Dry Matter per acre Total	1926 Yield of Hay per acre 1st Crop	1926 Yield of Hay per acre 2nd Crop§	1926 Yield of Hay per acre Total	1926 Dry Matter per acre 1st Crop	1926 Dry Matter per acre 2nd Crop	1926 Dry Matter per acre Total	Plot
			cwt.	cwt.	cwt.	lb.	lb.	lb.	cwt.	cwt.	cwt.	lb.	lb.	lb.	
1	Single dressing Amm. Salts (=43 lb. N.); (with Dung also 8 years, 1856-63) ...	not limed	15.1	16.1	31.2	1418	1268	2686	16.5	9.8	26.3	1602	881	2483	1
		limed ...	23.1	14.9	38.0	2075	1155	3230	21.9	9.2	31.1	2111	823	2934	
2	Unmanured (after Dung 8 years, 1856-63)	not limed	14.4	12.8	27.2	1308	974	2282	14.3	14.9	29.2	1303	1331	2634	2
		limed ...	21.7	12.8	34.5	1987	884	2871	16.3	8.5	24.8	1406	764	2170	
3	Unmanured	not limed	12.5	11.7	24.2	1122	871	1993	11.8	9.0	20.8	1026	807	1833	3
		limed ...	17.7	11.7	29.4	1647	863	2510	14.1	7.9	22.0	1285	711	1996	
4-1	Superphosphate of Lime	not limed	22.5	14.6	37.1	1971	971	2942	16.8	10.6	27.4	1511	952	2463	4-1
		limed ...	20.2	12.3	32.5	1839	839	2678	14.5	7.6	22.1	1229	682	1911	
4-2	Superphosphate of Lime and double dressing Amm. Salts (=86 lb. N.)	not limed	22.6	7.3	29.9	1812	570	2382	24.6	6.6	31.2	1843	595	2438	4-2
		limed ...	32.7	16.7	49.4	3126	1326	4452	37.1	10.1	47.2	3259	901	4160	
5-1	(N. half) Unmanured following double dressing Amm. Salts (=86 lb. N.) 1856-97 ...	not limed	13.9	8.0	21.9	1288	625	1913	12.6	8.8	21.4	1169	792	1961	5-1
5-2	(S. half) Superphosphate, Sulphate of Potash; following double dressing Amm. Salts (=86 lb. N.) 1856-97	not limed	24.2	14.9	39.1	2187	1152	3339	24.2	10.6	34.8	2137	951	3088	5-2
6	Complete Mineral Manure as plot 7; following double dressing Amm. Salts (=86 lb. N.) 1856-68	not limed	26.6	23.1	47.9	2320	1329	3649	31.5	15.7	47.2	2835	1402	4237	6
7	Complete Mineral Manure	not limed	28.2	22.8	51.0	2480	1403	3883	32.2	18.4	50.6	2949	1651	4600	7
		limed ...	35.0	19.1	54.1	2900	1051	3951	32.8	14.0	46.8	3450	1251	4701	
8	Mineral Manure without Potash	not limed	19.8	17.9	37.7	1714	1129	2843	20.0	14.3	34.3	1759	1277	3036	8
		limed ...	17.3	12.4	29.7	1575	873	2448	16.4	9.2	25.6	1473	901	2374	
9	Complete Mineral Manure and double dressing Amm. Salts (=86 lb. N.) ...	not limed	39.9	20.4	60.3	3617	1228	4845	42.5	18.6	61.1	3463	1666	5128	9
		limed ...	49.0	21.7	70.7	4455	1642	6097	54.1	22.5	76.6	4674	2019	6693	
10	Mineral Manure (without Potash) and double dressing Amm. Salts (=86 lb. N.) ...	not limed	28.1	10.1	38.2	2649	776	3425	25.6	11.9	37.5	2282	1064	3346	10
		limed ...	37.5	15.4	52.9	3524	1360	4884	38.0	18.5	56.5	3454	1656	5110	
11-1	Complete Mineral Manure and treble dressing Amm. Salts (129 lb. N.)	not limed	40.8	34.1	74.9	3607	2179	5786	55.4	28.3	83.7	4117	2536	6653	11-1
		limed ...	58.7	22.7	81.4	5338	1773	7111	54.5	23.0	77.5	4698	2065	6763	

11-2	As plot 11-1 and Silicate of Soda	not limed	49.5	30.3	79.8	4424	1950	6374	59.4	24.4	83.8	4535	2188	6723	11-2
		limed ...	63.9	26.4	90.3	5847	2150	7997	58.3	28.4	86.7	4860	2548	7408	
12	Unmanured	not limed	17.6	13.1	30.7	1630	1000	2630	18.4	15.4	33.8	1646	1376	3022	12
13	Dung 1905, and every fourth year since (omitted 1917), Fish Guano in 1907 and every fourth year since	not limed	45.8	26.9	72.7	4099	1461	5560	45.6	24.0	69.6	3767	2147	5914	13
		limed ...	38.5	25.3	63.8	3536	1406	4942	41.1	21.9	63.0	3465	1964	5429	
14	Complete Mineral Manure and double dressing Nitrate of Soda (=86 lb. N.) ...	not limed	61.1	25.2	86.3	4709	1886	6595	56.2	23.0	79.2	4626	2064	6690	14
		limed (Sun)	58.4	20.0	78.4	4725	1413	6138	55.9	16.7	72.6	4469	1499	5968	
		limed(Shade)	47.4	11.3	58.7	3846	781	4627	49.6	5.2	54.8	4181	465	4646	
15	Complete Mineral Manure as plot 7; following double dressing Nitrate of Soda (=86 lb. N. 1858-1875)	not limed	33.5	25.8	59.3	2854	1650	4504	30.5	19.5	50.0	2674	1750	4424	15
		limed ...	29.2	21.6	50.8	2676	1555	4231	25.8	13.4	39.2	2442	1196	3638	
16	Complete Mineral Manure and single dressing Nitrate of Soda (=43 lb. N.) ...	not limed	41.6	21.6	63.2	3480	1409	4889	38.6	18.8	57.4	2993	1688	4681	16
		limed ...	44.1	18.5	62.6	3763	1273	5036	38.0	17.1	55.1	3046	1529	4575	
17	Single dressing Nitrate of Soda (= 43 lb.N.)	not limed	26.8	15.9	42.7	2137	1024	3161	23.1	12.5	35.6	2010	1123	3133	17
		limed ...	30.8	14.9	45.7	2633	999	3632	28.5	12.6	41.1	2571	1127	3698	
18	Mineral Manure (without Super.), and double dressing Sulphate of Amm. (=86 lb. N.) 1905 and since; following Minerals and Amm. Salts supplying the constituents of 1 ton of Hay, 1865-1904 ...	not limed	17.7	14.6	32.3	1690	895	2585	19.4	24.0	43.4	1689	2147	3836	18
		limed (6788 lb.)	36.5	21.7	58.2	3372	1253	4625	49.7	24.2	73.9	4086	2165	6251	
		limed (3951 lb.)	29.8	18.7	48.5	2757	974	3731	39.1	19.0	58.1	3039	1703	4742	
19	Farmyard Dung in 1905 and every fourth year since (omitted in 1917) following Nitrate of Soda (=43 lb. N.) and Minerals, 1872-1904	not limed	29.4	18.4	47.8	2398	1123	3521	34.7	17.5	52.2	3106	1569	4675	19
		limed (3150 lb.)	27·0	15.0	42.0	2421	849	3270	30.0	8.7	38.7	2771	777	3548	
		limed (570 lb.)	27.0	14.1	41.1	2282	902	3184	32.6	10.8	43.4	3108	970	4078	
20	Farmyard Dung in 1905 and every fourth year since (omitted in 1917); each intervening year plot 20 receives Sulphate of Potash, Superphosphate and Nitrate of Soda (=26 lb. N.); following Nitrate of Potash and Superphosphate, 1872-1904	not limed	35.8	*	*	3010	*	*	47.1	18.1	65.2	4693	1625	6318	20
		limed (2772 lb.)	30.4	15.0	45.4	2654	1033	3687	43.9	11.5	55.4	4246	1027	5273	
		limed (570 lb.)	41.6	14.4	56.0	3513	977	4490	43.3	16.6	59.9	4243	1488	5731	

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 1903-4, 1907-8, 1915-16, 1923-24, and at the rate of 2,500 lb. to the acre in the Winter of 1920-21, except where otherwise stated.

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.

* Figures for this plot not recorded.

§ The second crop was carted green; the figures given are estimated hay yields, calculated from the dry matter.

The Park Grass Plots.

BOTANICAL COMPOSITION, PER CENT. 1923, 1st CROP.

Plot	Manuring	Liming	Gramineæ	Leguminosæ	Other Orders	"Other Orders" consist largely of	Plot
3	Unmanured	Limed ...	63.7	4.6	31.6	Plantago lanceolata; Poterium sanguisorba; Luzula campestris	3
		Unlimed ...	63.6	10.6	25.8	Plantago lanceolata; Centaurea nigra; Poterium sanguisorba	
7	Complete Mineral Manure	Limed ...	52.7	40.1	7.1	Achillea millefolium; Ranunculus sp.	7
		Unlimed ...	69.1	15.2	15.7	Plantago lanceolata; Spiræa ulmaria, etc.	
9	Complete Mineral Manure and double Amm. Salts	Limed ...	99.4	—	0.6	Rumex acetosa	9
		Unlimed ...	99.7	—	0.2	Rumex acetosa	
14	Complete Mineral Manure and double Nitrate of Soda	Limed ...	96.0	0.8	3.2	Taraxacum vulgare	14
		Unlimed ...	93.7	0.1	6.2	Taraxacum vulgare; Anthriscus sylvestris; Rumex acetosa	
15	As plot 7 following double Nitrate of Soda, 1858-75	Limed ...	69.2	18.3	12.4	Plantago lanceolata; Conopodium denudatum; Taraxacum vulgare	15
		Unlimed ...	57.8	15.4	26.8	Plantago lanceolata; Luzula campestris; Conopodium denudatum	
17	Single Nitrate of Soda	Limed ...	73.9	1.2	24.9	Plantago lanceolata; Leontodon hispidus; Centaurea nigra	17
		Unlimed ...	65.6	0.1	34.3	Plantago lanceolata; Leontodon hispidus; Centaurea nigra	
18	Mineral Manure (without Super.) and double Sulphate Amm. 1905 and since	L. 6,788 lb.	87.4	—	12.6	Rumex acetosa	18
		L. 3,951 lb.	85.6	—	14.4	Rumex acetosa	
		Unlimed ...	96.8	0.1	3.0	Rumex acetosa	
19	Farmyard Dung in 1905 and every 4th year since (omitted in 1917) ...	L. 3,150 lb.	72.4	17.0	10.6	Ranunculus sp.; Plantago lanceolata; Conopodium denudatum	19
		L. 570 lb. ...	79.2	10.0	10.7	Ranunculus sp.; Rumex acetosa; Conopodium denudatum	
		Unlimed ...	78.5	7.4	14.1	Ranunculus sp.; Rumex acetosa; Anthriscus sylvestris ...	
20	Farmyard Dung in 1905 and every 4th year since (omitted in 1917), each intervening year Sulphate Potash, Super., and Nitrate of Soda	L. 2,772 lb.	82.7	5.3	11.9	Anthriscus sylvestris; Ranunculus sp.; Conopodium denudatum; Tragapogon pratensis	20
		L. 570 lb. ...	82.5	10.6	6.8	Ranunculus sp.; Conopodium denudatum	
		Unlimed ...	88.2	2.5	9.3	Anthriscus sylvestris; Rumex acetosa: Ranunculus sp. ...	

