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AN ROINN TAILTE AGUS TALMHAÍOCHTA
(DEPARTMENT OF LANDS AND AGRICULTURE)

REPORT

ON THE

SUGAR BEET EXPERIMENTS,

1927. in Irland

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1928.

SUGAR BEET EXPERIMENTS, 1927.

PREVIOUS TRIALS.

As a result of experiments on the cultivation of sugar beet conducted by the Department during the three seasons 1911-12-13 it was shown—

(1) That with proper care and cultivation satisfactory crops of sugar beet could be grown in Ireland.

(2) That the most satisfactory results were likely to be obtained where the beet was grown in narrow moulded-up drills.

(3) That the heaviest yields were obtained where a top-dressing of nitrate of soda was applied to the crop in addition to a dressing of farmyard manure and a complete mixture of artificial manures.

In view of the Government's decision to promote the establishment of the sugar beet industry in this country the Department arranged for the conduct, during the seasons of 1925 and 1926, of a number of experiments with sugar beet. These tests were carried out under the supervision of the Agricultural Instructors in each county in the Saorstat and also at the Department's Farms. The results of these experiments, which were published in the Department's Journal, Vol. XXV., No. 1, and Vol. XXVI., No. 1, and also in leaflet form, showed—

(1) That of the four varieties of sugar beet tested the Dutch variety (Kuhn & Co.'s " P ") and the German variety (Klein Wanzleben Original " Z ") proved to be somewhat superior, particularly in regard to sugar content, to the Danish variety (The Scandinavian Seed Company's " K 7866 ") and the French variety (Vilmorin's Improved Selection " B ").

(2) That satisfactory crops of sugar beet can be grown on a great variety of soils and that soils capable of growing satisfactory root crops may be considered suitable for the production of sugar beet.

(3) That the position which the sugar beet crop occupied in the rotation did not appear to have any material influence on the yield or sugar content of the beet.

(4) That, on most soils it was desirable to apply a moderate dressing of farmyard manure, either to the beet crop or to the preceding crop, in addition to a complete mixture of artificial manures.

(5) That the time of the year at which farmyard manure was applied for the sugar beet crop, *i.e.*, whether the manure was ploughed in during the winter or was applied in the drills immediately before the seed was sown, did not appear to exercise any appreciable influence on the shape of the roots produced or on the value of the crop as determined by its yield and sugar content.

(6) That a dressing of artificial manures consisting of 4 cwt. superphosphate (35%), 4 cwt. kainit, and 1 cwt. sulphate of ammonia per statute acre applied immediately before sowing the sugar beet seed gave quite satisfactory returns as compared with the results obtained from certain modifications of this dressing. No benefit appears to have been derived from the application of the phosphatic and potassic manures in the winter instead of in the spring.

(7) That a top-dressing of nitrate of soda at the rate of 1 cwt. per statute acre applied after the crop was singled increased the average yield slightly without lowering to an appreciable extent the average sugar content of the beet. That the average increase in the value of the crop was barely sufficient to pay for the cost of the top-dressing but it should be observed that this top-dressing proved useful in stimulating the growth of crops which were backward because of the attacks of mangel fly or as a result of unfavourable soil or weather conditions.

(8) That thorough and frequent after-cultivation was necessary for the maximum development of the sugar beet crop.

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THE 1927 EXPERIMENTS.

The Department again arranged for the conduct, during the 1927 season, of two series of experiments with sugar beet:—

(1) Experiments under the supervision of the Agricultural Instructors in each county of the Saorstat; and

(2) Experiments at the Department's Farms and at the Albert Agricultural College (University College, Dublin).

I.—COUNTY EXPERIMENTS.

The experiments conducted by the Agricultural Instructors consisted of two series:—

(a) Variety and top-dressing trials.

(b) Manurial experiments.

VARIETY AND TOP-DRESSING TRIALS.

These trials were conducted by the Agricultural Instructors on lines similar to those adopted in the case of the sugar beet trials carried out in 1925 and 1926. The general conditions of the scheme of experiments were as follows:—

(1) That the area of the experimental plot at each centre should be one statute acre, except in the case of plots laid down in Counties Cavan, Donegal, Galway, Leitrim, Longford, Mayo, Monaghan, Roscommon, Sligo, where the area of each plot should be one-quarter statute acre.

(2) That the experimental plot at each centre should be sub-divided into 5 equal parts and cropped with five varieties of sugar beet, namely,—Danish (The Scandinavian Seed Co.'s "K 7866," Dutch (Kuhn & Co.'s "P"), French (Vilmorin's Improved Selection "B"), German (Klein Wanzleben Original "Z") and Wohanka (Wohanka & Co., Prague).

(3) That the sugar beet should be grown on land which in the previous season had been under tillage, preferably a corn crop, save that in districts where it is customary to grow roots after lea the beet might occupy the position usually taken by the root crop.

(4) That sugar beet grown on land which in the previous season had borne a corn crop should be manured with farmyard manure at the rate of about twelve tons per statute acre; a similar dressing to be given in the case of plots laid down on "manured" land, if considered necessary.

(5) That the following dressing of artificial manures should be applied at the time of sowing the crop, irrespective of the previous crop or manuring—

4 cwt. Superphosphate (35%)	Per statute acre.
4 cwt. Kainit	
1 cwt. Sulphate of Ammonia	

(6) That one-half of each sub-plot (*i.e.*, one half of the area under each of the five varieties of sugar beet) should be top-dressed, after the crops were singled, with nitrate of soda at the rate of 1 cwt. per statute acre.

(7) That the land on which the plots were to be laid down should be ploughed deeply, care being taken not to bring to the surface sub-soil containing substances deleterious to plant growth.

(8) That the seed bed should be as finely prepared as is customary in the case of the turnip crop.

(9) That the width of the drills should not exceed 24 inches if farmyard manure was applied immediately before the crop was sown and the width of the drills should not exceed 22 inches if farmyard manure was ploughed in, or if it was not applied directly to the sugar beet crop.

(10) That the seed should be sown at the rate of 18 lb. per statute acre, and not later in each district than is customary in the case of mangels, or as soon thereafter as a proper seed bed could be prepared.

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(11) That the drills should be horse-hoed at least once within a month from the date of sowing the crop and that, if necessary, this operation should be repeated before the crop was singled.

(12) That the plants should be singled to nine inches apart as soon as they had developed four leaves, exclusive of the cotyledons or primary seed leaves.

(13) That subsequent to singling, and until the leaves had met across the drills, the crop should be hand-hoed and horse-hoed as often as might be necessary to check completely the growth of weeds, and to maintain the surface soil in a loose, friable condition.

(14) That the crop should be moulded up when the foliage of the plants had reached such a stage that further cultivation was no longer necessary or practicable.

(15) That the yield of the crop on the various sub-plots should be determined as soon as the crop had reached maturity.

(16) That representative samples drawn from the various sub-plots should be forwarded to the State Laboratory for analysis.

In accordance with this Scheme experiments were conducted at 139 centres throughout the Saorstat. The number of experimental centres in each county is shown in Table I.

TABLE I.

County.	Number of Centres.	
LEINSTER.		
Carlow	4	
Dublin	4	
Kildare	4	
Kilkenny	4	
Laoighis	4	
Longford	4	
Louth	4	
Meath	4	
Offaly	4	
Westmeath	4	
Wexford	4	
Wicklow	4	
	—	48
MUNSTER.		
Clare	4	
Cork	18	
Kerry	7	
Limerick	8	
Tipperary, N.	4	
,, S.	4	
Waterford	4	
	—	49
CONNAUGHT.		
Galway	8	
Leitrim	4	
Mayo	8	
Roscommon	6	
Sligo	4	
	—	30
ULSTER.		
Donegal	4	
Cavan	4	
Monaghan	4	
	—	12
TOTAL		139

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Weather Conditions.

From 20th November, 1926, until the middle of January, 1927, the rainfall was considerably below normal. The last fortnight in January was wetter than usual, but February was a comparatively dry month. From the latter end of February up to nearly the middle of April the weather was comparatively mild but very wet. The following eight weeks, excepting the first week of May, were abnormally dry. During the third week of May and throughout the month of June harsh, chilly weather prevailed. The deficiency in rainfall was relieved about mid-June and throughout the month of July conditions were quite favourable for growth. From the end of the first week of August to the 1st of October the rainfall was excessive and air temperatures were generally below normal. The first 3 weeks of October were comparatively dry but night temperatures were low. Then ensued a very wet fortnight followed by five weeks of rather dry weather during which severe night frosts were frequent. During the latter half of December the weather was remarkably severe and heavy frosts and snowfalls occurred generally. In January, 1928, the rainfall was excessive and the ground remained sodden up to the close of the 1927-28 campaign.

Preparation of the Land for Seeding.

The dry weather which prevailed during the winter facilitated ploughing operations, but further cultivation in preparation for the sugar beet crop was backward and heavy soils in particular were prepared with some difficulty owing to the wet period of weather which extended from mid-February to mid-April. In most cases farmyard manure was put in the drills immediately before the seed was sown but at a few centres it was applied in winter before the land was ploughed. Owing to the weather conditions prevailing throughout the spring greater difficulty was experienced in producing a fine seed bed and in making the narrow drills recommended for sugar beet than in the two previous seasons.

Seeding.

In addition to the four varieties of seed which were included in the 1925 and 1926 trials a fifth variety, Wohanka, produced by Messrs. Wohanka & Co. of Prague, was included in the 1927 trials. Before the seed was despatched to the plot-holders a representative bulk sample of each of the five varieties was drawn and tested for germination at the Department's Seed Testing Station with the following results :—

Variety.	*Germination per cent.*
Danish (Scandinavian Seed Co. K 7866)...	115
Dutch (Kuhn & Co. P)	185
French (Vilmorin's Impd. Selection B) ...	153
German (Klein Wanzleben Original Z) ...	200
Wohanka (Wohanka & Co., Prague) ...	175

The weather during the last fortnight of April was quite favourable for the sowing of beet, but less than 12 per cent. of the plots were sown during that period mainly on account of difficulty in preparing the land. The first week of May was wet, but during the remainder of the month the weather was dry and fine. Up to the 10th of May less than 60 per cent. of the plots had been sown and after that date, when the dry weather became settled, the surface soil was not in good condition for the sowing and germination of beet seed. In fact, germination was irregular at most of the centres where land was prepared and the seed was sown during the second and third weeks of May, Seed sown at still later dates did not, as a rule, germinate until after the abundant rainfall between 5th and 18th June. With a single exception, all plots were sown before 1st June.

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Singling and after-cultivation.

Singling of the crop at the majority of centres was carried out when the plants had developed four leaves exclusive of the two primary seed leaves. On the average, the plants reached this stage of growth within 6 or 7 weeks after the date of sowing but the average period between sowing and singling was extended to 9 weeks in the case of the 15 centres where the crop was sown in April. Under favourable conditions of weather and soil the beet crop should be ready for singling within about 5 weeks after sowing but in many cases wet weather in March and April interfered with the preparation of a fine seed bed; dry weather in May delayed germination of the seed; and very cool weather in June retarded growth of the braird. As a result the crop was not singled in a number of cases until 8 weeks or more after it was sown. The rather wet weather which prevailed throughout the period during which the crop required after-cultivation rendered the control of weeds somewhat difficult, but only a few cases were reported where the crop received inadequate attention as regards after-cultivation or the moulding up of the drills before the leaves met across the furrows.

Harvesting.

The most reliable indication of the ripeness of sugar beet when grown in this country is afforded by periodical analyses of specially selected samples of roots in order to determine the rate of increase in growth and in sugar content. For this purpose the Department carried out during the period from the end of August, 1927, to the middle of February, 1928, a series of fortnightly analyses of the 1927 crop on samples drawn from 16 centres representative of all parts of the Saorstat. The results of these analyses indicated that, as in previous years, favourable results might be expected by obtaining weighings and samples from the experimental plots during the month of November and it was, accordingly, decided to complete this work as far as possible during that month. The procedure adopted in ascertaining the yield of the crop on the various sub-plots was as follows :—

An area of two statute perches representative of the general crop on each sub-plot was accurately measured off. The beets were lifted by hand, with the aid of a fork where necessary. Those which had bolted or were abnormally small were discarded. All loosely adhering soil was removed by scraping the roots with the back of the topping knife, after which the leaves and crown were cut off squarely at the point where the lowest leaf had originally appeared. When the roots from the measured area of two statute perches were scraped and topped, one quarter, by weight, of the roots was selected, having due regard to size and shape. From the roots, so selected, any branches or fangs, or portions thereof, of the thickness of an ordinary lead pencil were cut off, after which each root was thoroughly cleaned by washing and scrubbing. From the weight of such washed roots the "factory weight" for the produce of the whole sub-plot was then calculated.

After the roots had been weighed to ascertain the yield, a thoroughly representative sample consisting of from six to nine of the topped and washed roots from each sub-plot was despatched to the State Laboratory in Dublin, where, immediately after arrival, each sample was analysed for sugar content in accordance with the usual practice adopted by beet sugar factories.

Of the 139 centres where experiments were laid down complete results were obtained from 127 centres. At 84 of these centres a top-dressing of nitrate of soda at the rate of 1 cwt. per statute acre was applied to one half of each sub-plot in accordance with the conditions of the scheme as already set out. At 32 other centres, where the crop was backward in growth or where it was thought that the attacks of mangel fly were likely to interfere with the development of the crop, a top-dressing of nitrate of soda at the rate of 1 cwt. per statute acre was applied to the entire plot. At the remaining 11 centres supplies of nitrate of soda were not available and, consequently no top-dressing was applied to any portion of the plots.

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From 12 centres at which the experiments were conducted complete results were not obtained for the following reasons :—

At one centre in County Leitrim the soil was heavy and retentive and, owing to the wet season, the crop failed to such extent that no weighings or samples were taken. The crops on the plots at 3 centres located in Offaly, Meath and Longford were so irregular and patchy that it was impossible to obtain reliable weighings from the different sub-plots. At one centre in Mayo and at two centres in Galway reliable results were not obtained owing to errors in the cultivation of the crop. At three centres in Roscommon, Galway and Cavan, respectively, the crops grown on the experimental plots were lifted before weighings and samples could be obtained. At one centre in Kerry and at another in Monaghan the crop failed largely through neglect of cultivation and reliable records could not be obtained from the different sub-plots.

Detailed particulars in respect of :—

(*a*) the centres where only half of each plot was top-dressed with nitrate of soda at the rate of 1 cwt. per statute acre.

(*b*) the centres where the entire plot was top-dressed with nitrate of soda at the rate of 1 cwt. per statute acre.

(*c*) the centres where a top-dressing of nitrate of soda was not applied, are shown in Tables II, III and IV, respectively.

Summaries of the results appearing in Tables II and III are shown in Tables V and VI, respectively.

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TABLE

SHOWING PARTICULARS IN RESPECT OF CENTRES WHERE ONLY HALF

No.	Name and Address of Plotholder	Nature of Soil	Crop grown on land in 1926	Manuring				Time of application of F.Y.M.	Date of Sowing	Date of Singling	Average width of drills	Date of Application of Nitrate of Soda	"Stand" of Crop	Date of weighing of Crop	Date of analysis of Samples
				Farm-yard Manure	Super-phosphate 35%	Kainit	Sulphate of Ammonia				Inches				
				Tons	Cwt.	Cwt.	Cwt.								
	Co. Carlow.														
153	Abraham, William, Paulville, Tullow.	Loam	Oats	12	4	4	1	Spring	16 May	28 June	23	11 July	Regular	1 Dec.	5 Dec.
112	Nolan, Patrick, Monaughrim, Clonegal.	Peaty Loam	Oats	12	4	4	1	Spring	21 May	4 July	22½	9 July	Patchy	23 Nov.	25 Nov.
84	Byrne, Thomas, Rathoe, Tullow.	Loam	Potatoes	None	4	4	1	—	9 May	20 June	23	5 July	Regular	16 Nov.	18 Nov.
51	Finnegan, Bernard, Rathvilly.	Loam	Oats	12	4	4	1	Spring	18 May	30 June	23	7 July	Regular	9 Nov.	12 Nov.
	Co. Dublin.														
81	Sheridan, M. J., Bealinstown, Swords.	Clay Loam	Turnips	12	4	4	1	Spring	7 May	24 June	24	24 June	Regular	15 Nov.	18 Nov.
70	Hughes, W., Rathfarnham.	Loam	Potatoes	12	4	4	1	Spring	6 May	15 June	24	20 June	Regular	9 Nov.	15 Nov.
43	Malone, Miss, Hillsboro' Ho., Lucan.	Loam	Oats	12	4	4	1	Spring	23 April	1 July	24	1 July	Patchy	3 Nov.	10 Nov.
	Co. Kildare.														
168	Cope, Samuel H., Abbeyview, Castledermott.	Loam	Oats	14	4	4	1	Spring	28 May	7 July	24	12 July	Regular	9 Dec.	12 Dec.
132	Greene, John N., Kilkea Lodge, Mageney.	Heavy Loam	Barley	13	4	4	1	Spring	6 May	23 June	24	1 July	Regular	26 Nov.	29 Nov.
91	Doyle, Joseph, Sillagh, Naas.	Medium Loam	Turnips	None	4	4	1	—	18 May	30 June	21	4 Juyl	Regular	17 Nov.	19 Nov.
55	Hayden, Mrs. A., Castleroe Lodge, Mageney.	Clay Loam	Barley	12	4	4	1	Autumn	23 May	1 July	24	8 July	Patchy	9 Nov.	12 Nov.
	Co. Kilkenny.														
169	Manning, Thomas, Glenview, Johnswell.	Light Loam	Oats	12	4	4	1	Spring	25 May	16 July	23	21 July	Regular	10 Dec.	12 Dec.
164	Drennan, Michael, Rathlogan, Johnstown.	Medium Loam	Turnips	None	4	4	1	—	11 May	25 June	21	28 June	Regular	7 Dec.	9 Dec.
155	Murphy, Martin J., Rathclough, Danesfort.	Medium Loam	Potatoes	None	4	4	1	—	16 May	24 June	22	28 June	Regular	30 Nov.	5 Dec.
83	Lynch, John, Parksgrove, Ballyraggett.	Medium Loam	Potatoes	None	4	4	1	—	18 May	25 June	21	28 June	Regular	16 Nov.	18 Nov.
	Laoighis.														
89	Kenna, John, Pallas, Portlaoighise.	Slightly Heavy Loam	Barley	14	4	4	1	Winter	14 May	5 July	22	10 July	Patchy	18 Nov.	19 Nov.
60	Campion, Michael, Clonmeen Sth., Rathdowney	Medium Loam	Barley	14	4	4	1	Winter	16 May	26 June	22	27 June	Regular	10 Nov.	12 Nov.
27	Gowing, Thomas, Kilminchy, Portlaoighise.	Light Loam	Barley	14	4	4	1	Spring	6 May	18 June	24	20 June	Patchy	5 Nov.	8 Nov.
2	Phelan, William, Farran-Eglish, Ballacolla.	Medium Loam	Potatoes	12	4	4	1	Winter	7 May	22 June	23½	24 June	Regular	2 Nov.	4 Nov.
	Co. Louth.														
57	McKevitt, Thomas, Carrickroben, Kirkerley.	Light Clay Loam	Potatoes	12	4	4	1	Autumn	17 May	1 July	22½	14 July	Fairly Regular	9 Nov.	12 Nov.
	Co. Meath.														
163	McManus, James, Augherskea, Drumree.	Clay Loam	Oats	None	4	4	1	—	4 June	8 and 9 July	24	11 July	Regular	6 Dec.	8 Dec.
118	Gerrard, Major T. C., Gibbstown, Navan.	Clay Loam	Oats	12	4	4	1	Winter	9 May	16 June	24	22 June	Regular	24 Nov.	25 Nov.
108	Loughran, Henry, Dowdstown, Kilcarne, Navan.	Clay Loam	Root Crop	None	4	4	1	—	10 May	16 June	24	21 June	Regular	22 Nov.	23 Nov.
	Offaly														
144	Scally, Joseph, Ballycommon, Daingean.	Loam	Turnips	None	4	4	1	—	16 May	30 June	23	15 July	Regular	30 Nov.	2 Dec.
96	Fox, Michael, Agharney, Tullamore.	Sandy Loam	Turnips	None	4	4	1	—	19 May	4 July	24½	7 July	Regular	18 Nov.	21 Nov.
76	Foy, John, Welsh Island, Geashill.	Medium Loam	Barley	12	4	4	1	—	7 May	27 June	23½	4 July	Regular	16 Nov.	17 Nov.
	Co. Westmeath.														
158	Daly, Denis, Walshestown, Mullingar.	Medium Loam	Potatoes	12	4	4	1	Spring	9 May	14 June	24	16 June	Regular	5 Dec.	7 Dec.
147	The Earl of Longford, The Rt. Hon., Pakenham Hall, Castlepollard.	Heavy Loam	Turnips	10	4	4	1	Spring	9 May	11 June	24	14 June	Patchy	1 Dec.	2 Dec.
146	Lynch, John, Edmonton, Killucan.	Medium Loam	Potatoes	12	4	4	1	Spring	4 May	13 June	24	16 June	Patchy	1 Dec.	2 Dec.
145	Cole, James, Coralstown, Killucan.	Gravelly Loam	Potatoes	—	6	6	2	—	3 May	9 June	24	13 June	Regular	1 Dec.	2 Dec.
	Co. Wexford.														
28	Kinsella, William, Crosstown, Wexford.	Heavy Clay	Oats	20	4	4	1	Autumn	21 May	12 July	24	20 July	Regular	7 Nov.	8 Nov.
41	Pettit, Thomas, Ballyduskar, Killinick.	Sandy Loam	Potatoes	None	6	6	2	—	6 May	21 June	22	1 July	Regular	8 Nov.	10 Nov.
54	Furlong, John J., Littlegraigue, Duncormick.	Clay Loam	Potatoes	None	4	4	1	—	20 May	5 July	22	12 July	Regular	11 Nov.	12 Nov.
86	Deacon, Henry, Coolaught, Clonroche.	Shingly Loam	Potatoes	None	4	4	1	—	9 May	21 June	22	28 June	Regular	18 Nov.	19 Nov.
	Co. Wicklow.														
165	Langrell, Isaac, Killinure, Coolkenno, Tullow.	Moory Loam	Potatoes	12	4	4	1	Spring	18 May	4 July	23	15 July	Patchy	7 Dec.	10 Dec.
161	Byrne, Mrs. A. M., Ballyhane Ho., Redcross.	Rich Loam	Oats	12	4	4	1	Spring	17 May	6 July	23	14 July	Slightly Patchy	6 Dec.	8 Dec.
122	Byrne, C. M., Ballykellivane, Glenealy.	Medium Loam	Oats	12	4	4	1	Spring	21 May	4 July	23	11 July	Regular	25 Nov.	28 Nov.
94	Byrne, Matthew, Tinorin, Baltinglass.	Medium Loam	Turnips	12	4	4	1	Spring	19 May	1 July	22	14 July	Regular	18 Nov.	21 Nov.
	Co. Clare.														
33	Hehir, John, Clover Hill, Bunratty.	Heavy Loam	Oats	12	4	4	1	Spring	10 May	23 June	24	2 July	Regular	8 Nov.	9 Nov.
24	Enright, John, Craggalough Ho. Six-Mile-Bge.	Medium Loam	Oats	12	4	4	1	Spring	7 May	18 June	24	24 June	Regular	4 Nov.	7 Nov.
	Co. Cork.														
125	Coffey, Timothy, Church Hill, Enniskeane.	Medium Loam	Oats	12	4	4	1	Spring	25 April	7 to 13 June	22	28 June	Regular	26 Nov.	28 Nov.
44	Duggan, Cornelius, Greenfield, Ballincollig.	Heavy Alluvial Loam	Oats	12	4	4	1	Spring	4 May	14 to 18 June	22	27 June	Regular	9 Nov.	10 Nov.
49	Barten, W. T., Ballinphellc, Upton.	Heavy Sandstone Loam	Oats	12	4	4	1	Spring	29 April	11 to 18 June	24	27 June	Regular	9 Nov.	11 Nov.

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II.

OF EACH PLOT WAS TOP-DRESSED WITH NITRATE OF SODA.