The Park Grass Plots—*contd.*

BOTANICAL COMPOSITION, PER CENT. 1924, 1st CROP.

Plot	Manuring	Liming	Gramineæ	Leguminosæ	Other Orders	"Other Orders" consist largely of	Plot
3	Unmanured	Limed ...	51.2	14.5	34.3	Centaurea nigra; Scabiosa arvensis; Plantago lanceolata; Poterium sanguisorba	3
		Unlimed ...	50.0	8.0	42.0	Plantago lanceolata; Centaurea nigra; Leontodon hispidus; Poterium sanguisorba	
5-1	(N. half), Unmanured following double dressing of Amm. Salts (=86 lb. N.), 1856-97	Unlimed ...	68.0	1.7	30.3	Centaurea nigra; Scabiosa arvensis; Rumex acetosa ...	5-1
5-2	(S. half), Super., Sulphate of Potash; following double dressing of Amm. Salts (=86 lb. N.), 1856-97 ...	Unlimed ...	57.3	17.6	25.1	Rumex acetosa: Centaurea nigra; Luzula campestris; Achillea millefolium	5-2
7	Complete Mineral Manure	Limed ...	36.9	51.8	11.3	Heracleum sphondylium; Centaurea nigra	7
		Unlimed ...	47.1	33.3	19.6	Plantago lanceolata; Heracleum sphondylium; Conopodium denudatum; Achillea millefolium	
9	Complete Mineral Manure and double Amm. Salts	Limed ...	98.8	0.1	1.0	Conopodium denudatum; Rumex acetosa	9
		Unlimed ...	98.7	0.2	1.0	Heracleum sphondylium; Potentilla reptans	
14	Complete Mineral Manure and double Nitrate of Soda	Limed ...	84.9	6.2	8.9	Taraxacum vulgare; Anthriscus sylvestris	14
		Unlimed ...	90.2	0.4	9.4	Anthriscus sylvestris; Taraxacum vulgare	
18	Mineral Manure (without Super.) and double Sulphate Amm., 1905 and since	L. 6,788 lb.	91.8	0.1	8.1	Rumex acetosa; Conopodium denudatum	18
		L. 3,951 lb.	86.6	0.2	13.2	Rumex acetosa; Conopodium denudatum; Centaurea nigra	
		Unlimed ...	86.2	—	13.8	Heracleum sphondylium; Rumex acetosa	
19	Farmyard Dung in 1905 and every 4th year since (omitted in 1917) ...	L. 3,150 lb.	66.9	19.7	13.3	Ranunculus sp.; Taraxacum vulgare; Conopodium denudatum	19
		L. 570 lb. ...	69.0	21.6	9.4	Ranunculus sp.; Conopodium denudatum; Cerastium vulgatum	
		Unlimed ...	66.7	20.0	13.3	Ranunculus sp.; Conopodium denudatum; Centaurea nigra; Rumex acetosa	
20	Farmyard Dung in 1905 and every 4th year since (omitted in 1917) each intervening year Sulphate of Potash, Super. and Nitrate of Soda	L. 2,772 lb.	65.5	23.4	11.1	Taraxacum vulgare; Anthriscus sylvestris; Ranunculus sp.	20
		L. 570 lb. ...	57.8	30.5	11.7	Ranunculus sp.; Taraxacum sp.	
		Unlimed ...	71.2	16.8	12.0	Ranunculus sp.; Centaurea nigra	

WHEAT. BROADBALK FIELD, 1925.

Plot.	Manurial Treatment.	Top Portion.						Bottom Portion.						74 year Average 1852-1925.	
		Dressed Grain.		Offal Grain per Acre.	Straw per Acre.	Total Straw per Acre.	Proportion of Total Grain to 100 of Total Straw.	Dressed Grain.		Offal Grain per Acre.	Straw per Acre.	Total Straw per Acre.	Proportion of Total Grain to 100 of Total Straw.	Dressed Grain per Acre.	Total Straw per Acre.
		Yield per Acre.	Weight per Bushel.					Yield per Acre.	Weight per Bushel.						
		bush.	lb.	lb.	lb.	cwt.		bush.	lb.	lb.	lb.	cwt.		bush.	cwt.
2A	Farmyard Manure	10.5	58.4	88	1500	17.7	35.3	14.9	58.5	82	1591	19.1	44.6	26.8*	32.1*
2B	Farmyard Manure	15.1	59.1	151	1807	21.3	43.9	19.1	58.6	228	1907	22.8	52.9	33.5	34.2
3	Unmanured	6.7	58.8	49	518	5.8	68.3	5.7	58.1	37	569	6.5	50.8	11.7	9.8
5	Complete Mineral Manure	6.8	58.8	68	502	5.6	74.4	6.8	58.5	51	462	5.3	76.7	13.5	11.5
6	As 5, and Single Amm. Salts	10.1	58.7	87	707	8.1	74.7	10.1	58.7	80	784	9.2	65.5	21.7	20.3
7	As 5, and Double Amm. Salts	18.6	59.2	93	1558	17.9	59.6	21.4	54.7	100	1768	20.0	56.7	30.4	32.1
8	As 5, and Treble Amm. Salts	19.5	59.7	106	2182	25.0	45.5	21.7	59.0	95	1868	22.0	56.0	34.5	39.8
9	As 5, and Single Nitrate of Soda	16.3	58.2	45	1362	15.9	55.7	16.0	57.0	55	1534	17.6	49.1	18.8†	24.6†
10	Double Amm. Salts alone	14.0	59.2	138	1162	13.6	63.6	10.6	58.5	126	797	10.1	66.3	18.7	17.8
11	As 10, and Superphosphate	20.5	58.3	143	1558	17.7	62.3	16.9	57.2	142	1042	13.2	75.0	21.3	21.4
12	As 10, and Super. and Sulph. Soda	18.8	59.1	189	1496	17.3	67.0	18.0	58.6	189	1698	19.7	56.2	27.0	26.8
13	As 10, and Super. and Sulph. Potash ...	24.3	59.4	87	1832	21.4	63.8	22.2	59.0	64	2192	24.4	50.2	29.2	30.6
14	As 10, and Super. and Sulph. Magnesia ...	20.2	58.5	77	1556	17.9	62.8	21.7	58.9	78	2275	24.3	49.9	26.7	26.8
15	Double Amm. Salts in Autumn and Minerals	20.6	59.7	64	1460	16.6	69.6	16.3	59.5	66	1184	13.9	66.6	27.8	28.2
16	Double Nitrate and Minerals	21.2	59.5	104	2002	22.7	53.7	22.0	59.6	118	2175	24.5	52.0	29.9†	35.2†
17	Minerals alone, or double Amm. Salts alone in	9.7	59.6	68	624	7.1	81.1	10.7	60.0	56	692	8.0	77.9	27.8	27.7
18	alternate years	15.7	60.0	133	1272	14.6	65.8	14.2	59.8	157	1510	16.9	53.2	14.1	12.5
19	Rape Cake alone	12.6	59.7	55	1102	12.5	57.7	6.7	58.9	43	971	11.1	35.5	20.8‡	22.0‡
20	Mineral Manure (without Super.) and Amm. Salts	7.7	60.0	47	1045	11.6	39.1	—	—	—	—	—	—	16.5§	18.6§

* 26 years only, 1900-1925. † 41 years only, 1885-1925. ‡ 33 years only, 1893-1925. § 18 years only, 1906-1925 (no crop in 1912 and 1914).

WHEAT. BROADBALK FIELD, 1926.

Top portion fallowed.

Plot	Manurial Treatment	Dressed Grain		Offal Grain per Acre	Straw per Acre	Total Straw per Acre	Proportion of Total Grain to 100 of Total Straw
		Yield per Acre	Weight per Bushel				
		bush.	lb.	lb.	lb.	cwt.	
2A	Farmyard Manure	6.8	54.8	113	1979	24.6	17.6
2B	Farmyard Manure	6.5	55.5	133	2675	33.6	13.2
3	Unmanured	0.9	57.5*	9	135	1.8	30.2
5	Complete Mineral Manure	2.2	57.5	17	285	3.5	38.8
6	As 5, and Single Amm. Salts	5.9	56.8	50	1030	13.0	26.5
7	As 5, and Double Amm. Salts	5.7	55.1	91	1985	23.3	15.4
8	As 5, and Treble Amm. Salts	7.5	50.4	118	2973	33.5	13.2
9	As 5, and Single Nitrate of Soda	5.8	54.0	72	1293	16.0	21.8
10	Double Amm. Salts alone	4.4	51.3	84	1030	12.6	22.0
11	As 10, and Superphosphate	4.2	53.0	113	1360	17.7	16.8
12	As 10, and Super. and Sulph. Soda	7.1	54.1	149	1733	21.7	21.9
13	As 10, and Super. and Sulph. Potash ...	9.3	56.3	123	2205	26.4	21.7
14	As 10, and Super. and Sulph. Magnesia ...	8.6	54.6	135	1838	22.7	24.1
15	Double Amm. Salts in Autumn and Minerals	5.5	56.4	107	1408	18.9	20.4
16	Double Nitrate and Minerals	7.5	54.4	141	2283	27.8	17.8
17	Minerals alone or Double Amm.	6.4	56.0	88	1508	18.0	22.9
18	Salts alone in alternate years	3.6	56.0	60	668	9.0	27.2
19	Rape Cake alone	4.4	53.4	98	1503	17.6	16.6

* Adopted from plot 5.