TOP-DRESSED WITH NITRATE OF SODA.											NOT TOP-DRESSED WITH NITRATE OF SODA.									
Yield per Statute Acre (Factory Weight)					Sugar Content of Roots						Yield per Statute Acre (Factory Weight)					Sugar Content of Roots				
Danish Variety	Dutch Variety	French Variety	German Variety	Wohanka Variety	Danish Variety	Dutch Variety	French Variety	German Variety	Wohanka Variety		Danish Variety	Dutch Variety	French Variety	German Variety	Wohanka Variety	Danish Variety	Dutch Variety	French Variety	German Variety	Wohanka Variety
T. C.	T. C.	T. C.	T. C.	T. C.	%	%	%	%	%		T. C.	T. C.	T. C.	T. C.	T. C.	%	%	%	%	%
9 19	10 8	9 16	10 9	9 14	16·8	17·8	17·5	17·1	16·5		9 11	10 6	9 13	10 1	9 9	17·5	17·2	17·8	17·5	17·5
8 3	8 12	8 0	8 11	7 17	17·3	17·1	17·1	18·1	17·7		7 17	8 2	7 18	8 4	7 15	16·2	17·4	17·4	16·6	17·5
10 4	10 15	9 19	10 16	9 18	17·9	18·3	18·0	18·7	18·3		10 2	10 8	9 16	10 13	9 17	18·1	18·5	18·0	18·3	18·9
9 12	10 13	9 14	10 11	9 12	17·7	18·3	17·0	17·4	18·2		9 13	10 8	9 7	10 6	9 3	17·1	18·2	17·0	18·0	18·4
12 17	14 17	11 9	12 11	11 9	18·3	18·0	17·8	18·9	17·8		11 9	12 14	10 17	13 6	11 14	18·0	17·9	17·7	17·8	18·0
9 11	8 3	11 0	8 9	7 11	18·3	18·0	17·5	14·3	13·8		10 0	8 15	11 17	9 3	7 9	13·0	13·4	14·2	13·8	15·3
10 3	8 11	7 7	9 14	8 8	16·0	17·5	16·5	17·9	16·3		8 4	5 8	8 7	9 5	7 3	17·9	18·2	15·4	17·0	18·5
8 16	9 5	8 19	8 14	8 6	18·2	17·9	17·0	17·3	18·6		8 10	9 0	8 16	8 13	8 4	17·8	17·8	17·8	17·6	18·0
11 0	13 6	11 16	12 6	11 2	17·2	17·8	17·5	18·9	18·5		10 10	12 9	11 4	12 9	10 7	18·0	18·7	17·7	18·9	18·2
9 12	10 13	10 3	9 6	8 7	17·5	18·5	18·0	18·4	18·9		8 19	10 7	10 1	9 4	8 2	17·7	18·4	18·1	17·9	18·3
8 1	9 12	9 3	8 18	7 15	17·2	17·4	18·4	18·6	19·0		8 3	9 10	9 0	8 9	7 10	18·4	18·5	17·6	18·9	18·3
7 0	7 2	8 0	7 0	7 15	17·5	17·9	16·0	17·8	18·9		7 15	7 12	8 18	7 1	8 15	17·4	18·8	16·6	18·1	18·6
9 9	10 6	10 0	10 6	8 18	17·7	18·4	18·0	19·0	19·2		9 3	10 6	8 18	9 15	8 12	17·3	18·5	17·8	18·7	19·0
12 0	13 9	12 0	12 16	10 0	17·8	18·3	17·7	18·6	18·9		12 0	12 12	12 4	13 3	9 15	18·0	18·2	17·5	19·1	19·6
11 3	10 18	10 0	11 9	10 0	18·3	19·3	17·6	18·3	19·0		9 15	9 0	9 3	10 18	8 6	19·9	19·9	18·0	18·7	19·3
11 12	13 6	10 17	10 17	9 15	17·7	17·5	16·5	18·0	18·5		11 11	12 10	10 7	10 9	9 18	17·2	17·7	17·1	18·7	18·1
11 3	11 8	9 14	10 17	10 6	18·1	19·4	18·2	19·2	19·7		10 0	11 3	10 6	10 0	10 0	18·2	18·6	19·4	18·3	19·3
12 6	13 3	12 0	12 6	9 8	18·3	17·9	17·7	18·5	18·2		10 11	12 11	10 0	9 11	9 10	18·1	18·0	17·6	17·3	17·7
13 0	12 6	13 3	13 0	11 0	18·2	13·4	16·8	13·7	14·7		13 8	11 11	13 5	12 18	11 11	12·8	13·7	14·9	13·2	14·2
10 17	11 19	11 8	10 2	9 10	17·6	17·9	17·4	18·1	18·0		10 5	11 10	11 4	9 4	8 11	17·5	18·2	17·8	18·1	18·1
13 2	11 16	12 14	15 8	15 2	15·2	16·3	15·7	17·0	16·6		12 14	11 8	12 6	15 7	14 11	15·7	16·2	15·8	16·3	16·4
14 17	16 0	14 11	16 7	17 8	17·0	16·5	16·0	17·1	16·7		13 14	15 8	14 5	16 11	17 2	17·5	17·0	16·8	17·7	17·2
13 14	16 11	14 17	19 11	19 10	15·8	16·5	17·4	17·5	18·7		13 6	16 2	14 10	19 15	19 5	17·5	18·5	17·6	18·7	19·0
11 4	10 13	9 16	10 8	9 4	17·5	18·3	17·2	18·7	18·5		10 3	9 10	9 16	11 0	10 2	17·5	17·5	18·1	18·7	19·0
10 0	12 1	11 6	11 8	10 3	17·9	17·8	17·5	17·5	18·6		10 19	11 7	11 2	10 12	11 0	17·4	18·1	17·0	18·4	18·6
9 18	10 3	10 3	10 8	8 3	17·3	19·0	17·7	18·6	19·0		10 1	9 15	9 0	10 0	8 17	17·8	18·6	19·2	19·0	19·2
12 2	12 4	13 2	14 16	14 18	17·2	16·7	14·6	16·6	16·8		11 10	11 13	12 1	12 16	13 2	17·4	17·5	14·8	17·6	17·1
10 6	10 12	10 17	11 5	10 19	16·7	16·6	16·7	16·9	17·1		9 7	9 18	10 5	10 17	10 2	16·4	17·4	17·5	17·5	16·8
10 7	9 18	10 2	11 3	11 1	16·4	16·4	15·6	18·0	17·2		9 18	9 12	9 16	10 4	10 10	16·7	16·6	16·7	16·9	17·1
15 2	14 6	14 1	15 10	15 1	17·3	17·3	17·1	17·5	17·2		13 10	13 2	13 3	13 16	13 8	17·4	16·3	18·0	18·5	18·5
11 9	12 0	13 9	11 9	10 0	15·2	14·7	15·7	15·2	15·6		11 3	11 4	12 6	11 0	8 5	14·0	15·6	14·9	15·9	15·2
18 0	18 0	15 0	18 0	13 5	16·9	15·5	17·6	15·6	18·2		15 12	16 0	14 10	17 5	13 3	17·2	18·3	17·1	18·5	18·5
10 15	12 6	11 15	11 15	10 3	16·9	16·6	17·0	17·3	16·7		10 9	11 15	11 6	11 3	10 0	17·0	17·3	15·9	17·5	17·5
11 15	13 6	12 6	12 15	10 15	17·3	18·9	18·0	18·4	18·1		12 18	12 15	12 5	13 10	10 6	18·0	18·2	18·8	18·5	18·8
8 2	8 8	8 2	8 9	8 7	20·3	18·4	20·3	17·1	19·0		8 3	8 4	7 16	7 17	8 5	19·3	18·2	19·7	17·1	18·0
9 0	8 16	9 2	8 16	9 2	17·5	18·8	18·3	19·4	17·7		8 16	9 3	8 18	9 0	9 1	18·3	18·3	17·9	18·9	18·8
8 18	9 10	9 0	9 6	8 19	16·1	16·6	17·0	16·8	18·6		9 0	9 4	8 14	8 18	9 4	17·2	18·0	17·3	17·5	17·1
8 19	9 5	8 7	9 7	9 3	17·3	17·8	17·0	17·2	16·4		9 0	9 2	8 6	8 18	9 2	19·2	18·6	19·0	18·8	18·8
10 10	10 9	11 11	10 4	10 12	17·4	17·4	17·3	17·9	17·5		9 15	10 2	10 19	10 1	10 1	17·4	17·2	18·4	18·8	19·0
11 17	12 7	12 5	12 12	10 9	17·5	18·1	17·9	17·4	16·8		12 0	13 2	12 3	11 6	10 12	18·3	19·0	17·7	18·4	17·8
15 6	14 7	13 7	14 13	10 18	18·0	18·5	18·3	18·5	19·0		15 1	15 7	15 7	14 13	13 13	17·8	17·8	17·5	18·7	18·6
14 4	16 0	13 7	14 11	12 17	16·1	17·5	16·8	17·0	17·9		14 10	16 0	13 14	15 17	13 14	16·9	17·1	17·9	18·0	18·0
14 6	13 3	13 8	14 0	11 0	17·0	17·8	16·2	16·8	16·3		13 14	12 14	12 6	12 11	10 14	16·5	17·4	17·2	18·2	17·3

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TABLE

SHOWING PARTICULARS IN RESPECT OF CENTRES WHERE ONLY HALF

No.	NAME AND ADDRESS OF PLOTHOLDER	Nature of Soil	Crop grown on land in 1926	MANURING				Time of application of F.Y.M.	Date of Sowing	Date of Singling	Average width of drills	Date of Application of Nitrate of Soda	"Stand" of Crop	Date of weighing of Crop	Date of analysis of Samples
				Farmyard Manure	Superphosphate 35%	Kainit	Sulphate of Ammonia								
				Tons.	Cwt.	Cwt.	Cwt.				Inches				
23	McGrath, Patrick, Ballymaw, Waterfall.	Heavy Sandstone Loam	Wheat	12	4	4	1	Spring	4 May	13 to 18 June	23½	27 June	Regular	3 Nov.	7 Nov.
121	Ffrench-Blake, Miss N., Crowbally, Castlemartyr	Gravelly Sandstone Loam	Wheat	12	4	4	1	Autumn	25 May	15 July	22	26 July	Slightly Patchy	25 Nov.	26 Nov.
61	Wood, J. F., Ballinhassig	Sandstone Loam	Mangels	12	4	4	1	Spring	11 May	27 June	24	18 July	Very Patchy	11 Nov.	12 Nov.
48	O'Brien, Mrs. Johanna, Loughatalia, Ballinacurra.	Deep Free Loam	Oats	12	4	4	1	Spring	5 May	14 June	22	24 June	Regular	8 Nov.	11 Nov.
47	Foley-Turpin, W., Youngrove, Midleton.	Peaty Loam	Turnips	None	4	4	1	—	7 May	16 July	22	20 July	Slightly Patchy	9 Nov.	10 Nov.
63	Barry, P. H., Ballyellis, Buttevant.	Medium Loam	Wheat	12	4	4	1	Spring	9 May	17 to 24 June	22	1 July	Regular	10 Nov.	12 Nov.
25	Fahy, J. W., Mount Ruby, Mallow.	Clay Loam	Wheat	12	4	4	1	Autumn	5 May	27 June	19	1 July	Regular	4 Nov.	7 Nov.
130	Wycherley, J., Ardaha, Roscarbery, Clonakilty	Deep Loam	Oats	12	4	4	1	Spring	2 April	1 to 5 July	24	10 July	Regular	25 Nov.	29 Nov.
99	O'Connell, J., Coolnahane, Banteer.	Sandy Loam	Oats	12	4	4	1	Spring	17 May	1 July	22½	11 July	Regular	19 Nov.	21 Nov.
31	Philpott, Joseph, Riverview, Kanturk.	Medium Loam	Oats	12	4	4	1	Spring	6 May	25 June	24	6 July	Fairly Regular	7 Nov.	8 Nov.
21	Barry, Timothy, Castlemagner, Lombardstown	Heavy Clay Loam	Oats	12	4	4	1	Spring	4 May	21 June	24	5 July	Regular	3 Nov.	7 Nov.
	CO. KERRY.														
170	Reynolds, R.B., Faha Court, Beaufort.	Stiff Loam	Turnips	18	4	4	1	Spring	14 May	26 June	24	9 July	Regular	9 Dec.	12 Dec
156	The Earl of Kenmare, The Rt. Hon., Estate Office, Killarney.	Peaty Loam	Turnips	20	4	4	1	Spring	25 May	18 July	27	3 Aug.	Regular	2 Dec.	6 Dec.
141	St. Joseph's Industrial School, Tralee.	Rich Loam over Limestone	Potatoes	None	6	6	2	—	16 May	10 June	24	24 June	Regular	25 Nov.	1 Dec.
	CO. LIMERICK.														
59	McSweeney, Con, Tully, Darragh.	Gravel Loam	Oats	12	4	4	1	Spring	30 April	27 June	24	8 July	Regular	11 Nov.	12 Nov.
38	Ryan, Thomas, Toomaline, Doon.	Cold Wet Clay Moor	Potatoes	12	4	4	1	Spring	27 April	6 July	24	20 July	Regular	7 Nov.	10 Nov.
22	Goodbody, Gerald E., Woodstown, Lisnagry.	Clay Loam	Oats	12	4	4	1	Spring	6 May	15 June	23	30 June	Regular	3 Nov.	7 Nov.
20	O'Grady, Thomas, Cappanahana, Newport.	Gravelly	Potatoes	12	4	4	1	Spring	9 May	27 June	24	11 July	Regular	3 Nov.	7 Nov.
	CO. TIPPERARY.														
50	King, William, Carrig Cottage, Carrig.	Strong Clay Loam	Barley	15	4	4	1	Autumn	23 May	20 July	22	15 July	Regular	9 Nov.	12 Nov.
45	Boylan, Thomas, Croghan, Birr.	Sharp Clay	Barley	None	4	4	1	—	19 May	20 July	24	30 July	Regular	8 Nov.	11 Nov.
34	Gray, Thomas, Kevinstown, Borrisokane.	Black Loam	Wheat	15	4	4	1	Spring	18 May	25 July	22	8 Aug.	Regular	7 Nov.	9 Nov.
129	Delaney, Samuel, Ballycullen, Mullinahone.	Medium Clay	Wheat	12	4	4	1	Spring	18 May	30 June	22	4 July	Regular	26 Nov.	29 Nov.
102	Shine, Edmund, Garryroe, Ardfinan.	Medium Clay	Turnips	12	4	4	1	Spring	16 May	30 June	24	2 July	Regular	19 Nov.	22 Nov.
88	O'Connor, Patrick, Nicholastown, Cahir.	Medium Clay	Oats	12	4	4	1	Spring	9 May	23 June	24	1 July	Regular	16 Nov.	19 Nov.
79	Burke, William, Kilmore, Clonmel.	Heavy Clay	Wheat	12	4	4	1	Autumn	28 April	13 June	22	20 June	Regular	14 Nov.	17 Nov.
	CO. WATERFORD.														
159	Butler, John, Liccaun, Dunmore, E.	Deep Red Sandstone Loam	Oats	12	4	4	1	Spring	9 May	20 & 22 June	20	24 June	Regular	2 Dec.	7 Dec.
124	Connors, Nicholas, Glen, Stradbally, Kilmacthomas.	Free working Red Sandstone	Oats	None	4	4	1	—	19 May	28 June	22	30 June	Patchy	26 Nov.	28 Nov.
92	Flynn, Thomas, Coolnagower, Dungarvan.	Deep Drift Loam	Turnips	12	4	4	1	Winter	21 May	5 July	22	13 July	Regular	15 Nov.	19 Nov.
30	Higgins, John, Kilgronan, Dungarvan.	Deep Sandy Alluvial Loam, Seaside	Potatoes	None	6	6	2	—	6 May	10 to 15 June	18½	22 June	Regular	5 Nov.	8 Nov.
	CO. ROSCOMMON.														
151	Cochrane, Michael J., Tremane, Roscommon.	Heavy Clay Soil	Oats	15	4	4	1	Winter	6 May	30 June	25	30 June	Regular	2 Dec.	5 Dec.
148	Dillon, Thomas, Sragh, Knockcroghery.	Medium Loam	Potatoes	15	4	4	1	Spring	9 May	30 June	25½	30 June	Regular	1 Dec.	3 Dec.
	CO. SLIGO.														
13	McGowan, John, Ballygregan, Carney.	Heavy Loam	Barley	12	4	4	1	Spring	28 May	5 July	24½	13 July	Regular	2 Nov.	7 Nov.
11	Anderson, Percy, Colga House, Calry.	Heavy Loam	Turnips	12	4	4	1	Spring	20 May	27 June	25	30 June	Regular	3 Nov.	7 Nov.
	CO. CAVAN.														
140	O'Reilly, Joseph, Lakeview, Gowna.	Deep Loam	Turnips	None	4	4	1	—	23 May	7 July	24	16 July	Regular	29 Nov.	1 Dec.
	CO. DONEGAL.														
129	Doherty, Mrs. M. C., Clougherna, Ballyliffin.	Light Mooty Soil	Oats	12	4	4	1	Spring	20 May	8 July	22	18 July	Regular	24 Nov.	26 Nov.
72	Weir, Mrs. M. A., Tamnawood, Ballindrait.	Deep Medium Loam	Oats	None	4	4	1	—	16 May	30 June	22½	26 July	Regular	15 Nov.	16 Nov.
58	Robinson, H. S., Milltown, Newtowncunningham.	Stiff Loam	Oats	12	4	4	1	Spring	10 May	27 June	24	25 July	Regular	10 Nov.	12 Nov.
40	Patterson, John A., Drumoghill, Manorcunningham.	Medium Loam	Oats	12	4	4	1	Spring	10 May	28 June	23	25 July	Regular	8 Nov.	10 Nov.
	CO. MONAGHAN.														
133	Donovan, James, Drumboory, Carrickmacross.	Medium Loam	Oats	None	4	4	1	—	28 May	22 July	23	8 Aug.	Regular	26 Nov.	29 Nov.
106	Asylum Farm, Monaghan, Mr. Fitzpatrick (Steward)	Heavy Loam	Oats	15	4	4	1	Winter	18 May	8 July	23	13 July	Rather Patchy	22 Nov.	23 Nov.
10	McGorisk, P., Coolderry, Carrickmacross.	Deep Clay Loam	Potatoes	None	4	4	1	—	16 May	14 to 28 June	24	12 July	Regular	3 Nov.	5 Nov.