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

Hay, Dry Matter, and Nitrogen per Acre, 1925 and 1926.

Year	No. of Cuttings	As Hay	Dry Matter	Nitrogen	Seed Sown
1925	2	1525	1270	33	April 17th, Re-seeded
1926	2	1248	1040	32	June 1st, Patched
Averages:					
25 years, 1854—1878		7664	6387	179	
25 years, 1879—1903		3924	3270	101	
20 years, 1904—1923		2640	2200	65	

WHEAT AFTER FALLOW (without Manure 1851, and since).

Hoos Field, **1925** and **1926**.

	1925	1926	Average 70 years 1856-1925
Dressed Grain { Yield per Acre—bushels	5.9	5.24	14.70
Dressed Grain { Weight per Bushel—lb.	58.9	58.2	58.8
Offal Grain per Acre—lb.	33.5	96.0	50.7
Straw per Acre—lb.	623.0	780.0	—
Total Straw per Acre—cwt.	6.8	9.0	12.7
Proportion of Total Grain to 100 of Total Straw	49.8	39.7	—

AVERAGE WHEAT YIELDS *of* VARIOUS COUNTRIES.

Country	Mean Yield per Acre 1901-10 bushels	Country	Mean Yield per Acre 1901-10 bushels
Great Britain	31.6	Denmark	41.3
England	31.7	Argentine	10.6
Hertfordshire	30.5	Australia	10.1
France	20.2	Canada	19.5
Germany	29.1	United States	14.3
Belgium	35.1	Russia—European	10.0

NOTE.—Figures for Great Britain, England and Hertfordshire are taken from the Board of Agriculture's "Agricultural Statistics," Vol. 46. Other figures from "Annuaire International de Statistique Agricole," 1910-12, and converted at the rate of 60 lb. per bushel.

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PERMANENT BARLEY PLOTS. Hoos Field, 1925, 1926.

PRODUCE PER ACRE.

Plot.	Manuring.	1925. Dressed Grain. Yield per Acre.	1925. Dressed Grain. Weight per Bushel.	1925. Offal Grain per Acre.	1925. Straw per Acre.	1925. Total Straw per Acre.	1925. Proportion of Total Grain to 100 of Total Straw.	1926. Dressed Grain. Yield per Acre.	1926. Dressed Grain. Weight per Bushel.	1926. Offal Grain per Acre.	1926. Straw per Acre.	1926. Total Straw per Acre.	1926. Proportion of Total Grain to 100 of Total Straw.	74 years Average Yield 1852—1926.† Dressed Grain per Acre.	74 years Average Yield 1852—1926.† Total Straw per Acre.
		bush.	lb.	lb.	lb.	cwt.		bush.	lb.	lb.	lb.	cwt.		bush.	cwt.
1 O	Unmanured	6.7	50.8	33	396	5.0	66.9	6.1	51.5	30	382	7.1	42.9	13.6	7.9
2 O	Superphosphate only	10.9	52.3	44	594	7.6	72.5	12.2	53.1	32	569	8.3	72.6	19.2	9.8
3 O	Alkali Salts only	5.0	50.0	26	355	4.5	54.0	4.8	50.8	41	374	5.7	39.6	14.5	8.6
4 O	Complete Minerals	7.1	51.8	43	470	6.3	58.0	12.9	52.5	135*a*	875	13.2	55.3*a*	19.3	11.0
5 O	Potash and Superphosphate ...	8.1	52.3	33	451	5.9	69.4	9.9	52.5	39	622	9.6	51.9	15.7	9.5
1 A	Ammonium Salts only	9.4	49.5	39	693	8.5	53.3	12.0	51.9	52	836	11.9	50.5	24.0	13.8
2 A	Superphosphate and Amm. Salts	19.0	52.5	147	1037	13.2	77.5	26.1	52.1	63	1546	18.9	67.4	36.4	20.7
3 A	Alkali Salts and Amm. Salts ...	11.0	51.8	55	864	10.9	51.2	11.3	50.6	65	1009	13.0	43.8	26.2	16.1
4 A	Complete Minerals and Amm. Salts	19.3	51.7	116	1372	16.6	59.6	30.1	51.7	74	2054	23.6	61.7	39.9	23.8
5 A	Potash, Super. and Amm. Salts ...	21.8	53.3	122	1436	17.5	65.4	24.2	53.0	50	1645	20.7	57.4	34.4	21.9
1 AA	Nitrate of Soda only	12.6	50.3	52	825	10.2	60.0	15.9	52.9	62	1084	16.0	50.6	24.5*	15.4*
2 AA	Super. and Nitrate of Soda ...	29.9	53.7	165	1623	20.2	78.3	31.0	52.1	78	1986	23.6	64.1	39.3*	23.3*
3 AA	Alkali Salts and Nitrate of Soda	10.0	50.0	76	803	10.4	49.4	10.3	50.3	70	1051	16.8	31.4	24.9*	16.5*
4 AA	Complete Minerals and Nitrate of Soda	18.7	53.0	96	1342	15.5	62.5	27.9	51.0	89	2167	24.5	55.1	38.2*	23.7*
1 AAS	As Plot 1 AA and Silicate of Soda	13.8	52.0	69	941	12.1	58.0	21.0	53.3	70	1359	17.7	59.9	30.5*	18.4*
2 AAS	,, ,, 2 AA ,, ,,	26.3	53.6	124	1381	17.5	78.2	37.8	52.0	94	2316	27.7	66.4	40.3*	24.2*
3 AAS	,, ,, 3 AA ,, ,,	12.5	52.3	96	963	12.2	54.8	16.6	52.3	107	1271	17.9	48.7	31.7*	20.1*
4 AAS	,, ,, 4 AA ,, ,,	17.9	52.9	66	1364	16.8	53.6	35.0	51.5	95	2299	27.0	62.8	40.6*	25.7*
1 C	Rape Cake only	24·5	52.9	87	1955	18.1	68.3	24.5	52.4	60	1559	19.1	62.9	35.9	20.7
2 C	Superphosphate and Rape Cake	21.9	54.4	128	1331	15.8	74.8	33.6	51.5	63	2019	23.4	68.4	38.4	22.1
3 C	Alkali Salts and Rape Cake ...	12.7	52.8	99	1001	12.5	54.7	20.4	52.2	39	1570	18.8	52.3	34.2	20.6
4 C	Complete Minerals and Rape Cake	21.3	53.2	85	1298	15.5	69.9	34.6	52.0	64	2107	25.5	65.2	38.0	22.8
7—1	Unmanured (after dung 20 years, 1852—71)	7.0	51.5	76	475	6.3	61.7	11.0	53.3	48	725	10.9	51.6	22.8‡	13.7‡
7—2	Farmyard Manure	22.0	52.3	121	1158	15.9	71.4	35.8	52.1	88	2331	27.6	63.3	45.1	28.1
6—1	Unmanured	5.7	50.5	54	354	4.9	62.6	7.1	51.5	50	485	7.8	47.3	14.9	8.7
6—2	Ashes from Laboratory furnace ...	7.5	51.0	36	431	5.6	66.4	9.6	52.4	43	620	8.7	55.6	15.9	9.4
1 N	Nitrate of Soda only	11.8	51.8	80	820	11.3	54.7	14.3	52.0	70	1078	16.0	45.4	29.0§	18.0§
2 N	,, ,, ,, ...	16.8	53.3	63	1172	14.0	61.2	20.0	52.5	85	1436	19.6	51.6	32.1§§	20.1§§

† 1912, all plots were fallowed. * 58 years, 1868—1926. ‡ 54 years, 1872—1926. § 73 years, 1853—1926. §§ 67 years, 1859—1926.

a A large amount of black medic seed in Offal Grain.

Little Hoos Field. Swedes, 1926.

Produce per acre. Roots and Leaves in Tons.

	Manurial Treatment	Roots	Leaves	Total	Season of last Dressing
A 1	Control	*12.61*	*2.31*	*14.92*	—
2		**21.79**	**3.94**	**25.73**	1926
3	Ordinary Dung, 16 tons	11.46	2.87	14.33	1921
4		8.25	2.44	10.69	1922
5		9.20	2.53	11.73	1924
B 1	Cake-fed Dung, 16 tons	**21.11**	**3.75**	**24.86**	1926
2	Control	*13.30*	*2.62*	*15.92*	—
3		14.95	2.99	17.94	1921
4	Cake-fed Dung, 16 tons	13.88	3.09	16.97	1922
5		12.74	2.94	15.68	1924
C 1	Shoddy; Superphosphate; Sulphate	**16.74**	**3.01**	**19.75**	1926
2	of Potash	13.44	2.62	16.06	1921
3	Control	*10.28*	*2.32*	*10 60*	—
4	Shoddy; Superphosphate	5.72	1.56	7.28	1922
5	Sulphate of Potash	1.87	0.56	2.43	1924
D 1	Guano; Sulphate of Ammonia ...	**17.31**	**3.20**	**20.51**	1926
2	Sulphate of Potash	13.71	2.68	16.39	1921
3		12.96	2.79	15.75	1922
4	Control	*11.34*	*2.36*	*13.70*	—
5	Guano; Sulphate of Ammonia, Sul-				
	phate of Potash	13.79	3.41	17.20	1924
E 1		**16.86**	**2.89**	**19.75**	1926
2	Rape Dust; Superphosphate	11.64	2.55	14.19	1921
3	Sulphate of Potash	8.71	2.08	10.79	1922
4		14.36	2.62	16.98	1924
5	Control	*10.81*	*2.42*	*13.22*	—
F 1	Control	*7.20*	*1.78*	8.98	—
2		**15.54**	**2.85**	**18.39**	1926
3	Superphosphate; Sulphate of Ammo-	5.95	1.40	7.35	1921
4	nia; Sulphate of Potash	6.59	1.41	8.00	1922
5		11.60	2.00	13.60	1924
G 1	Bone Meal; Sulphate of Ammonia;	**14.46**	**2.97**	**17.43**	1926
2	Sulphate of Potash	7.08	1.88	8.96	1921
3	Control	*3.86*	*1.09*	*4.95*	—
4	Bone Meal; Sulphate of Ammonia;	6.84	1.75	8.59	1922
5	Sulphate of Potash	8.89	2.02	10.91	1924
H 1		**13.40**	**2.08**	**15.48**	1926
2	Basic Slag; Sulphate of Ammonia;	9.50	1.88	11.38	1921
3	Sulphate of Potash	9.47	1.94	11.41	1922
4		9.88	1.85	11.73	1924
5	Control	*4.76*	*1.47*	*6.23*	—

1925, field fallowed.