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II.

OF EACH PLOT WAS TOP-DRESSED WITH NITRATE OF SODA.

TOP-DRESSED WITH NITRATE OF SODA										NOT TOP-DRESSED WITH NITRATE OF SODA.									
Yield per Statute Acre (Factory Weight)					Sugar Content of Roots					Yield per Statute Acre (Factory Weight)					Sugar Content of Roots				
Danish Variety	Dutch Variety	French Variety	German Variety	Wohanka Variety	Danish Variety	Dutch Variety	French Variety	German Variety	Wohanka Variety	Danish Variety	Dutch Variety	French Variety	German Variety	Wohanka Variety	Danish Variety	Dutch Variety	French Variety	German Variety	Wohanka Variety
T. C.	T. C.	T. C.	T. C.	T. C.	%	%	%	%	%	T. C.	T. C.	T. C.	T. C.	T. C.	%	%	%	%	%
9 11	12 11	9 8	12 14	11 0	16·4	17·0	16·1	17·5	17·2	9 3	11 6	10 8	11 6	10 17	16·4	17·4	16·1	17·6	18·0
7 11	5 0	7 14	8 11	7 6	16·0	17·3	15·8	17·0	18·2	7 6	8 3	6 14	7 8	6 14	17·5	17·6	16·4	17·5	17·5
7 4	9 6	6 3	7 17	7 9	15·4	15·9	14·5	16·8	16·1	7 3	7 3	6 9	8 0	7 3	16·3	16·0	15·8	15·2	16·5
18 6	16 14	15 17	18 14	13 17	16·5	18·2	17·4	16·9	17·9	17 8	16 14	16 6	18 3	14 11	16·9	18·6	16·4	17·4	18·3
11 5	5 8	11 2	11 8	8 0	17·9	16·3	17·1	17·8	17·5	9 11	6 5	9 8	7 8	6 17	16·2	16·7	18·0	15·4	17·4
11 13	11 19	10 18	13 8	11 13	17·6	18·9	17·9	19·4	18·8	12 3	13 8	11 2	11 19	10 16	17·1	18·5	18·3	19·0	17·8
16 5	16 2	15 11	14 10	11 1	16·3	18·2	17·2	18·0	18·3	15 3	16 7	15 19	14 13	12 14	17·2	18·2	16·6	17·9	19·1
11 16	15 6	10 1	9 14	8 17	15·9	17·4	15·9	18·2	18·2	11 14	15 7	9 8	9 9	8 15	17·2	18·6	18·0	18·3	17·9
12 7	11 17	11 6	11 17	11 12	16·5	18·0	17·5	18·1	18·6	11 7	12 7	10 18	12 1	11 6	17·5	17·8	17·7	18·3	18·7
9 3	7 16	8 16	7 19	8 3	16·9	16·7	15·5	17·5	17·3	9 18	7 0	9 0	8 11	7 6	15·0	15·8	17·4	17·5	17·7
10 12	11 14	10 1	10 4	10 7	16·7	18·6	16·1	18·5	17·2	10 17	9 19	9 8	11 11	9 3	19·0	18·2	17·6	18·1	17·7
14 3	13 12	13 3	14 5	11 8	17·8	18·3	17·4	18·5	18·9	14 0	13 2	12 17	13 17	11 12	18·3	18·8	18·0	18·7	18·7
10 6	9 14	10 2	10 11	9 11	15·7	17·1	15·5	16·2	16·5	10 6	10 3	9 14	9 12	9 14	15·7	16·4	16·0	17·0	18·0
15 2	14 18	14 4	15 0	12 0	16·5	17·7	16·5	17·3	15·8	14 1	15 0	14 1	14 18	12 2	16·3	15·5	16·5	16·7	16·2
10 15	10 18	10 12	10 6	9 10	16·2	16·6	16·4	17·0	17·5	11 10	10 0	10 6	8 12	8 0	16·4	17·3	15·6	16·9	16·8
10 6	8 0	8 12	9 3	7 15	17·2	18·6	17·5	17·4	18·3	8 18	7 10	8 12	10 0	7 0	17·2	18·2	17·3	18·4	19·0
13 15	12 6	11 3	12 0	10 18	18·6	17·3	18·0	18·0	16·5	13 3	12 12	10 12	12 18	10 0	18·5	18·1	16·6	17·5	17·3
12 18	10 12	12 0	10 15	10 12	17·5	17·5	17·6	17·1	16·2	12 6	12 12	11 10	10 12	9 3	17·3	17·3	17·0	17·6	17·8
9 18	10 3	10 3	9 14	11 5	18·3	17·4	16·5	18·0	18·1	7 9	8 15	8 10	8 2	8 0	16·5	17·5	17·3	16·0	17·0
10 12	11 0	9 3	10 10	8 13	17·0	19·0	17·1	18·0	19·4	9 5	9 16	8 16	9 9	7 8	17·1	18·1	18·5	18·0	19·4
7 17	7 11	7 11	7 16	7 10	17·2	18·2	17·5	17·6	18·2	7 11	6 13	6 11	7 9	7 3	16·9	18·2	17·6	18·0	18·5
13 11	11 17	12 17	12 0	10 15	18·9	19·4	18·2	18·2	18·4	12 17	11 0	11 14	11 10	10 10	18·3	18·7	18·0	17·5	18·0
10 7	11 7	11 11	11 10	10 0	18·1	19·4	18·0	18·7	19·8	10 0	11 3	10 13	11 7	10 11	18·3	19·3	18·0	19·1	19·8
11 10	11 10	10 10	11 4	9 13	17·6	17·5	17·5	17·7	18·1	11 13	11 4	10 4	10 8	9 10	17·5	16·9	17·4	17·9	18·8
13 10	13 0	12 10	13 10	13 0	18·4	19·7	18·0	19·0	19·2	13 0	12 10	12 5	12 0	12 0	17·6	19·1	18·3	18·4	19·0
12 9	13 18	13 9	12 0	11 6	16·7	17·3	16·8	17·6	17·4	12 9	13 3	13 3	11 15	10 3	16·6	17·6	16·4	17·4	17·6
10 10	9 9	10 10	8 15	9 0	17·1	17·6	17·8	16·4	17·7	8 15	9 14	9 0	8 3	8 17	15·9	17·0	17·9	16·5	17·7
9 10	11 19	10 15	9 13	8 19	16·2	17·5	16·5	18·0	17·5	11 5	11 10	10 18	9 13	8 2	15·8	17·2	16·5	17·2	17·0
14 13	14 12	14 9	13 15	12 14	16·9	18·3	17·6	17·3	18·6	14 13	14 13	14 16	14 13	11 1	16·7	17·2	16·1	18·1	18·2
12 7	11 19	14 1	13 0	11 14	15·6	18·3	15·7	17·6	18·1	10 0	10 15	10 3	9 18	11 10	16·2	18·5	17·7	18·6	18·0
10 12	12 17	12 2	9 4	13 12	17·2	18·1	16·3	17·7	16·7	9 16	9 12	9 1	8 13	10 19	17·0	17·8	17·0	19·0	18·2
9 8	8 6	8 12	8 18	7 17	14·8	15·1	15·7	16·6	14·9	8 2	7 4	7 5	7 18	6 18	16·3	16·8	16·5	16·6	17·5
10 18	10 3	12 19	12 12	9 3	16·2	17·0	15·9	15·3	17·2	9 3	9 6	9 17	9 11	8 4	16·2	17·0	15·8	17·0	17·2
10 6	10 3	10 3	9 15	9 3	15·4	16·9	14·8	18·5	17·0	8 12	9 3	8 0	9 3	8 18	16·2	17·8	18·1	18·1	18·7
8 6	9 4	9 7	9 16	7 4	17·4	18·0	17·0	17·5	17·7	6 8	7 12	6 14	7 18	6 2	17·3	17·7	17·2	18·4	17·8
8 16	10 4	9 13	11 6	10 5	17·3	18·4	18·8	17·2	17·4	8 9	9 18	9 16	10 7	9 6	17·7	17·5	18·5	18·7	18·0
9 8	10 6	9 14	11 2	9 4	17·4	19·0	17·8	17·6	18·3	9 2	9 16	9 4	10 16	9 5	17·8	19·1	17·9	18·7	17·9
11 16	12 2	11 18	12 15	11 12	17·6	18·3	17·8	18·0	17·9	11 2	11 6	11 3	12 0	10 18	17·6	17·6	17·0	17·0	18·2
7 8	8 17	7 17	8 3	7 0	17·8	18·5	17·1	18·9	19·2	7 11	9 3	7 11	7 14	7 8	17·8	18·5	17·1	18·5	18·6
9 4	9 8	11 17	9 8	10 2	17·1	18·3	17·5	17·1	17·7	9 8	9 0	12 8	8 11	10 0	17·2	16·8	16·5	17·0	17·2
10 0	12 3	10 11	11 14	12 11	16·5	17·6	16·1	15·3	16·3	9 14	10 11	10 3	11 11	10 17	16·6	15·8	15·0	16·2	15·9

HIGH HAM

TABLE III.—SHOWING PARTICULARS IN RESPECT OF CENTRES WHERE THE

No.	NAME AND ADDRESS OF PLOTHOLDER	Nature of Soil	Crop grown on land in 1926	MANURING				Time of application of F.Y.M.	Date of Sowing	Date of Singling
				Farm-yard Manure	Super-phos-phate 35%	Kainit	Sulphate of Ammo-nia			
	CO. LOUTH.			Tons	Cwt.	Cwt.	Cwt.			
56	Halpenny, Thomas, Ardee	Clay Loam	Wheat	None	4	4	1	—	10 May	14 June
17	Murphy, Mrs. E., Johnstown, Riverstown ...	Medium Clay	Oats	None	4	4	1	—	12 May	28 June
16	Malone, Michael, Rathcor, Riverstown	Light Clay Loam	Barley	None	4	4	1	—	4 May	30 June
	CO. CLARE.									
8	Blackhall, Miss M., Kellard, Doonbeg	Peaty Soil	Mangels	5 tons Seaweed	4	4	1	Spring	5 May	18 June
19	McInerney, Patrick, Doonagrogue Castle, Killimer, Ennis.	Medium Loam	Potatoes	6	4	4	1	Spring	5 May	22 & 23 June
	CO. CORK.									
35	McLysaght, S. R., Hazlewood, Mallow	Clay Loam	Oats	12	4	4	1	Spring	28 April	25 June
32	Lynch, F., Woodview, Mallow	Stiff Clay Loam	Oats	12	4	4	1	Spring	25 May	4 July
166	Crowley, Thomas, Ballyhalwick, Dunmanway ...	Sandy Loam	Oats	12	4	4	1	Spring	6 April	12 to 16 July
157	O'Driscol, T. J., Derrymilleen, Enniskeane ...	Light Loam	Lea Oats	12	4	4	1	Spring	4 April	10 to 15 July
	CO. KERRY.									
90	Sugrue, Patrick, Ballyvelly, Tralee	Medium Loam	Turnips	None	4	4	1	—	9 May	18 June
78	McElligott, B., Lerrig, Ardfert	Deep Sandy Loam	Turnips	Seaweed	4	4	1	Spring	29 April	11 to 13 June
66	Dillon, Matthew, Ardconnell, Ardfert	Gravelly Loam	Oats	12	4	4	1	Spring	7 May	13 & 14 June
	CO. LIMERICK.									
117	Fennell, Thomas, Boherboy, Rathkeale	Heavy Limestone Loam	Oats	15	4	4	1	Spring	5 May	13 June
116	Fitzgerald, Michael, Ballyfolin, Kilfinny ...	Medium Loam	Potatoes	15	4	4	1	Spring	2 May	21 June
115	McNamara, Thomas, Knockanes, Adare ...	Heavy Loam	Oats	15	4	4	1	Spring	20 May	8 July
114	Mulcahy, Patrick, Ballinahown, Ardagh ...	Light Sandstone Loam	Oats	15	4	4	1	Spring	27 April	8 June
	CO. GALWAY.									
134	Keane, Joseph, Coorheen, Loughrea	Medium Limestone Loam	Oats	15	4	4	1	Spring	6 May	15 June
109	O'Kelly, J. D., Gurtray, Portumna	Strong Limestone Loam	Oats	15	4	4	1	Spring	20 April	12 June
	CO. LEITRIM.									
98	Clements, Colonel H. B., Lough Rynn, Mohill ...	Peaty Bog reclaimed	Oats	15	4	4	1	Spring	4 May	28 June
	CO. MAYO.									
138	Shannon, William, Cloona, Ballina	Rich Loam	Potatoes	12	4	4	1	Spring	10 May	7 July
105	Cooke, Henry, Fortlands, Crossmolina	Peaty Soil	Oats	12	4	4	1	Spring	9 May	4 July
104	O'Boyle, Anthony, Mount Cormick, Crossmolina	Medium Loam	Oats	12	4	4	1	Spring	9 May	4 July
15	Rose, Thomas, Ashfield, Aughnagower	Peaty	Oats	10	4	4	1	Spring	17 May	28 June
4	Corley, Michael, Aughadrina, Castlebar	Deep Moory Loam	Potatoes	None	4	4	1	—	10 May	22 June
3	Winters, John, Aughadrina, Castlebar	Moist Loam	Potatoes	None	4	4	1	—	10 May	22 June
160	Doherty, William, Temple, Charlestown ...	Medium Loam	Potatoes	12	4	4	1	Spring	5 May	8 July
	CO. ROSCOMMON.									
139	Brady, Thomas, Lissardra, Boyle	Clay Loam	Potatoes	15	4	4	1	Spring	10 May	4 July
68	Allen, John, Cooltigue, Four-Mile-House ...	Clay Soil	Potatoes	15	4	4	1	Spring	17 May	4 July
5	Flanagan, Patrick, Attaballa, Clooneyquin, Castlerea	Limestone Mixed Loam	Potatoes	15	4	4	1	Spring	10 May	5 July
	CO. SLIGO.									
12	Doherty, Michael, Ardtrasna, Ballergill	Rich Sandy Loam	Oats	12	4	4	1	Spring	10 May	22 June
	CO. CAVAN.									
162	Cole (T.D.), J. J., Nahilla Park, Clover Hill ...	Light Stony Loam	Potatoes	14	4	4	1	Spring	26 May	13 July
119	Clarke, James, Coradua, Bailieboro'	Stony Loam	Potatoes	15	4	4	1	Spring	24 May	29 June

HAAH

ENTIRE PLOT WAS TOP-DRESSED WITH NITRATE OF SODA.

Average width of drills	Date of application of Nitrate of Soda	"Stand" of Crop	Date of weighing of Crop	Date of analysis of Samples	TOP-DRESSED WITH NITRATE OF SODA									
					Yield per Statute Acre (Factory Weight)					Sugar Content of Roots				
					Danish Variety	Dutch Variety	French Variety	German Variety	Wohanka Variety	Danish Variety	Dutch Variety	French Variety	German Variety	Wohanka Variety
Inches					T. C.	T. C.	T. C.	T. C.	T. C.	%	%	%	%	%
24	20 June	Fairly Regular	10 Nov.	12 Nov.	12 9	12 13	12 8	11 1	10 1	17·6	17·1	17·0	17·2	17·5
24	4 July	Slightly Patchy	3 Nov.	7 Nov.	9 13	9 3	8 15	8 14	7 7	17·5	17·2	16·5	17·0	17·5
24	4 July	Regular	3 Nov.	7 Nov.	9 12	9 6	8 17	9 11	7 4	18·2	18·5	17·6	19·0	15·8
25	30 June	Fairly Regular	2 Nov.	8 Nov.	10 3	8 0	11 12	8 0	8 16	15·8	17·5	16·3	18·0	17·6
24	28 June	Regular Wohanka Patchy	5 Nov.	7 Nov.	9 0	9 10	8 11	7 4	7 4	17·6	17·2	16·5	17·8	15·1
22	30 June	Rather Patchy	7 Nov.	10 Nov.	11 17	12 4	11 18	10 17	10 19	15·9	17·1	16·0	15·0	16·5
24	9 July	Regular	8 Nov.	9 Nov.	8 5	8 7	7 19	7 8	7 17	16·3	17·0	16·9	17·9	17·6
25	19 July	Very Patchy	9 Dec.	10 Dec.	9 4	8 12	7 14	9 6	6 16	18·5	18·8	18·3	19·0	18·5
24½	16 July	Patchy	3 Dec.	6 Dec.	9 14	9 18	8 10	10 11	9 1	17·9	17·7	15·7	17·9	18·1
25	18 June	Regular	18 Nov.	19 Nov.	14 6	13 9	13 9	13 6	13 17	17·6	17·7	16·8	17·1	16·7
25	22 June	Regular	16 Nov.	17 Nov.	15 10	15 3	13 9	15 0	11 15	17·2	18·8	17·6	18·0	17·7
24	22 June	Regular	12 Nov.	14 Nov.	16 9	16 0	13 6	13 9	12 17	15·8	17·1	16·3	17·3	16·5
28	20 June	Regular	14 Nov.	25 Nov.	14 2	13 1	13 2	16 0	16 9	18·5	18·7	18·5	18·7	18·7
23	4 July	Regular	16 Nov.	25 Nov.	16 10	15 16	16 10	17 0	14 0	16·0	16·5	16·3	17·3	16·5
28	18 July	Regular	11 Nov.	25 Nov.	13 6	13 8	14 10	14 10	13 0	15·9	16·9	14·5	16·0	17·3
25	15 June	Regular	15 Nov.	25 Nov.	16 0	15 1	15 5	14 2	13 4	16·3	17·2	17·4	17·1	17·8
24	24 June	Regular	28 Nov.	29 Nov.	11 5	12 10	11 15	11 3	12 0	17·4	17·4	16·1	17·0	17·6
18	4 May	Regular	15 Nov.	23 Nov.	13 3	13 5	17 12	12 4	16 5	17·0	18·0	15·7	17·1	18·5
24	2 July	Regular	19 Nov.	21 Nov.	10 0	9 5	9 5	11 8	8 11	18·0	17·9	16·2	15·8	16·7
24½	14 July	Regular	28 Nov.	1 Dec.	9 10	9 12	9 4	9 16	9 5	15·8	15·5	16·3	15·8	15·5
25	12 July	Regular	19 Nov.	23 Nov.	9 18	9 15	9 15	10 0	9 16	18·4	18·3	16·7	17·1	17·2
24½	16 July	Regular	19 Nov.	23 Nov.	8 8	8 7	8 11	8 13	8 10	16·6	17·0	16·9	17·9	18·5
24	23 June	Regular	4 Nov.	6 Nov.	9 2	9 0	9 0	9 10	9 5	17·6	17·5	16·7	17·6	18·0
24	20 June	Regular	3 Nov.	4 Nov.	12 8	12 15	12 10	12 18	12 18	15·9	17·8	15·5	17·9	16·8
24	20 June	Fairly Regular	3 Nov.	4 Nov.	9 16	10 0	10 0	10 2	10 0	16·0	17·4	15·7	17·0	16·8
25	18 July	Regular	3 Dec.	7 Dec.	10 2	10 0	10 8	10 16	10 1	18·1	18·8	18·0	17·3	17·6
27	8 July	Regular	30 Nov.	1 Dec.	7 15	7 12	8 15	9 0	8 10	14·7	16·3	16·0	16·6	16·9
24½	5 July	Regular	14 Nov.	15 Nov.	9 16	11 14	13 1	11 6	12 17	16·8	17·8	16·8	17·8	17·1
24½	6 July	Regular	2 Nov.	4 Nov.	9 7	12 5	12 19	13 3	14 5	16·2	18·0	16·5	17·2	17·5
25	5 July	Regular	3 Nov.	7 Nov.	14 19	14 8	14 2	13 13	11 19	16·2	15·7	16·1	16·7	16·0
26	16 July	Patchy	6 Dec.	8 Dec.	6 18	5 9	6 6	5 15	5 3	17·0	17·6	16·0	18·	18·3
24	2 July	Patchy	24 Nov.	26 Nov.	5 3	6 0	8 0	6 6	6 12	16·7	16·7	16·3	16·8	17·2

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TABLE

SHOWING PARTICULARS IN RESPECT OF CENTRES

No.	NAME AND ADDRESS OF PLOTHOLDER	Nature of Soil	Crop grown on land in 1926	MANURING				Time of application of F.Y.M.	Date of Sowing	Date of Singling
				Farm-yard Manure	Super-phos-phate 35%	Kainit	Sulphate of Ammo-nia			
				Tons.	Cwt.	Cwt.	Cwt.			
	CO. DUBLIN.									
29	Lawlor, J. P., Irishtown Ho., Clondalkin ...	Clay Loam	Oats	12	4	4	1	Spring	27 April	—
	CO. LONGFORD.									
142	Dooner, Thomas, Killashee	Medium Loam	Oats	12 to 14	4	4	1	Spring	5 May	13 June
137	Dimond, Thomas, Derry, Ballymahon	Heavy Loam	Potatoes	12 to 13	4	4	1	Spring	27 April	14 June
136	Kenny, Patrick, Rath Lodge, Abbeyshrule ...	Moor	Turnips	12	4	4	1	Spring	9 May	27 June
	TIPPERARY, N.R.									
167	Cross, James P., Norwood, Nenagh	Clay Loam	Corn	15	4	4	1	Spring	23 May	4 July
	CO. GALWAY.									
171	Trayer, James, Renville, Oranmore	Sandy Soil	Potatoes	12	4	4	1	Spring	14 May	27 June
150	Costello, Thomas, Clough, Cummer, Ballyglunin ...	Stiff Clay	Oats	12	4	4	1	Spring	16 May	22 June
87	Kelly, James, Bredagh, Caltra, Ballinasloe ...	Clay Loam	Oats	12	4	4	1	Spring	7 May	24 June
	CO. LEITRIM.									
126	Pye, William E., Laughta, Kinlough	Peaty Loam	Potatoes	None	4	4	1	—	8 May	20 July
135	Bradshaw, Alex. H. Drumkielvy, Mohill ...	Clay Loam	Oats	15	4	4	1	Spring	2 May	5 July
	CO. SLIGO.									
14	Ferguson, H., Cloughboley P.O.	Rich Loam	Wheat	12	4	4	1	Spring	18 May	16 June

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IV.