NOTES.—Since 1919 the manure for each plot (except of series A and B) has been rationed at 40 lb. Nitrogen, 100 lb. Calcium Phosphate and 50 lb. Potash per acre. Each plot has been supplied with as much of its particular manure (shoddy, guano, etc.) as possible without exceeding the receipt in any of the three rationed ingredients. Any deficit in either of these three has been made good by adding the necessary quantity of Sulphate of Ammonia, Superphosphate, or Sulphate of Potash. No manure was applied for 1923 crop.

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

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Hay. Great Field, 1925 and 1926.

Plot.	Manurial Treatment. Quantities per Acre.	Yield per Acre. 1925. No Potash. cwt.	Yield per Acre. 1925. With Potash. cwt.	Yield per Acre. 1926. No Potash. cwt.	Yield per Acre. 1926. With Potash. cwt.	Dry Matter per Acre. 1926.* No Potash. lb.	Dry Matter per Acre. 1926.* With Potash. lb.
1 A	High Grade Slag, No. 12, 1,170 lb.	38.2	34.8	41.6	40.4	3628	3519
1 B		48.4	42.9	43.2	37.5	3776	3381
2 A	Open Hearth Slag, No. 13, 1,925 lb.	36.3	37.9	36.3	42.3	3159	3741
2 B		45.0	35.0	37.3	39.5	3214	3688
3 A	Open Hearth Slag, No. 14, 1,930 lb.	39.8	34.3	35.5	38.4	3198	3336
3 B		40.7	32.3	37.5	40.9	3384	3730
4 A	Gafsa Phosphate 750 lb.	47.0	32.7	39.6	41.1	3358	4129
4 B		42.5	32.7	37.3	42.3	3252	3940
A C	Control. No Manure	37.0	34.1	31.8	43.0	2853	3648
B C		45.2	35.7	40.2	38.2	3154	3397
7 C	Nauru Phosphate 263 lb.	37.1	35.5	—	—	—	—
7 D		33.6	32.9	—	—	—	—
8 C	Nauru Slag Phosphate, No. 8, 411 lb.	36.4	31.3	—	—	—	—
8 D		30.7	31.4	—	—	—	—
1 C	High Soluble Slag, No. 1, 872 lb.	33.6	38.8	—	—	—	—
2 C	Low Soluble Slag, No. 2, 1,225 lb.	30.7	33.4	—	—	—	—
3 C	Gafsa Phosphate, 347 lb.	30.5	36.1	—	—	—	—
4 C	Tunisian Phosphate, 336 lb. ...	33.4	34.8	—	—	—	—
5 C	Florida Phosphate, 292 lb. ...	36.4	35.5	—	—	—	—
C C	Control. No Manure	27.9	32.0	—	—	—	—
D C		30.0	27.1	—	—	—	—

Kainit at 4 cwt. per acre, applied January 28th, 1924.
* Dry Matter determinations were not made in 1925.
Series C and D were discarded in 1926.

Great Knott Field, 1926.

Produce per Acre.

Wheat Varieties	Dressed Yield per Acre. bush.	Grain Weight per bush. lb.	Straw per Acre lb.	Total Straw per Acre. cwt.	Proportion of Total Grain to 100 Total Straw
Red Standard	30.7	61.4	3105	31.4	54.6
Browick A	36.8	58.7	4118	42.8	49.4
Browick B	36.2	57.7	3406	35.5	53.5
Little Joss A	45.9	62.6	4795	48.3	55.5
Little Joss B	46.5	61.8	4630	47.2	57.4
R. Million A	37.1	61.4	3900	43.5	48.9
R. Million B	37.4	61.2	3224	38.9	54·8

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REPLICATED EXPERIMENTS.

QUALITATIVE EXPERIMENT WITH POTASH.

Potatoes (Kerr's Pink).

1925, West Barnfield. S.E.

I	C	D	A	B
II	A	B	C	D
III	D	C	B	A
IV	B	A	D	C

1926, Stackyard Field. N.E.

I	C	B	A	D
II	B	D	C	A
III	D	A	B	C
IV	A	C	D	B

Repeated each year in a 4×4 Latin Square with plots of $\frac{1}{50}$ of an acre.

Actual Weight in lb.

Row	1925				1926			
	Basal A	Sulphate B	Muriate C	P.M.S. D	Basal A	Sulphate B	Muriate C	P.M.S. D
I	173	398	444	422	461.5	557.0	584.0	498.5
II	279	439	423	409	389.0	519.5	477.0	485.5
III	212	445	428	436	378.5	467.5	491.5	474.5
IV	237	453	393	410	464.0	492.0	511.0	507.0
Total	901	1735	1688	1677	1693.0	2036.0	2063.5	1965.5

Summary.

Year	Average Yield	Basal 6 cwt.Super. 2 cwt.Sulph. of Amm.	Basal + 2 cwt.Sulph. of Potash 1925--47.71% 1926--48.14%	Basal + equiv. Mur. of Potash 1925--52.11% 1926--52.11%	Basal + equiv. Pot. man. salts 1925--27.65% 1926--29.60%	Average	Standard Error
1925	Tons per acre	5.03	9.68	9.42	9.36	8.37	0.203
	Per cent.	60.1	115.6	112.5	111.8	100.0	2.43
1926	Tons per acre	9.45	11.36	11.52	10.97	10.82	0.210
	Per cent.	87.3	105.0	106.4	101.3	100.0	1.91

1925. Strong response to all potash applications, the sulphate showing some superiority.
1926. Only moderate response to potash; both sulphate and muriate superior to potash manure salts.

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POTASH AND NITROGEN QUANTITIES.

Potatoes (Kerr's Pink). West Barnfield, 1925.

S.W.

I		II		III		IV	
A	*S*	*M*	*J*	*N*	*Q*	*T*	*S*
D	*T*	*N*	*Q*	*J*	*A*	*D*	*C*
R	*P*	*C*	*L*	*M*	*R*	*P*	*L*
C	*Q*	*R*	*A*	*S*	*D*	*N*	*J*
N	*J*	*S*	*D*	*P*	*L*	*A*	*R*
M	*L*	*P*	*T*	*C*	*T*	*M*	*Q*

Area of plots $\frac{1}{50}$ acre.

Basal Manure:—
Superphosphate
3 cwt. per acre.

Actual Weight in lb.

Block	Control *T*	Basal *A*	Basal + 2 cwt. S/Amm. *J*	Basal + 4 cwt. S/Amm. *N*	Basal + 2 cwt. S/Pot. *C*	Basal + 2 cwt. S/Pot. + 2 cwt. S/Amm *L*	Basal + 2 cwt. S/Pot. + 4 cwt. S/Amm. *P*	Basal + 4 cwt. S/Pot. *D*	Basal + 4 cwt. S/Pot. + 2 cwt. S/Amm. *M*	Basal + 4 cwt. S/Pot. + 4 cwt. S/Amm. *Q*	Basal + 6 cwt. S/Pot. + 4 cwt. S/Amm. *R*	Basal + 6 cwt. S/Pot. + 6 cwt. S/Amm. *S*
I	272	322	217	328	340	437	464	388	491	487	508	516
II	252	281	315	298	320	438	450	352	482	515	461	464
III	226	198	247	344	341	393	439	338	466	501	519	456
IV	234	191	157	185	298	377	472	342	449	461	475	441
Total	984	992	936	1155	1299	1645	1825	1420	1888	1964	1963	1877

Summary of Results.

Average Yield per Acre.	Control	Basal	Basal + 2 cwt. S/Amm.	Basal + 4 cwt. S/Amm.	Basal + 2 cwt. S/Pot.	Basal + 2 cwt. S/Pot. + 2 cwt. S/Amm.	Basal + 2 cwt. S/Pot. + 4 cwt. S/Amm.	Basal + 4 cwt. S/Pot.	Basal + 4 cwt. S/Pot. + 2 cwt. S/Amm	Basal + 4 cwt. S/Pot. + 4 cwt. S/Amm	Basal + 6 cwt. S/Pot. + 4 cwt. S/Amm.	Basal + 6 cwt. S/Pot. + 6 cwt. S/Amm.	General Average	Standard Error
Tons ...	5.491	5.536	5.223	6.445	7.249	9.180	10.184	7.924	10.536	10.960	10.954	10.474	8.346	0.3597
Per cent.	65.8	66.3	62.6	77.2	86.8	110.0	122.0	94.9	126.2	131 3	131.2	125.5	100	4.31

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Potatoes (Kerr's Pink). Stackyard Field, 1926.

N.W.

N	J	F	A	D	O	K	A
K	Q	O	D	L	B	F	N
B	C	M	L	H	P	G	E
H	E	P	G	M	Q	C	J
A	L	J	C	P	Q	B	E
K	B	G	O	C	H	J	O
E	F	Q	D	N	M	A	D
N	H	P	M	F	G	K	L

SYSTEM OF REPLICATION :—Randomised blocks for all manurial combinations.

Plots $\frac{1}{50}$ acre.

Basal Dressing = 3 cwt. Superphosphate per acre.

Treatment	Actual Yield in lb.							
Nitrogen cwt.	0				1			
Potash cwt.	0	1	2	4	0	1	2	4
	A	B	C	D	E	F	G	H
I	317.5	363.0	368.0	381.5	314.0	383.0	434.5	447.5
II	404.5	308.0	356.0	439.0	318.0	434.0	402.0	422.0
III	351.5	367.5	383 5	316.0	357.5	381.5	455.5	354.0
IV	325.0	359.0	328.5	259.0	395.5	410.5	351.5	390.5
Total ...	1398.5	1397.5	1436.0	1395.5	1385.0	1609.0	1643.5	1614.0
Nitrogen cwt.	2				4			
Potash cwt.	0	1	2	4	0	1	2	4
	J	K	L	M	N	O	P	Q
I	302.5	444.5	471.5	449.0	332.0	450.0	527.0	568.0
II	456.0	544.5	483.5	504.0	468.0	533.5	500.0	561·5
III	443.0	472.5	495.5	474.5	385.5	502.5	496.5	531.0
IV	483.0	430.0	394.5	444.0	522.0	512.0	559.0	550.0
Total ...	1684.5	1891.5	1845.0	1871.5	1707.5	1998.0	2082.5	2210.5

Summary of Results.