WHERE NO NITRATE OF SODA WAS APPLIED.

Average width of drills	Date of application of Nitrate of Soda	"Stand" of Crop	Date of weighing of Crop	Date of analysis of Samples	NOT TOP-DRESSED WITH NITRATE OF SODA									
					Yield per Statute Acre (Factory Weight)					Sugar Content of Roots				
					Danish Variety	Dutch Variety	French Variety	German Variety	Wohanka Variety	Danish Variety	Dutch Variety	French Variety	German Variety	Wohanka Variety
					T. C.	T. C.	T. C.	T. C.	T. C.	%	%	%	%	%
Inches														
24	—	Very Patchy	2 Nov.	8 Nov.	8 7	8 5	9 2	8 10	7 2	15·5	14·9	15·4	15·4	15·5
24	—	Regular	29 Nov.	1 Dec.	19 8	17 14	17 3	18 5	18 5	18·0	17·5	16·9	17·5	16·8
24	—	Regular	27 Nov.	1 Dec.	15 1	15 1	14 0	17 3	16 0	18·5	18·6	18·3	18·3	19·0
24	—	Fairly Regular	25 Nov.	1 Dec.	13 12	13 3	11 18	13 17	11 4	16·2	16·1	18·9	18·0	17·4
22	—	Regular	9 Dec.	10 Dec.	10 16	9 15	10 8	9 3	9 7	17·1	17·3	16·7	17·7	18·5
22	—	Regular	9 Dec.	13 Dec.	9 18	10 0	9 15	10 6	9 3	15·5	15·5	17·0	15·3	15·7
25	—	Patchy	2 Dec.	5 Dec.	8 12	9 3	9 7	10 4	8 18	14·4	17·7	16·1	16·4	14·9
24	—	Regular	17 Nov.	19 Nov.	11 0	11 17	10 14	11 3	10 5	17·2	18·2	18·9	19·3	19·3
24	—	Patchy	10 Nov.	28 Nov.	8 3	8 14	8 14	7 15	7 5	16·5	16·9	15·6	16·6	14·7
24	—	Slightly Patchy	25 Nov.	30 Nov.	8 0	8 11	7 5	8 8	9 11	17·0	17·7	14·7	16·7	17·9
25	—	Regular	5 Nov.	6 Nov.	13 4	12 19	10 4	10 16	9 17	17·7	18·8	17·6	18·3	17·1
	AVERAGE RETURNS FOR 11 CENTRES ...				11 9	11 7	10 15	11 8	10 12	16·7	17·2	16·9	17·2	17·0

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TABLE

SHOWING AVERAGE RETURNS FOR EACH COUNTY AND PROVINCE IN RESPECT OF CENTRES.

PROVINCE.	COUNTY.	Number of Centres.	TOP DRESSED WITH: Average Yield per Statute Acre (Factory Weight). Danish Variety.	Dutch Variety.	French Variety.	German Variety.	Wohanka Variety.	Average Sugar. Danish Variety.	Dutch Variety.
			T. C.	T. C.	T. C.	T. C.	T. C.	%	%
LEINSTER ...	CARLOW	4	9 9	10 2	9 7	10 2	9 5	17·4	17·9
	DUBLIN	3	10 17	10 10	9 19	10 5	9 9	17·5	17·8
	KILDARE ...	4	9 7	10 14	10 0	9 16	8 17	17·5	17·9
	KILKENNY ...	4	9 18	10 9	10 0	10 8	9 3	17·8	18·5
	LAOIGHIS ...	4	12 0	12 11	11 9	11 15	10 2	18·1	17·0
	LONGFORD ...	–	–	–	–	–	–	–	–
	LOUTH	1	10 17	11 19	11 8	10 2	9 10	17·6	17·9
	MEATH	3	13 18	14 16	14 1	17 5	17 7	16·0	16·4
	OFFALY ...	3	10 7	10 19	10 8	10 13	9 3	17·6	18·3
	WESTMEATH ...	4	11 19	11 15	12 0	13 3	12 19	16·9	16·7
	WEXFORD ...	4	12 19	13 18	13 2	13 9	11 1	16·6	16·4
	WICKLOW ...	4	8 15	8 19	8 12	8 19	8 18	17·8	17·9
MUNSTER ...	CLARE	2	11 4	11 8	11 18	11 8	10 10	17·4	17·8
	CORK	14	12 2	11 19	11 4	12 3	10 6	16·7	17·6
	KERRY	3	13 4	12 15	12 10	13 5	10 19	16·7	17·7
	LIMERICK ...	4	11 18	10 9	10 12	10 11	9 14	17·4	17·5
	TIPPERARY, N.R. ...	3	9 9	9 11	8 19	9 7	9 3	17·5	18·2
	TIPPERARY, S.R. ...	4	12 4	11 18	11 17	12 1	10 17	18·2	19·0
	WATERFORD ...	4	11 15	12 9	12 6	11 1	10 10	16·7	17·7
CONNAUGHT ...	ROSCOMMON ...	2	11 9	12 8	13 1	11 2	12 13	16·4	18·2
	SLIGO	2	10 3	9 4	10 15	10 15	8 10	15·5	16·0
ULSTER	CAVAN	1	10 6	10 3	10 3	9 15	9 3	15·4	16·9
	DONEGAL ...	4	9 11	10 9	10 3	11 5	9 11	17·4	18·4
	MONAGHAN ...	3	8 17	10 3	10 2	9 15	9 18	17·1	18·1
PROVINCIAL AVERAGES:—									
	LEINSTER ...	38	10 19	11 8	10 17	11 9	10 10	17·3	17·5
	MUNSTER ...	34	11 17	11 13	11 5	11 12	10 5	17·0	17·8
	CONNAUGHT ...	4	10 16	10 16	11 18	10 18	10 12	15·9	17·1
	ULSTER	8	9 8	10 6	10 2	10 10	9 12	17·1	18·1
AVERAGES FOR AN SAORSTAT		84	11 3	11 8	11 0	11 8	10 6·5	17·1	17·6

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V.

WHERE ONLY HALF OF EACH PLOT WAS TOP-DRESSED WITH NITRATE OF SODA.

NITRATE OF SODA. CONTENT OF ROOTS.			NOT TOP-DRESSED. AVERAGE YIELD PER STATUTE ACRE. (Factory Weight).					AVERAGE SUGAR CONTENT OF ROOTS.				
French Variety.	German Variety.	Wohanka Variety.	Danish Variety.	Dutch Variety.	French Variety.	German Variety.	Wohanka Variety.	Danish Variety.	Dutch Variety.	French Variety.	German Variety.	Wohanka Variety.
%	%	%	T. C.	T. C.	T. C.	T. C.	T. C.	%	%	%	%	%
17·4	17·8	17·7	9 6	9 16	9 3	9 16	9 1	17·2	17·8	17·5	17·6	18·1
17·3	17·0	15·9	9 17	8 19	10 7	10 11	8 15	16·3	16·5	15·8	16·2	17·2
17·7	18·3	18·7	9 0	10 6	9 15	9 14	8 11	18·0	18·3	17·8	18·3	18·2
17·3	18·4	19·0	9 13	9 17	9 16	10 4	8 17	18·1	18·8	17·5	18·6	19·1
17·3	17·3	17·8	11 7	11 19	10 19	10 14	10 5	16·6	17·0	17·2	16·9	17·3
–	–	–	–	–	–	–	–	–	–	–	–	–
17·4	18·1	18·0	10 5	11 10	11 4	9 4	8 11	17·5	18·2	17·8	18·1	18·1
16·4	17·2	17·3	13 5	14 6	13 14	17 4	16 19	16·9	17·2	16·7	17·6	17·2
17·4	18·2	18·7	10 8	10 4	9 16	10 10	9 19	17·6	18·0	18·1	18·7	18·9
16·0	17·3	17·1	11 1	11 1	11 6	11 18	11 15	16·9	16·9	16·7	17·6	17·4
17·1	16·6	17·1	12 13	12 18	12 11	13 4	10 8	16·5	17·3	16·7	17·6	17·5
18·1	17·6	17·9	8 14	8 18	8 8	8 13	8 18	18·5	18·2	18·5	18·1	18·2
17·6	17·6	17·1	10 17	11 12	11 11	10 13	10 6	17·8	18·1	18·0	18·6	18·4
16·6	17·7	17·7	11 15	12 0	11 3	11 13	10 6	16·9	17·5	17·2	17·6	17·9
16·5	17·3	17·1	12 16	12 15	12 4	12 16	11 3	16·8	16·9	16·8	17·5	17·6
17·4	17·4	17·1	11 9	10 13	10 5	10 10	8 11	17·3	17·7	16·6	17·6	17·7
17·0	17·9	18·6	8 2	8 8	7 19	8 7	7 10	16·8	17·9	17·8	17·3	18·3
17·9	18·4	18·9	11 17	11 9	11 4	11 6	10 13	17·9	18·5	17·9	18·2	18·9
17·2	17·3	17·8	11 15	12 5	11 19	11 1	9 11	16·2	17·2	16·7	17·3	17·6
16·0	17·6	17·4	9 18	10 3	9 12	9 5	11 4	16·6	18·1	17·3	18·8	18·1
15·8	15·9	16·0	8 12	8 5	8 11	8 14	7 11	16·2	16·9	16·1	16·8	17·3
14·8	18·5	17·0	8 12	9 3	8 0	9 3	8 18	16·2	17·8	18·1	18·1	18·7
17·8	17·6	17·8	8 15	9 13	9 4	10 5	8 18	17·6	17·9	17·6	18·2	17·9
16·9	17·1	17·7	8 17	9 11	10 1	9 5	9 8	17·2	17·0	16·2	17·2	17·2
17·2	17·6	17·7	10 8	10 16	10 11	11 1	10 3	17·3	17·7	17·3	17·7	17·96
17·0	17·7	17·8	11 9	11 10	10 19	11 3	9 17	17·0	17·6	17·2	17·7	18·0
15·9	16·8	16·7	9 5	9 4	9 1	9 0	9 8	16·4	17·5	16·7	17·8	17·7
17·1	17·5	17·7	8 16	9 11	9 7	9 15	9 2	17·3	17·6	17·1	17·8	17·8
17·0	17·6	17·7	10 13	10 18	10 11	10 17·8	9 18	17·16	17·65	17·2	17·7	17·95

ННСГБ НААН Инв. № 40281-1

TABLE VI.

SHOWING AVERAGE RETURNS FOR EACH COUNTY AND PROVINCE IN RESPECT OF CENTRES WHERE THE ENTIRE PLOT WAS TOP-DRESSED WITH NITRATE OF SODA.

PROVINCE	COUNTY	No. of Centres	Average Yield per Statute Acre (Factory Weight)					Average Sugar Content of Roots				
			Danish Variety	Dutch Variety	French Variety	German Variety	Wohanka Variety	Danish Variety	Dutch Variety	French Variety	German Variety	Wohanka Variety
			T. C.	T. C.	T. C.	T. C.	T. C.	%	%	%	%	%
LEINSTER—												
	CARLOW ...	—	—	—	—	—	—	—	—	—	—	—
	DUBLIN ...	—	—	—	—	—	—	—	—	—	—	—
	KILDARE ...	—	—	—	—	—	—	—	—	—	—	—
	KILKENNY ...	—	—	—	—	—	—	—	—	—	—	—
	LAOIGHIS ...	—	—	—	—	—	—	—	—	—	—	—
	LONGFORD ...	—	—	—	—	—	—	—	—	—	—	—
	LOUTH ...	3	10 11	10 7	10 0	9 15	8 4	17·8	17·6	17·0	17·7	16·9
	MEATH ...	—	—	—	—	—	—	—	—	—	—	—
	OFFALY ...	—	—	—	—	—	—	—	—	—	—	—
	WESTMEATH ...	—	—	—	—	—	—	—	—	—	—	—
	WEXFORD ...	—	—	—	—	—	—	—	—	—	—	—
	WICKLOW ...	—	—	—	—	—	—	—	—	—	—	—
MUNSTER—												
	CLARE ...	2	9 11	8 15	10 1	7 12	8 0	16·7	17·3	16·4	17·9	16·3
	CORK	4	9 15	9 15	9 0	9 10	8 13	17·1	17·6	16·7	17·4	17·7
	KERRY	3	15 8	14 17	13 8	13 18	12 16	16·9	17·9	16·9	17·5	17·0
	LIMERICK ...	4	14 19	14 6	14 17	15 8	14 3	16·7	17·3	16·7	17·3	17·6
	TIPPERARY, N.R.	—	—	—	—	—	—	—	—	—	—	—
	TIPPERARY, S.R.	—	—	—	—	—	—	—	—	—	—	—
	WATERFORD ...	—	—	—	—	—	—	—	—	—	—	—
CONNAUGHT—												
	GALWAY ...	2	12 4	12 18	14 13	11 13	14 3	17·2	17·7	15·9	17·0	18·0
	LEITRIM ...	1	10 0	9 5	9 5	11 8	8 11	18·0	17·9	16·2	15·8	16·7
	MAYO	7	9 18	9 18	9 18	10 5	9 19	16·9	17·5	16·6	17·2	17·2
	ROSCOMMON ...	3	8 19	10 10	11 12	11 3	11 17	15·9	17·4	16·4	17·2	17·2
	SLIGO	1	14 19	14 8	14 2	13 13	11 19	16·2	15·7	16·1	16·7	16·0
ULSTER—												
	CAVAN	2	6 0	5 14	7 3	6 0	5 17	16·8	17·1	16·1	17·5	17·8
	DONEGAL ...	—	—	—	—	—	—	—	—	—	—	—
	MONAGHAN ...	—	—	—	—	—	—	—	—	—	—	—
PROVINCIAL AVERAGES—												
	LEINSTER ...	3	10 11	10 7	10 0	9 15	8 4	17·8	17·6	17·0	17·7	16·9
	MUNSTER ...	13	12 12	12 3	11 19	12 1	11 4	16·8	17·5	16·7	17·5	17·3
	CONNAUGHT ...	14	10 8	10 15	11 4	10 19	11 0	16·7	17·4	16·4	17·0	17·2
	ULSTER ...	2	6 0	5 14	7 3	6 0	5 17	16·8	17·1	16·1	17·5	17·8
AVERAGES FOR AN SAORSTAT ...		32	11 1	10 19	11 3	10 19	10 10	16·9	17·4	16·5	17·3	17·2

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The results shown in the foregoing tables were obtained from 127 centres at which 1,055 sub-plots were laid down. The returns from these 1,055. sub-plots show that the average yield was 10 tons 17 cwt. (factory weight) of beet per statute acre and that the average sugar content of the samples was 17·4 per cent. The Dutch and German varieties were on the average exactly equal both as regards yield and sugar content and were superior in both respects to the Danish and French varieties. The Wohanka variety produced on the average a lower yield than any of the other varieties but in sugar content it was slightly superior to even the Dutch and German varieties. A comparison of the yields obtained from the sub-plots at each centre where the trials were conducted shows that the highest yield was produced by either the Dutch or German varieties at 59 per cent. of the total number of centres from which results were obtained and that as in the case of the average yield from all sub-plots the Dutch and German varieties were superior to all other varieties in an equal number of cases. A similar comparison of the returns from the 211 series of sub-plots in regard to the sugar content of the five varieties shows that in 88 per cent. of the total number of cases the highest sugar content was obtained from either the Dutch, German or Wohanka varieties. Taking the combined average results in regard to both yield and sugar content the Dutch and German varieties were exactly equal and were distinctly superior to each of the other three varieties. Although the difference in the returns produced by the French, Danish and Wohanka varieties is not very marked the Wohanka variety produced the poorest results.

Effects of Top-dressing.

From the results at the centres where half of each plot was top-dressed with nitrate of soda at the rate of 1 cwt. per statute acre, it will be observed that the average yield from the top-dressed sub-plots exceeded that obtained from the sub-plots which were not top-dressed by approximately 9 cwt. per statute acre. On the other hand, the average sugar content of the samples from all sub-plots which were not top-dressed was 0·14 per cent. higher than the average sugar content of the samples from the corresponding sub-plots which were top-dressed. This difference in sugar content is, however, so slight that it can hardly be regarded as significant. A comparison of the average returns from each centre in respect of the sub-plots which were top-dressed with nitrate of soda and those which were not top-dressed shows that at approximately 20 per cent. of the centres the top-dressing had the effect of increasing the average yield by one ton or more and that in approximately an equal number of cases the average sugar content of the beet grown on the sub-plots which received no top-dressing was at least 0·5 per cent. higher than the sugar content of the beet grown on the adjoining top-dressed plots. On the other hand at about 25 per cent. of the centres where half of each plot was top-dressed with nitrate of soda the top-dressing had no appreciable effect on the yield and at an equal number of centres it had no marked influence on the sugar content. From a study of these results it is evident that a top-dressing of nitrate of soda at the rate of one cwt. per statute acre is not likely to lower the sugar content of the beet to any appreciable extent. It is also evident that the increased yield resulting from such a top-dressing depends largely upon the condition of the soil and the growth of the crop at the time of application. In unfavourable seasons or under adverse conditions, as for example, where the crop is attacked by pests or diseases, a top-dressing of nitrate of soda may be the means of carrying the plants over a critical period in the early stages of growth.

Influence of place in rotation.

At the 127 centres from which complete returns were received the sugar beet was grown after a corn crop at 74 centres and after potatoes or a manured root crop at 53 centres. From the results of these experiments no definite conclusion can be formed as to the influence of the preceding crop on the yield or sugar content of the beet. It is evident, however, that sugar beet can be grown successfully in a variety of positions in the rotation, and it is

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probable that the practice of growing beet after lea oats in the position usually occupied by the root crop will be generally adopted where beet is grown as an ordinary farm crop.

Soils.

At the great majority of centres at which the experiments were conducted the soil was described as loam or medium loam. At a considerable number of centres the soils were heavy or clay loams. At 14 centres the soil was said to be of a moory or peaty nature, and at 9 centres the soils were described as light or sandy loams. Although the average yield from the crops grown at centres where the soil was described as peaty was lower than the average yield in respect of all centres, the average sugar content of the crops at these particular centres was up to the general average. Of the different types of soils on which beet was grown the best returns, both as regards yield and sugar content, were obtained on the lighter types of soils. The cool wet weather which prevailed throughout the greater part of the season was particularly favourable to these types of soils. It is evident however, from the results of these experiments that satisfactory crops of sugar beet, both as regards yield and sugar content, can be produced on almost any type of soil which may be regarded as suitable for ordinary tillage crops provided, of course, that due attention is paid to manuring and cultivation.

Manuring.

At the centres where farmyard manure was applied directly to the sugar beet crop it was ploughed in during the winter at 14 centres, and at the remaining centres it was applied in the drills immediately before the seed was sown. Owing to the small number of centres at which farmyard manure was applied in winter it is not possible to draw conclusions as to the effect of this practice on the yield and sugar content of the crop. From the reports received it would appear that the shape of the roots was not adversely affected where the farmyard manure was applied in the drills.

At 20 of the centres where the beet followed a root crop or potatoes and was grown on artificial manures only, the results, both as regards yield and sugar content, were quite satisfactory. At the 8 centres where the beet was grown after a corn crop and was manured with artificials only the average yield was slightly below the general average. At four centres where the prescribed mixture of artificial manure was applied at the rate of 14 cwt, per statute acre yields well above the average were obtained but the sugar content of the roots was below average. At the two centres where seaweed was applied in place of farmyard manure satisfactory results were obtained,

Bolting and Forking.

Although bolting did not occur to the same extent as in 1926 the returns for the 1927 crop afford further evidence that bolting is influenced by the date of sowing and by subsequent weather conditions. Bolting was most prevalent in the case of the crops which were sown very early in the season and where growth was, owing to weather conditions, subsequently retarded, whereas the crops sown late in the season were comparatively free from bolted plants. At most centres the Wohanka variety produced a much greater number of bolted plants than any of the other varieties tested. The French variety also produced a large proportion of bolted plants. Although the German and Danish varieties produced a number of " bolters " at most centres the proportion of bolted plants was not nearly so great as in the case of the other two varieties mentioned above. The Dutch variety, on the whole, produced a very small proportion of bolted plants and as regards bolting it is evident that this variety is distinctly superior to the other varieties included in these trials.

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In nearly all cases the shape of the roots was satisfactory but at a number of centres a rather large proportion was forked—a defect which involves loss to both the grower and the factory. The experiments provide some evidence that forking may be associated with soils of the heavy, peaty and gravelly types. On the other hand, the results indicate that the application of well rotted farmyard manure in the drills immediately before sowing did not result in the production of an undue proportion of forked roots.

Pests and Diseases.

Mangel fly was again the only pest which was at all prevalent during the past season. The fly attacked the crop at 60 centres, but from only 2 centres was it reported that the returns from the crop were materially reduced as a result of the attack.

Although the weather was rather favourable for the development of fungoid diseases affecting the leaves of sugar beet no serious damage of this nature was reported. Phoma, or crown rot, was reported as having caused slight damage at only four centres.

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Manurial Experiments.

In view of the general practice regarding the manuring of the sugar beet and mangel crops, it was decided, in the case of the sugar beet experiments conducted by the Department in 1925, that the manurial dressing per statute acre to be applied to all experimental plots should be as follows :—

12 tons farmyard manure.
4 cwt. superphosphate (35%)
4 cwt. kainit.
1 cwt. sulphate of ammonia.

The above mixture of artificial manures gave such satisfactory results when applied to the experimental plots in 1925 that it was adopted as the standard manurial dressing for both experimental and commercial crops of sugar beet grown in 1926 and 1927. In order, however, to determine whether this standard dressing of artificial manures or some modification thereof was likely to give the most satisfactory results when applied to sugar beet, it was decided to conduct in 1926 a series of manurial trials with various mixtures of artificial manures. The results of these manurial trials were included in a report on the sugar beet experiments in 1926 which was published in the Department's Journal, Vol. XXVI, No. 1, and also in leaflet form.

A somewhat similar series of manurial trials with various mixtures of artificial manures was carried out in 1927. As in the previous year, these trials were confined to Counties Carlow, Kildare, Kilkenny, Laoighis, Offaly, Tipperary (N.R.), Waterford, Wexford and Wicklow, where the bulk of the supplies of sugar beet for the Carlow factory were grown. These experiments were conducted at four centres in each county, except County Wicklow where the trials were carried out at only two centres. The plots were laid down at almost all centres on land which in the previous season had been cropped with lea oats. At all centres a dressing of farmyard manure was applied uniformly at the rate of 12 tons per statute acre, either during the winter before the land was ploughed or in the drills in the spring. At each centre five-eighths of a statute acre was divided into ten uniform plots, each

comprising five drills. The following dressings of artificial manures were applied to the respective plots at each centre :—

PLOT	MANURES	
I.	3 cwt. superphosphate (35%) 4 ,, kainit 1 ,, sulphate of ammonia	per statute acre.
II.	5 cwt. superphosphate (35%) 4 ,, kainit 1 ,, sulphate of ammonia	per statute acre.
III.	6 cwt. superphosphate (35%) 4 ,, kainit 1 ,, sulphate of ammonia	per statute acre.
IV.	4 cwt. superphosphate (35%) 3 ,, kainit 1 ,, sulphate of ammonia	per statute acre.
V.	4 cwt. superphosphate (35%) 5 ,, kainit 1 ,, sulphate of ammonia	per statute acre.
VI.	4 cwt. superphosphate (35%) 4 ,, kainit 1 ,, sulphate of ammonia	per statute acre.
VII.	4 cwt. superphosphate (35%) 4 ,, kainit 2 ,, sulphate of ammonia	per statute acre.
VIII.	4 cwt. superphosphate (35%) 4 ,, kainit Calcium cyanamide sufficient to supply the same quantity of Nitrogen as is contained in one cwt. of sulphate of ammonia.	per statute acre.
IX.	4 cwt. superphosphate (35%) 4 ,, kainit 1 ,, nitrate of soda	per statute acre.
X.	4 cwt. superphosphate (35%) 4 ,, kainit 2 ,, nitrate of soda	per statute acre.

The artificial manures were applied immediately before the seed was sown, except in the case of Plots IX and X, to which the nitrate of soda was applied as a top-dressing. Plot IX received a top-dressing at the rate of 1 cwt. per statute acre, immediately after the crop was singled, and plot X received a similar top-dressing at the same time. In addition, the latter plot received a second top-dressing at the same rate a week or two later.

The Dutch variety of seed which was included in the variety trials was sown at all centres where the Manurial Trials were carried out.

The general cultivation of the crop on these plots was the same as in the case of the variety trials already referred to. Throughout the growing season very little difference was noted at most centres in the appearance of the crop on the various sub-plots except that in the case of Plots II and III, which received the dressings of 5 and 6 cwts. respectively of superphosphate, Plot VII, which received the dressing of 2 cwt. of sulphate of ammonia, and Plot X, which received the dressing of 2 cwt. of nitrate of soda per statute acre, the growth of foliage was, as a rule, somewhat more vigorous throughout the growing season than in the case of the other plots. It was reported that at the time when weighings were taken for the determination of yield there was very little outward indication of ripeness of the crop on any of the plots,

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and at the majority of the centres this was particularly noticeable in the case of Plots VII and X which received the heavier dressings of nitrogenous manures.

The procedure adopted with regard to the weighing, sampling and analysis of the produce of these plots was the same as in the case of the variety trials conducted by the Agricultural Instructors except that plants which had bolted were included in the quantities weighed for the determination of the yield.