	Average Yield in tons per Acre.				Average Yield per cent.			
	Cwt. per Acre, Sulph. of Potash.				Cwt. per Acre, Sulph. of Potash.			
Cwt. per acre Sulphate of Ammonia	0	1	2	4	0	1	2	4
0	7.80	7.80	8.01	7.79	82.3	82.3	84.6	82.2
1	7.73	8.98	9.17	9.01	81.6	94.8	96.8	95.0
2	9.40	10.56	10.30	10.44	99.20	111.4	108.7	110.2
4	9.53	11.15	11.62	12.34	100.5	117.7	122.6	130.1

Standard Error 0.519 tons, or 5.48 per cent.

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QUALITATIVE EXPERIMENT WITH POTASH.

Sugar Beet. Woburn, 1926.

S.S.E.

C	*O*	*K*	*S*	*M*
O	*M*	*C*	*K*	*S*
K	*S*	*M*	*O*	*C*
M	*K*	*S*	*C*	*O*
S	*C*	*O*	*M*	*K*

System of Replication:—Latin square.

S=Sulphate of Potash
M=Muriate of Potash
K=30 per cent. Potash Salts
} +Basal.

C=Basal only (Super S/A+N/S)
O=No manure
Area of plots, $\frac{1}{80}$ acre

Actual Weights in lb.

C		O		K		S		M	
Roots	Tops	Roots	Tops	Roots	Tops	Roots	Tops	Roots	Tops
640	*465*	512	*294*	600	*341*	566	*423*	558	*378*
527	*412*	544	*358*	554	*422*	578	*421*	567	*413*
539	*424*	460	*342*	671	*546*	578	*417*	520	*392*
539	*454*	528	*366*	603	*555*	497	*352*	609	*507*
547	*457*	470	*307*	560	*444*	563	*440*	540	*471*
2792	*2212*	2514	*1667*	2988	*2308*	2782	*2053*	2794	*2161*

Summary of Results.

Average Yield per Acre.	S	M	K	C	O	General Mean	Standard Error
Roots—pounds	33384	33528	35956	33504	30168	33288	646.44
Tops—pounds	*24636*	*25932*	*27696*	*26544*	*19992*	*24960*	*946.8*
Roots—tons	14.90	14.94	16.05	14.96	13.47	14.86	.2886
Tops—tons	*11.0*	*11.58*	*12.36*	*11.85*	*8.93*	*11.14*	*0.42*
Roots—per cent.	100.29	100.72	107.71	100.65	90.63	100.0	1.942
Tops—per cent.	*98.70*	*103.85*	*110.96*	*106.35*	*80.10*	*100.0*	*3.793*

Significant response only to the Potash Manure Salts.

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NITROGENOUS TOP DRESSING ON ROOTS.

Sugar Beet Experiment. Rothamsted, 1926.

W.N.W.

Columns

Rows	I	II	III	IV
I	*12N*	*9N*	*6N*	*2N*
II	*9N*	*12N*	*2N*	*6N*
III	*6N*	*2N*	*12N*	*9N*
IV	*2N*	*6N*	*9N*	*12N*

System of Replication:—Latin Square, 4×4.

Plots $\frac{1}{145}$ acre.

Basal dressing Super. 3 cwt., Muriate of Potash 2 cwt., Sulphate of Ammonia $1\frac{1}{2}$ cwt. (=2N).

Nitrate of Soda 4 cwt. (6N), 7 cwt. (9N), and 10 cwt. (12N), applied as top dressing.

Row	Actual Weights in lb.							
	12N		9N		6N		2N	
	Roots	Tops	Roots	Tops	Roots	Tops	Roots	Tops
I	316.0	*394.0*	284.5	*407.0*	275.5	*403*	229.0	*321.5*
II	273.5	*393.0*	297.0	*392.5*	231.0	*353*	280.0	*369.5*
III	267.0	*414.0*	236.5	*382.0*	298.0	*364*	277.5	*399.0*
IV	255.0	*385.0*	267.5	*422.5*	281.5	*442*	308.5	*394.0*
Total	1111.5	*1586.0*	1085.5	*1604.0*	1086.0	*1562*	1095.0	*1484.0*

Summary of Results.

Average Yield per Acre.	12N	9N	6N	2N	General Mean	Standard Error
Roots, pounds	40292	39349	39368	39694	39676	685
Tops, pounds	*57492*	*58145*	*56622*	*53795*	*56514*	*1163*
Roots, tons	17.99	17.57	17.57	17.72	17.71	0.31
Tops, tons	*25.67*	*25.96*	*25.28*	*24.02*	*25.23*	*0.52*
Roots, per cent.	101.6	99.2	99.2	101.1	100.0	1.73
Tops, per cent.	*101.7*	*102.9*	*100.2*	*95.2*	*100.0*	*2.06*

No significant response in roots, and scarcely in tops.

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Sugar Beet. Woburn, 1926.

S.E.

3N	*N*	*O*	*2N*	*C*
2N	*3N*	*N*	*C*	*O*
N	*2N*	*C*	*O*	*3N*
O	*C*	*2N*	*3N*	*N*
C	*O*	*3N*	*N*	*2N*

System of Replication :—Latin square.
3N = Sulphate of Amm. + Double N/S
2N = „ „ + Single N/S } + Basal.
N = „ „ no N/S
C = Basal only (Super. + S/K)
O = No manure.

Actual Weight in lb.

3N		2N		N		C		O	
Roots	Tops	Roots	Tops	Roots	Tops	Roots	Tops	Roots	Tops
624	*578*	689	*634*	507	*430*	645	*371*	505	*356*
581	*467*	641	*524*	613	*373*	557	*294*	516	*307*
647	*525*	539	*406*	605	*349*	559	*355*	485	*395*
688	*535*	602	*380*	755	*522*	788	*462*	483	*331*
617	*454*	932	*632*	666	*355*	481	*488*	526	*467*
3157	*2559*	3403	*2576*	3146	*2029*	3030	*1970*	2515	*1856*

Summary of Results.

Average Yield per Acre.	3N	2N	N	C	O	General Mean	Standard Error
Roots, pounds	37884	40836	37752	36360	30180	36602	2396
Tops, pounds	*30708*	*30912*	*24348*	*23640*	*22272*	*26304*	*176*
Roots, tons	16.9	18.2	16.9	16.2	13.5	16.3	1.1
Tops, tons	*13.7*	*13.7*	*10.8*	*10.5*	*9.9*	*11.7*	*0.8*
Roots, per cent.	103.5	111.6	103.1	99.3	82.5	100.0	6.5
Tops, per cent.	*116.7*	*117.5*	*92.6*	*89.9*	*84.9*	*100.0*	*6.7*

https://doi.org/10.23637/ERADOC-1-84

Mangolds (Red Intermediate). West Barnfield, 1925.

N.E.

C	D	F	I
H	E	I	
A	B	G	
I	E	C	II
G	A	B	
F	H	D	

SYSTEM OF REPLICATION :—
Randomised blocks in duplicate.
Plots $\frac{1}{20}$ acre.
Basal Manure : Super., 3 cwt. per acre.
Kainit, 4 ,, ,,

	Control A	Basal B	Basal + 1 cwt. S/Amm. C	Basal + 1 cwt. S/Amm. Top Dress'd D	Basal + 1 cwt. S/Amm. + 1 cwt. S/Amm. Top Dress'd E	Basal + 2 cwt. S/Amm. F	Basal + 2 cwt. S/Amm. Top Dress'd G	Basal + 3 cwt. S/Amm. H	Basal + 3 cwt. S/Amm. Top Dress'd I
Roots—Actual Weights in cwt.									
I	15.04	18·47	13·84	18.64	13.60	19.81	20.02	13.60	22.77
II	17.53	18.65	12.35	17.46	19.96	15.92	18.15	14.76	17.95
Total	32.57	37.12	26.19	36.10	33.56	35.73	38.17	28.36	40.72
Leaves—Actual Weights in lb.									
I	593.0	663.5	498.0	767	552	687.0	784.5	506.0	877.0
II	618.5	689.0	436.5	684	705	619.5	666.0	536.5	700.5
Total	1211.5	1352.5	934.5	1451	1257	1306.5	1450.5	1042.5	1577.5

SUMMARY

Average Yield per Acre.	A	B	C	D	E	F	G	H	I	Mean	S.E.
Roots, tons	16.28	18.56	13.09	18.05	16.78	17.87	19.08	14.18	20.36	17.14	1.80
Tops, tons	*5.408*	*6.038*	*4.172*	*6.478*	*5.612*	*5.833*	*6.475*	*4.654*	*7.042*	*5.746*	*0.44*
Roots, per cent.	94.9	108.3	76.4	105.3	97.9	104.3	111.3	82.7	118.8	100.0	10.5
Tops, per cent.	*94.1*	*105.1*	*72.6*	*112.7*	*97.7*	*101.5*	*112.7*	*81.0*	*122.6*	*100.0*	*7.66*

https://doi.org/10.23637/ERADOC-1-84

TOP DRESSING ON CEREALS.

Oats (Grey Winter). Long Hoos Field, 1925.

SYSTEM OF REPLICATION: Four randomised blocks with additional plots F or G.

Plots, $\frac{1}{40}$ acre.

N.

I	III	II	IV
A	C	F	B
E	D	C	A
D	B	E	G
C	A	B	D
F	E	A	C
B	G	D	E

Basal Manure was:—
Super. 2 cwt. per acre.
M/Amm.. equivalent to 1 cwt. per acre S/Amm. for single dressing.
S/Amm., 1 cwt. per acre for single dressing.

Actual Weight in lb.

Columns	Basal A	Single S/Amm. Early B	Single S/Amm. Late C	Double S/Amm. Early D	Double S/Amm. Late E	Single M/Amm Early F	Double M/Amm Early G
Total Grain.							
I	53.00	69.75	73.00	73.00	83.75	60.50	—
II	55.75	61.50	67.00	78.75	75.75	—	64.50
III	43.00	56.75	68.75	67.50	63.50	68.75	—
IV	56.50	69.25	61.00	59.50	68.00	—	66.25
Total	208.25	357.25	269.75	278.75	291.00	129.25	130.75
Total Straw.							
I	65.5	94.0	94.5	101.0	97.5	88.5	—
II	70.5	87.0	83.0	111.0	100.0	—	109.0
III	64.0	85.5	82.5	93.0	93.0	89.5	—
IV	63.5	90.0	84.5	106.5	96.5	—	100.5
Total	263.5	356.5	344.5	411.5	387.0	178.0	209.5

Summary.

Average Yield per Acre.	Basal	Single S/Amm. Early	Single S/Amm. Late	Double S/Amm Early	Double S/Amm Late	Single M/Amm Early	Double M/Amm Early	General Average	Standard Error
Grain, pounds	2082	2492.5	2697.5	2787.5	2910	2585	2615	2608.3	116.7
Straw, pounds	*2635*	*3565*	*3445*	*4115*	*3870*	*3560*	*4190*	*3584*	*85.6*
Grain, bushels	49.57	59.35	64.23	66.37	69.29	61.55	62.26	62.10	2.778
Straw, cwt.	*23.53*	*31.83*	*30.76*	*36.74*	*34.55*	*31.79*	*37.41*	*32.00*	*0.764*
Grain, per cent.	79.8	98.6	103.4	106.9	111.6	99.1	100.3	100	4.47
Straw, per cent.	*73.5*	*99.5*	*96.1*	*114.8*	*108.0*	*99.3*	*116.9*	*100*	*2.39*
Total Produce, pounds ...	4717	6057.5	6142.5	6902.5	6780.0	6145.0	6805.0	6193	—

https://doi.org/10.23637/ERADOC-1-84 *pp 57*

Oats (Grey Winter). Long Hoos Field. Season 1926.

N

	OA	2ME	2SL	OB	2SL	OA	OB	1SE	
X	1SE	1ME	1ML	1SL	2ME	2ML	1ME	1ML	W
	OC	2ML	OD	2SE	OC	1SL	OD	2SE	
	2SE	2ME	OA	1ML	OA	2SE	2SL	2ML	
Y	OB	1SL	1SE	1ME	1ML	OB	OC	1SL	Z
	2ML	OC	2SL	OD	2ME	OD	1ME	1SE	
	2SE	2ML	1SE	2ME	2SL	2SE	2ME	OA	
K	OA	OB	1ML	OC	1ME	2ML	OB	1ML	J
	2SL	1ME	OD	1SL	OC	OD	1SE	1SL	
	2ME	1ME	2ML	2SL	1SE	OA	OB	1SL	
L	1SL	OA	OB	1ML	1ME	2SE	2ML	OC	M
	1SE	OC	2SE	OD	OD	2ME	2SL	1ML	

SYSTEM OF REPLICATION:—8 replicates each $\frac{1}{40}$ acre in randomised blocks of 12 plots.

QUANTITIES.—Sulphate of Ammonia applied at the rate of 1 cwt. and 2 cwts. per acre. Muriate of Ammonia (the equivalence of above in Nitrogen) applied at the rate of 94.5 lb. and 189 lb. per acre.

Early dressing applied when 50% of the plants are tillering. Late dressing applied when the shoot number reaches its maximum.

O=No Top Dressing.
E-L=Early or Late application.
S-M=Sulphate or Muriate of Ammonia.
1-2=Single or Double dressing.

Actual Weights in lb., Total Grain.

	OA	OB	OC	OD	1SE	1SL	1ME	1ML	2SE	2SL	2ME	2ML
Block X	61.375	65.5	68.125	72.125	77.5	80.5	65.375	75.125	83.0	64.25	68.75	65.125
,, W	79.25	83.5	83.25	84.875	80.75	93.125	89.125	86.625	86.625	79.625	88.5	82.625
,, Y	75.5	74.875	62.75	86.125	85.125	67.75	85.75	85.625	83.25	87.125	82.875	74.25
,, Z	91.5	86.25	88.75	82.5	80.5	88.875	86.0	89.25	64.5	88.75	84.125	91.25
,, K	78.625	79.0	83.875	77.75	88.25	88.125	86.5	87.375	82.0	79.125	83.875	78.125
,, J	84.625	84.5	87.875	79.625	76.875	79.625	76.5	87.125	82.875	74.375	78.25	80.5
,, L	68.875	79.5	63.25	83.75	69.0	67.875	79.375	87.625	82.125	87.125	81.875	93.125
,, M	81.25	80.5	89.625	84.75	90.75	80.75	93.5	93.25	85.375	89.0	83.875	93.375

Actual Weights in lb., Total Straw.

	OA	OB	OC	OD	1SE	1SL	1ME	1ML	2SE	2SL	2ME	2ML
Block X	83.0	96.0	93.5	98.5	121.0	133.5	107.5	106.0	161.0	100.0	130.0	101.5
,, W	122.0	140.5	121.5	166.5	160.5	191.0	165.0	146.0	185.0	130.5	159.0	137.5
,, Y	102.0	104.0	99.0	138.0	130.5	100.5	149.0	132.5	142.0	129.5	133.0	103.5
,, Z	149.5	144.0	155.0	139.5	158.5	158.0	190.5	127.5	161.5	180.5	170.0	165.5
,, K	110.0	115.5	133.5	113.0	127.5	140.0	150.0	119.0	116.0	117.0	181.0	114.5
,, J	144.0	145.5	121.5	136.5	165.5	142.5	147.0	154.5	196.5	129.0	200.0	133.0
,, L	100.5	113.0	90.5	140.5	108.0	100.0	128.0	141.5	175.5	153.0	138.0	138.0
,, M	126.0	128.5	157.0	122.0	147.5	154.5	142.0	162.0	181.5	188.0	192.5	164.0

Summary of Results.

Average Yield per Acre	None	Single	Double	Standard Error	Sulphate early	Muriate early	Sulphate late	Muriate late	Single early	Double early	Single late	Double late	Standard Error	Mean
				(*a*)									(*b*)	
Grain—per cent. ...	97.5	102.0	100.5	1.39	100.0	101.2	99.8	104.0	101.0	100.3	103.1	100.7	1.972	100
Grain—bushels ...	75.4	78.9	77.7	1.08	77.3	78.2	77.2	80.4	78.0	77.5	79.7	77.9	1.525	77.3
Straw—per cent. ...	89.3	101.9	108.7	2.218	110.3	112.3	101.7	97.1	104.0	118.6	99.9	98.9	3.137	100
Straw—cwt. ...	44.1	50.3	53.7	1.095	54.5	55.4	50.2	47.9	51.3	58.6	49.3	48.8	1.549	49.3

(*a*) Refers to means of 32 plots, *e.g.*, Single v. Double, or Sulphate v. Muriate.
(*b*) Refers to means of 16 plots, *e.g.*, Early Sulphate v. Late Sulphate or Single Early v. Double Early.

In the grain in spite of a very small standard error, the Single dressing alone produced a significant increase in yield, and this equally whether the dressings were of Sulphate or Muriate applied either early or late. The Double dressing produced no further significant increase.

In the straw the Double dressing produced a significant increase, this being entirely due to those plots which received the dressing early. The early dressed plots yielded significantly more than those where the dressing was applied late.

https://doi.org/10.23637/ERADOC-1-84

Wheat. Great Harpenden Field, 1926.

N.E.

A	OA	1ME	1ML	2SE	OA	1ME	OB	1SL	B
	1SE	2ME	OB	2SL	2SE	OC	1SE	2ML	
	OC	2ML	OD	1SL	OD	2SL	2ME	1ML	
C	OA	1SL	2ME	1ME	2SL	OA	1ML	1SL	D
	1ML	OB	OC	1SE	2ME	2SE	OB	2ML	
	2SL	2SE	OD	2ML	1ME	1SE	OC	OD	

SYSTEM OF REPLICATION:—Four Randomised blocks.

Plots $\frac{1}{40}$ acre.

Sulphate of Ammonia at the rate of 1 and 2 cwt. per acre. Muriate of Ammonia the equivalence of 1 and 2 cwt. of Sulphate of Ammonia, at the rate of 92 lb. and 184 lb. per acre.

O=No top dressing.
E-L=Early or Late application.
S-M=Sulphate or Muriate of Amm.
1-2=Single or Double Dressing.

Total Grain—Actual Weights in lb.

Block	OA	OB	OC	OD	1SE	1SL	1ME	1ML	2SE	2SL	2ME	2ML
A	51.75	47.5	48.25	44.0625	34.0	55.125	59.375	56.875	58.5	56.5	57.25	54.875
B	55.375	56.25	53.0	56.125	59.75	57.75	65.75	60.0	61.375	59.5	60.25	54.75
C	35.25	28.875	30.5	25.25	30.0	38.625	49.5	33.125	29.125	30.125	56.0	29.875
D	39.25	34.0	21.375	20.875	23.0	45.5	37.5	56.375	35.625	46.25	48.5	37.5

Total Straw—Actual Weights in lb.

Block	OA	OB	OC	OD	1SE	1SL	1ME	1ML	2SE	2SL	2ME	2ML
A	112.0	122.0	116.0	132.5	129.0	129.0	123.5	130.0	143.0	133.0	143.0	122.5
B	129.5	135.0	133.5	136.5	144.0	142.5	153.5	138.0	138.5	155.5	156.5	140.5
C	100.5	91.5	111.5	87.5	115.5	101.0	135.5	94.5	100.0	103.5	129.5	105.5
D	136.0	120.0	96.0	92.0	101.0	130.5	107.0	139.5	135.5	131.0	134.5	114.5

Summary of Results.

Average Yield per acre	O	Single	Double	Standard Error	Early Sulphate	Early Muriate	Late Sulphate	Late Muriate	Single Early	Double Early	Single Late	Double Late	Standard Error	Mean
				(a)									(b)	
Grain, per cent. ...	88.9	104.7	106.5	3.51	91.0	119.2	106.9	105.3	98.6	111.7	110.8	101.4	4.96	100.0
Grain, bushels ...	27.0	31.8	32.3	1.066	27.7	36.2	32.5	32.0	30.0	33.9	33.6	30.8	1.508	30.4
Straw, per cent. ...	93.3	101.5	105.2	2.61	101.5	109.2	103.4	99.3	101.7	108.9	101.3	101.4	3.691	100.0
Straw, cwt.	41.3	45.0	46.6	1.16	45.0	48.4	45.8	44.0	45.1	48.3	44.9	44.9	1.640	44.3

(a) Refers to means of 16 plots.
(b) „ „ 8 „

Muriate beats sulphate, an effect entirely due to the early dressings; as regards quantity, double early and single late give the best returns in grain.

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MALTING BARLEY.

Great Knott Field, 1925.

N.W.

II	*D*	*K*	*F*	*G*	*H*	*E*	*C*	*A*	*B*
I	*C*	*A*	*H*	*E*	*B*	*D*	*G*	*K*	*F*

	Control	1 cwt. S/Amm. + 168 lb. S/Pot. + 3 cwt. Super.	1 cwt. S/Amm. + 3 cwt. Super.	1 cwt. S/Amm. + 168 lb. S/Pot.	168 lb. S/Pot. + 3 cwt. Super.	1 cwt. S/Amm.	91 lb. M/Amm. + 168 lb. S/Pot. + 3 cwt. Super.	155 lb. M/Pot. + 1 cwt. S/Amm. + 3 cwt. Super.	2 cwt. S/Amm. + 168 lb. S/Pot. + 3 cwt. Super.

Total Grain.

	A	B	C	D	E	F	G	H	K
I	23.5	23.0	28.0	31.0	29.75	43.75	36.0	36.5	43.25
II	32.0	41.5	36.25	25.25	22.25	34.75	36.75	35.0	29.25
Total	55.5	64.5	64.25	56.25	52.00	78.50	72.75	71.5	72.50

Total Straw.

	A	B	C	D	E	F	G	H	K
I	27.5	36.5	33.5	39.5	32.5	51.5	43.5	39.0	51.5
II	39.0	56.0	41.5	25.0	26.5	38.0	41.0	40.5	37.5
Total	66.5	92.5	75.0	64.5	59.0	89.5	84.5	79.5	89.0

Summary.

Average Yield per Acre.	Control	1 cwt. S/Amm. + 168 lb. S/Pot. + 3 cwt. Super.	1 cwt. S/Amm. + 3 cwt. Super.	1 cwt. S/Amm. + 168 lb. S/Pot.	168 lb. S/Pot. + 3 cwt. Super.	1 cwt. S/Amm.	91 lb. M/Amm. + 168 lb. S/Pot. + 3 cwt. Super.	155 lb. M/Pot. + 1 cwt. S/Amm. + 3 cwt. Super.	2 cwt. S/Amm. + 168 lb. S/Pot. + 3 cwt. Super.	General Average	Standard Error*
Grain, pounds ...	1388	1613	1606	1406	1300	1963	1819	1788	1813	1632.6	257.9
Straw, pounds ...	*1663*	*2313*	*1875*	*1613*	*1475*	*2238*	*2113*	*1988*	*2225*	*1944.4*	*6.9*
Grain, bushels ...	26.69	31.02	30.88	27.04	25.00	37.75	34.98	34.38	34.87	31.397	4.96
Straw, cwt.	*14.85*	*20.65*	*16.74*	*14.40*	*13.17*	*19.98*	*18.87*	*17.75*	*19.87*	*17.3611*	*2.73*
Grain, per cent. ...	85.0	98.8	98.4	86.1	79.6	120	111.4	109.5	111	100	15.8
Straw, per cent. ...	*85.5*	*118.9*	*96.4*	*82.9*	*75.9*	*115.1*	*108.6*	*102.2*	*114.4*	*100*	*15.74*
Total Produce, pounds	3051	3926	3481	3019	2775	4201	3932	3776	4038	3577	

* Standard Error not of certain validity, but the best available estimate.

https://doi.org/10.23637/ERADOC-1-84

New Zealand Field, 1926.

I				N			
D	*A*	*H*	*C*	*C*	*A*	*H*	*E*
F	*E*	*G*	*B*	*G*	*D*	*B*	*F*
H	*C*	*E*	*G*	*E*	*H*	*B*	*F*
B	*F*	*D*	*A*	*G*	*A*	*C*	*D*
III				IV			

SYSTEM OF REPLICATION: Randomised Blocks.

Area $\frac{1}{25}$ each plot.

Actual Weights in lb.

Block	*A* Super. + S/Amm. + S/Pot.	*B* Super. + S/Amm.	*C* S/Amm. + S/Pot.	*D* Super. + S/Pot.	*E* S/Amm.	*F* Super. + S/Pot. + M/Amm.	*G* Super. + S/Pot. + M/Pot.	*H* Control
Total Grain.								
I	104.625	93.375	94.75	111.625	101.25	103.625	91.625	103.00
II	92.625	94.75	89.625	92.25	74.5	89.5	97.625	67.375
III	95.125	97.875	106.375	111.25	90.25	105.625	96.5	109.00
IV	76.625	90.25	79.375	83.75	88.125	98.0	95.625	78.25
Total	369.000	376.25	370.125	398.875	354.125	396.75	381.375	357.625
Total Straw.								
I	182.5	189.5	180.0	182.0	185.5	192.5	193.0	169.0
II	161.5	168.5	162.0	159.5	150.0	162.5	169.5	128.5
III	179.0	199.0	208.5	178.5	173.5	191.5	187.0	171.0
IV	144.5	167.0	156.5	147.5	167.5	169.5	178.0	158.0
Total	667.5	724.0	707.0	667.5	676.5	716.0	727.5	626.5

Summary of Results.

Average Yield per Acre.	Super. + S/Amm. + S/Pot.	Super. + S/Amm.	S/Amm. + S/Pot.	Super. + S/Pot.	S/Amm.	Super. + S/Pot. + S/Amm.	Super. + S/Pot. + M/Pot.	Control	General Mean	Stand'd Error
Grain, pounds	2306	2352	2313	2493	2213	2480	2384	2235	2346.7	105.25
Straw, pounds	*4172*	*4525*	*4419*	*4172*	*4228*	*4475*	*4547*	*3916*	*4306.6*	*108.73*
Grain, bushels	44.35	45.22	44.49	47.94	42.56	47.69	45.84	42.98	45.13	2.02
Straw, cwt.	*37.25*	*40.40*	*39.45*	*37.25*	*37.75*	*39.96*	*40.60*	*34.96*	*38.45*	*0.97*
Grain, per cent.	98.27	100.20	98.57	106.22	94.30	105.65	101.57	95.24	100	4.48
Straw, per cent.	*96.87*	*105.07*	*102.60*	*96.87*	*98.18*	*103.91*	*105.58*	*90.92*	*100*	*2.52*
Total Produce, pounds ...	6478	6877	6732	6665	6441	6955	6930	6151	6653.4	

https://doi.org/10.23637/ERADOC-1-84

Long Hoos. Winter Oats. Season 1926.

COMPARISON OF NITROGENOUS MANURES.

W.S.W.

Block 1				Block 2				Block 3			
A	*D*	*B*	*C*	*C*	*A*	*D*	*B*	*D*	*C*	*A*	*B*

SYSTEM OF REPLICATION :—Randomised Blocks.
Plots $\frac{1}{40}$ acre ; dressings equivalent to 1 cwt. of Sulphate of Ammonia.

Actual Total Weights in lb.

Block	S/Amm. rate of 1 cwt. per acre A		Equivalent Muriate of Amm. B		Equivalent Urea C		No Nitrogenous Dressing D	
	Grain	Straw	Grain	Straw	Grain	Straw	Grain	Straw
I	67.375	*105.5*	80.00	*116.5*	82.75	*129.5*	61.875	*107.0*
II	77.625	*102.0*	81.375	*118.5*	86.75	*134.0*	71.375	*95.5*
III	72.25	*111.5*	71.375	*107.5*	67.0	*100.5*	59.25	*84.0*
Total	217.25	*329.0*	232.75	*342.5*	236.5	*364.0*	192.5	*286.5*

Summary.

Average Yield per Acre.	S/Amm.	M/Amm.	Urea	Control	Mean	S. E.
Grain, pounds	2897	3103	3153	2567	2930	108.039
Straw, pounds	*4387*	*4567*	*4853*	*3820*	*4407*	*113.284*
Grain, bushels	68.97	73.89	75.08	61.11	69.76	2.572
Straw, cwt.	*39.17*	*40.77*	*43.32*	*34.11*	*39.35*	*1.011*
Grain, per cent.	98.86	105.92	107.62	87.60	100.00	3.687
Straw, per cent.	*99.55*	*103.63*	*110.14*	*86.69*	*100.00*	*2.551*
Total Produce, pounds ...	7284	7670	8005	6387	7357	—

https://doi.org/10.23637/ERADOC-1-84

SEASONAL EFFECT OF PHOSPHATE AND NITROGEN.

Barley. Sawyer's Field, 1925.

Area of Plots $\frac{1}{20}$ acre.

S.W.

A	B	B	A	C	D	D	C
C	D	D	C	A	B	B	A
I		II		III		IV	

Total Weights in lb.

Block	1 cwt. Mur/Potash + 1 cwt. S/Amm.		1 cwt. Mur/Potash + 1 cwt. S/Amm. + 4 cwt. Super.		1 cwt. Mur/Potash		1 cwt. Mur/Potash + 4 cwt. Super.	
	A		B		C		D	
	Grain	Straw	Grain	Straw	Grain	Straw	Grain	Straw
I	127.25	*131.0*	135.25	*141*	98.0	*117.5*	110.25	*109.0*
II	112.0	*129.5*	131.0	*141*	103.75	*108.0*	104.50	*108.5*
III	122.75	*123.0*	136.25	*129*	97.25	*98.5*	99.25	*108.0*
IV	117.25	*106.0*	117.75	*125*	94.25	*104.5*	95.25	*102.0*
Total	479.25	*489.5*	520.25	*536*	393.25	*428.5*	409.25	*427.5*

Summary of Results

Average Yield per Acre.	1 cwt. Mur/Potash + 1 cwt. S/Amm. A	1 cwt. Mur/Potash + 1 cwt. S/Amm. + 4 cwt. Super. B	1 cwt. Mur/Potash C	1 cwt. Mur/Potash + 4 cwt. Super. D	General Mean	Standard Error*
Grain, pounds	2396	2601	1966	2046	2252	52.2
Straw, pounds	*2448*	*2680*	*2143*	*2138*	*2352*	*52.4*
Grain, bushels	46.08	50.02	37.81	39.35	43.32	1.0
Straw, cwt.	*21.86*	*23.93*	*19.13*	*19.09*	*21.0*	*0.5*
Grain, per cent.	106.4	115.5	87.3	90.8	100.0	2.3
Straw, per cent.	*104.1*	*114.0*	*91.1*	*90.9*	*100.0*	*2.2*
Total produce, pounds ...	4844	5281	4109	4184	4604.375	

* The Standard Error is not in this case of certain validity, but is the best available estimate.

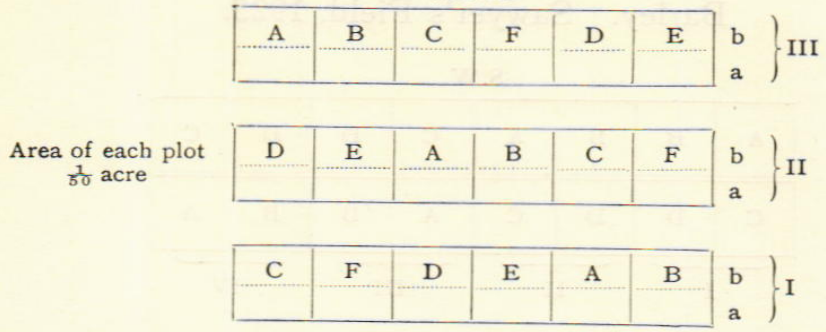
https://doi.org/10.23637/ERADOC-1-84

GREEN MANURING.

Oats (Grey Winter). Long Hoos, 1925.

Green Manures.

N.N.E.



Actual Weight in lb.

Blocks		F.Y.M. A	Mustard B	Trifolium C	Oats D	Vetches E	Control F
Grain.							
I	a	55.0	59.5	51.5	40.0	61.5	60.5
	b	49.5	62.0	50.0	42.5	59.0	55.0
II	a	42.5	46.0	43.5	33.0	45.5	51.0
	b	51.5	54.0	50.0	31.0	56.0	59.0
III	a	47.5	45.5	47.5	38.5	57.0	51.0
	b	49.5	54.5	48.5	32.0	39.0	51.5
Total		295.5	321.5	291.0	217.0	318.0	328.0
Straw.							
I	a	111.5	104.0	109.5	87.5	104.5	111.5
	b	109.5	114.0	89.5	75.0	108.0	89.0
II	a	81.0	84.5	86.0	59.5	99.0	101.0
	b	86.0	90.5	86.5	61.0	93.0	104.5
III	a	79.0	79.5	80.0	67.5	97.0	81.0
	b	86.0	88.5	84.5	60.5	110.5	86.0
Total		553.0	561.0	536.0	411.0	612.0	573.0

Summary.

Average Yield per Acre.	F.Y.M.	Mustard	Trifolium	Oats	Vetches	Control	General Average	Standard Error*
Grain, pounds	2462.5	2679.2	2425	1808.3	3650	2733.3	2459.7	82.1
Straw, pounds	*4608*	*4675*	*4467*	*3425*	*5100*	*4775*	*4508.3*	*158.8*
Grain, bushels	58.63	63.79	57.74	43.05	63.10	65.08	58.56	1.96
Straw, cwt.	*41.14*	*41.74*	*39.88*	*30.58*	*45.54*	*42.63*	*40.25*	*1.418*
Grain, per cent.	100.1	108.9	98.6	73.5	107.7	111.1	100	3.34
Straw, per cent.	*102.2*	*103.7*	*99.1*	*76.0*	*113.1*	*105.9*	*100*	*3.52*
Total produce, pounds	7071	7354	6892	5233	7750	7508	6968	—

* The Standard Error is not in this case of certain validity, but is the best available estimate.

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CULTIVATION EXPERIMENT.

Sawyer's Field. Swedes, 1926.

S.W. ROOTS

S1
F1
N1
S2
F2
N2
S3
F3
N3

SYSTEM OF REPLICATION :—Triplicate strips. Plots ¼ acre.

S—prepared by Simar rototiller.

F—usual implements, flat seed bed.

N—usual implements, sown on ridges.

NOTE.—Each strip was lifted in five equal portions and the weight of each strip was separately recorded.

Actual Weight of Roots in lb. No. of Roots.

	S	F	N	Total	S	F	N	Total
1	5531	6858	6475	18864	3720	3572	2877	10169
2	5347	6068	7200	18615	4037	2962	2501	9500
3	4909	5634	6160	16703	4081	3334	2642	10057
Total	15787	18560	19835	54182	11838	9868	8020	29726

Summary.

Average Yield per Acre.	S	F	N	Mean	S.E.
Number of Roots ...	15784	13157	10693	13212	82.6919
Number per cent. ...	119.47	99.59	80.93	100	6.2200
Weight in pounds ...	21049	24747	26447	24081	902.7803
Weight in tons	9.40	11.05	11.81	10.75	0.4030
Weight per cent.	87.41	102.76	109.83	100	3.7500

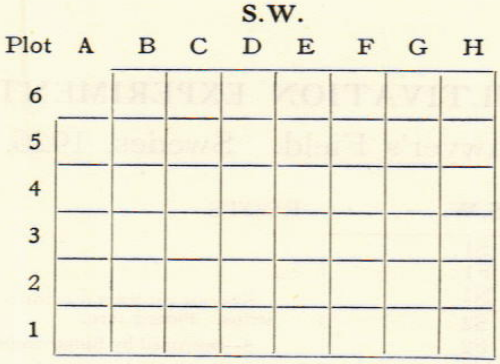
Plots cultivated with the Simar implement show significantly more roots, but a lower yield than the ridged land; flat cultivation is intermediate in both respects with yield not significantly less than the ridge cultivation.

https://doi.org/10.23637/ERADOC-1-84

UNIFORMITY TRIAL.

Wheat (Red Standard). Sawyer's Field, 1925.

Area of each plot .098 acre



Actual Weight in lb.

Plot	A lb.	B lb.	C lb.	D lb.	E lb.	F lb.	G lb.	H lb.	Total lb.
				Total Grain.					
6	—	229.00	202.625	197.375	170.875	187.250	202.250	162.50	1351.875
5	196.375	191.50	172.500	147.125	75.250	141.250	150.750	131.50	1206.250
4	198.750	184.25	206.375	133.250	72.125	73.250	82.000	89.00	1039.000
3	191.500	196.50	166.375	168.625	117.375	113.750	88.375	134.50	1177.000
2	132.500	142.50	155.875	86.750	103.625	140.750	161.250	164.75	1088.000
1	195.500*	165.50	124.000	72.000	103.500	171.000	185.250	197.00	1018.250
Total	719.125	1109.250	1027.750	805.125	642.750	827.250	869.875	879.25	6880.375
				Total Straw.					
6	—	282.5	247.0	252.0	213.0	229.5	247.0	200.00	1671.0
5	253.0	230.5	215.0	200.0	104.5	192.0	193.0	174.00	1562.0
4	252.0	229.5	263.5	180.0	98.0	99.5	114.5	124.00	1361.0
3	248.0	245.0	211.5	219.0	146.5	151.0	114.5	180.50	1516.0
2	170.5	184.5	200.5	126.5	138.5	192.0	229.5	221.50	1463.5
1	205.5*	219.0	171.0	110.0	136.0	224.0	253.5	253.00	1366.5
Total	923.5	1391.0	1308.5	1087.5	836.5	1088.0	1152.0	1153.00	8940.0

* One of the weighings of Plot A1 was not recorded.

Summary.

	Grain. lb.	Grain. bushels.	Straw. lb.	Straw. cwt.
Average yield per acre	1526	25.4	1983	17.7
Standard deviation	65.2	1.09	77.0	0.69
Standard deviation per cent. ...	4.2		3.9	

https://doi.org/10.23637/ERADOC-1-84

Sawyers Field.
Uniformity Experiment, 1926. Swedes.

Plot	A	B	C	D	E	F	G	H
6	—	613.5	601.5	816.5	899.0	882.0	890.0	782.5
	—	*3608*	*3936*	*4372*	*4488*	*4464*	*4436*	*4120*
	—	**1716**	**1689**	**1688**	**1665**	**1737**	**1674**	**1841**
5	600.0	604.5	632.5	634.5	841.0	691.0	665.0	978.5
	4080	*4228*	*4452*	*4566*	*4594*	*4443*	*4504*	*4624*
	1559	**1559**	**1655**	**1667**	**1678**	**1694**	**1708**	**1540**
4	600.5	599.5	575.5	568.0	606.5	794.5	741.0	762.5
	4056	*3988*	*4188*	*4296*	*4327*	*4420*	*4402*	*4435*
	1507	**1593**	**1554**	**1528**	**1530**	**1596**	**1480**	**1499**
3	611.5	639.5	718.0	707.0	676.0	614.5	654.5	730.5
	4056	*4046*	*3996*	*4106*	*4292*	*4108*	*3950*	*4128*
	1506	**1448**	**1502**	**1448**	**1474**	**1542**	**1497**	**1484**
2	791.5	741.5	683.0	719.5	758.0	641.5	594.5	613.5
	4224	*4164*	*4228*	*4284*	*4276*	*4004*	*3956*	*4019*
	1497	**1416**	**1519**	**1482**	**1452**	**1438**	**1410**	**1362**
1	478.0	522.5	568.0	586.0	512.0	497.0	541.0	509.5
	3811	*4172*	*4019*	*4279*	*3547*	*3231*	*4143*	*3807*
	1360	**1362**	**1394**	**1379**	**1387**	**1355**	**1474**	**1534**

Figures in ordinary type = Actual Weight of Leaves in lb.
,, italics = ,, ,, Roots ,,
,, heavy type = ,, No. of Roots.

SUMMARY.

	Roots lb.	Roots tons	Leaves lb.	Leaves tons	Roots No.
Average Yield per acre ...	*41675*	*18.6*	6700	3.0	**15335**
Standard Deviation ...	*2793*	*1.2*	1100	0.4	**1179**
Standard Deviation per cent.	*6.7*		16.4		**7.7**

https://doi.org/10.23637/ERADOC-1-84