Of the 34 centres at which experiments were laid down complete returns are available from 31 centres. Reliable returns could not be obtained from three centres where the crop was very patchy.

Detailed particulars in respect of the 31 centres from which complete returns were obtained are shown in Table VII.

НСГБ НААН

TABLE

SHOWING RESULTS OF MANURIAL TRIALS

No.	NAME AND ADDRESS OF PLOTHOLDER	Nature of Soil	Crop grown on the land in 1926	Date of Sowing	Date of Singling	Date of Weighing of Crop	Date of Analysis of Samples	YIELD PER STATUTE				
								cwt. 3 Super. 4 Kainit 1 Sulph. Amm.	cwt. 5 Super. 4 Kainit 1 Sulph. Amm.	cwt. 6 Super. 4 Kainit 1 Sulph. Amm.	cwt. 4 Super. 3 Kainit 1 Sulph. Amm.	cwt. 4 Super. 5 Kainit 1 Sulph. Amm.
	CO. CARLOW.							T. C.	T. C.	T. C.	T. C.	T. C.
113	Murphy, Michael, Newstown, Tullow	Loam	Oats	24 May	30 June	21 Nov.	25 Nov.	9 0	9 14	9 18	9 12	9 8
36	Kavanagh, Jeremiah, Ouragh, Tullow	Light Loam	Oats	21 May	6 July	7 Nov.	10 Nov.	8 12	8 9	8 19	8 14	9 4
7	Byrne, Mrs. B. M., Paulville, Tullow	Loam	Oats	17 May	11 July	2 Nov.	4 Nov.	9 4	9 7	9 13	9 4	9 2
	CO. KILDARE.											
—	Spiers, A. L., Burtown, Athy ...	Clay Loam	Oats	6 June	20 July	16 Dec.	17 Dec.	7 15	8 6	8 10	7 16	8 2
143	Bury-Weld, Mr. Somerton, Naas ...	Clay Loam	Oats	25 May	30 June	30 Nov.	2 Dec.	8 12	9 7	9 8	8 2	9 0
131	Greene, John N., Kilkea Lodge, Mageney.	Heavy Loam	Oats	6 May	25 June	25 Nov.	29 Nov.	9 19	11 3	11 6	10 11	11 2
80	O'Connor, James Elm Hall, Celbridge	Deep Loam	Oats	17 May	24 June	16 Nov.	18 Nov.	8 2	9 4	9 16	9 2	9 7
	CO. KILKENNY.											
128	Broderick Walter, Croan, Dunnamaggin.	Medium Loam	Barley	18 May	25 June	26 Nov.	29 Nov.	8 18	9 3	9 3	8 18	7 15
53	Mathers, James, Ratheash, Clifden	Medium Loam	Barley	6 May	15 June	10 Nov.	12 Nov.	10 6	10 12	10 15	11 9	10 18
52	Downey, John, Carran, Dunbell ...	Clay Loam	Oats	10 May	21 June	10 Nov.	12 Nov.	10 18	11 0	12 18	10 0	11 17
1	Hughes, Nicholas, Balief, Woodsgift	Medium Loam	Oats	6 May	18 June	22 Oct.	28 Oct.	9 6	11 12	12 4	9 3	10 15
	LAOIGHIS.											
101	Harte, Patrick, Anster, Ballacolla ...	Light Loose Loam	Oats, no Manure	20 May	7 July	19 Nov.	22 Nov.	10 8	10 14	11 11	9 18	10 14
62	Campion, L., Clonmeen South, Rathdowney.	Medium Loam	Oats, no Manure	10 May	24 June	9 Nov.	12 Nov.	10 14	10 3	9 16	10 11	10 11
39	Dowling, John, Derrydavy, Mountmellick.	Light Brown Loam	Barley, no Manure	9 May	22 June	7 Nov.	10 Nov.	10 5	11 11	12 0	10 14	11 3
6	Costello, Michael, Upper Lea, Portarlington.	Medium Loam	Barley, no Manure	6 May	19-22 June	3 Nov.	4 Nov.	10 6	11 0	12 0	11 3	12 1
	OFFALY.											
77	Foy, John, Welsh Island, Geashill ...	Medium Loam	Barley	7 May	25 June	16 Nov.	17 Nov.	9 12	10 10	10 17	10 1	10 9
37	McLoughlin, Joseph, Ballydaly, Tullamore.	Loam	Oats	6 May	23 June	7 Nov.	9 Nov.	12 10	13 5	12 12	11 16	12 4
9	Doyle, James, Kildangan, Tullamore	Strong Moor.	Oats	10 May	—	3 Nov.	5 Nov.	9 13	9 8	9 0	9 0	10 14
	CO. TIPPERARY, N.R.											
154	Maher, William, Laha, Templemore	Strong Clay	Oats	20 May	23 July	2 Dec.	5 Dec.	8 4	8 8	8 5	9 8	9 3
95	Cross, James P., Norwood, Nenagh ...	Strong Clay	Oats	16 May	20 June	19 Nov.	21 Nov.	10 14	11 12	12 11	11 9	11 13
93	Russell, James, Boulesca, Templetuohy, Templemore.	Black Loam	Barley	24 May	14 July	18 Nov.	19 Nov.	8 9	8 14	9 14	9 10	10 13
67	Esmonde O. E., Dromenagh, Borrisokane.	Heavy Loam	Oats	21 May re-Sown 14 June	30 July	11 Nov.	14 Nov.	7 12	7 14	8 5	8 8	8 13
	CO. WATERFORD.											
82	Kiersey, John, Ballyhussa, Kilmacthomas.	Shingly Red Sandstone Loam	Oats	12 May	27 June	11 Nov.	18 Nov.	10 0	11 3	11 12	10 2	10 13
46	Morrissey, Patrick, Affane, Cappoquin	Limestone Loam	Wheat	8 May	22 June	8 Nov.	11 Nov.	12 4	13 10	13 1	12 15	12 13
26	(Reps.) Morrissey, William, Ballinaskeagh, Dungarvan.	Medium Loam.	Oats	6 May	8 June	3 Nov.	7 Nov.	10 0	9 18	9 18	10 3	10 15
	CO. WEXFORD.											
123	Scallan, Peter, Clonroche	Shingly Loam	Oats	7 May	10 July	26 Nov.	28 Nov.	10 6	10 3	10 6	11 15	11 10
103	Fortune, Richard, Doononey, Adamstown.	Loam	Oats	21 May	8 July	22 Nov.	23 Nov.	10 15	10 5	10 0	10 15	10 0
73	O'Neill, Mrs. Mary, Shanoo, Bridgetown.	Heavy Clay	Oats	20 May	10 July	15 Nov.	16 Nov.	11 9	13 0	13 0	12 10	11 6
18	Furlong, Thomas, Knockreigh, Adamstown.	Shingly Loam	Oats	9 May	12 July	4 Nov.	7 Nov.	12 18	10 12	11 9	11 6	13 3
	CO. WICKLOW.											
64	Burke, Patrick, Lackeragh, Baltinglass.	Deep Loam	Oats	24 May	4 July	11 Nov.	14 Nov.	8 14	9 0	9 4	8 16	8 19
149	Fisher George, Mergenstown Demesne, Dunlavin.	Dark Loam	Oats	25 May	4 July	2 Dec.	5 Dec.	8 14	9 3	9 2	8 15	8 17
	AVERAGES FOR 31 PLOTS ...	—	—	—	—	—	—	9 16	10 5	10 11	10 1	10 8

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VII.

CONDUCTED BY THE AGRICULTURAL INSTRUCTORS.

(FACTORY WEIGHT).					SUGAR CONTENT OF ROOTS.									
cwt. 4 Super. 4 Kainit. 1 Suplh. Amm.	cwt. 4 Super. 4 Kainit. 2 Sulph. Amm.	cwt. 4 Super. 4 Kainit. Calcium Cyana-mide	cwt. 4 Super. 4 Kainit. 1 Nitrate of Soda	cwt. 4 Super. 4 Kainit. 2 Nitrate of Soda	cwt. 3 Super. 4 Kainit. 1 Sulph. Amm.	cwt. 5 Super. 4 Kainit. 1 Sulph. Amm.	cwt. 6 Super. 4 Kainit. 1 Sulph. Amm.	cwt. 4 Super. 3 Kainit. 1 Sulph. Amm.	cwt. 4 Super. 5 Kainit. 1 Sulph. Amm.	cwt. 4 Super. 4 Kainit. 1 Sulph. Amm.	cwt. 4 Super. 4 Kainit. 2 Sulph. Amm.	cwt. 4 Super. 4 Kainit. Calcium Cyana-mide	cwt. 4 Super. 4 Kainit. 1 Nitrate of Soda	cwt. 4 Super. 4 Kainit. 2 Nitrate of Soda
T. C.	T. C.	T. C.	T. C.	T. C.	%	%	%	%	%	%	%	%	%	%
9 19	9 19	9 11	9 18	10 1	18·3	18·9	18·2	18·2	18·2	18·6	18·2	18·0	17·0	18·0
8 15	9 13	8 19	9 8	9 12	17·8	17·8	17·4	18·2	18·3	16·6	18·0	17·2	17·6	17·2
9 5	9 14	9 6	9 8	9 13	17·7	17·7	17·8	18·3	17·2	18·0	18·1	17·2	16·8	17·0
8 0	9 5	7 17	7 14	9 7	18·8	19·2	18·8	18·8	18·7	18·2	18·2	18·2	18·8	19·5
8 18	10 0	8 13	8 1	9 3	18·0	18·0	18·0	17·4	17·8	18·0	17·0	18·1	18·2	18·3
11 14	12 6	10 18	10 6	11 16	18·9	18·7	18·5	18·0	17·0	18·6	17·1	17·6	18·4	18·0
9 4	9 19	8 14	8 13	9 7	17·7	17·3	17·7	17·5	18·0	17·0	16·6	17·5	18·0	18·1
8 19	9 9	8 6	8 0	9 9	18·5	19·0	18·5	18·5	18·4	18·5	18·5	18·8	19·0	18·5
10 12	9 12	9 9	11 15	11 0	19·2	18·6	18·4	18·7	19·1	18·8	19·4	18·6	18·7	18·6
12 0	12 0	9 10	9 15	12 0	18·7	19·0	19·4	19·0	19·7	19·1	19·4	19·0	18·8	18·7
10 0	12 0	9 9	10 18	9 18	19·3	19·1	19·6	19·1	19·1	18·7	18·8	18·7	19·0	19·0
10 14	11 17	10 0	10 11	10 8	19·0	19·2	19·2	18·5	19·0	18·7	19·2	18·9	18·2	18·7
9 11	10 17	9 6	10 8	11 0	18·2	19·4	19·3	18·6	18·7	18·7	19·4	19·3	18·3	19·3
12 8	13 3	12 11	11 17	12 5	18·5	18·4	18·4	18·7	18·1	18·5	18·3	17·4	18·1	17·3
10 17	11 14	10 11	11 8	12 6	16·5	19·6	19·2	19·6	19·2	19·1	18·8	18·8	18·6	19·5
10 14	10 19	9 17	10 8	9 12	19·0	18·7	18·5	18·8	19·6	19·7	19·6	19·0	19·1	19·4
11 6	12 4	12 2	11 12	12 2	17·9	17·4	17·8	17·6	17·7	17·7	17·9	18·6	18·4	17·7
10 14	10 0	9 5	9 11	9 12	18·2	18·6	19·1	18·8	18·7	18·5	18·1	18·8	19·1	18·6
8 15	8 15	8 18	8 14	8 19	18·6	18·8	17·9	18·1	18·2	18·0	17·6	17·8	17·6	18·0
11 9	10 13	10 8	10 17	11 14	15·8	17·5	17·5	17·6	18·9	19·0	18·8	18·2	18·3	18·0
10 8	9 3	8 15	8 14	10 2	16·5	16·5	16·2	16·8	17·4	17·7	17·1	17·7	17·9	18·5
8 13	9 12	8 16	8 15	8 18	17·8	17·7	18·3	18·5	18·4	17·3	17·6	18·6	17·6	18·2
10 18	11 1	10 17	10 15	10 18	16·6	17·4	16·2	17·3	16·8	17·2	18·2	17·0	16·6	16·5
12 15	11 16	13 1	12 0	12 7	18·1	18·6	18·2	18·3	17·9	17·5	18·0	18·1	18·4	17·2
10 3	10 15	9 8	9 6	9 3	17·5	17·7	17·0	17·5	17·9	17·7	16·9	17·5	17·5	16·8
10 0	10 18	11 12	11 18	11 15	17·5	18·5	18·2	18·2	18·0	17·2	17·8	15·8	17·4	17·9
10 5	8 15	9 0	9 7	10 0	17·1	17·5	17·9	17·8	17·7	17·5	16·5	17·6	17·1	18·0
12 0	10 18	11 3	11 6	12 10	17·1	17·2	18·4	17·0	17·6	16·8	16·7	16·9	16·2	16·2
13 3	11 15	11 18	12 15	13 0	16·7	16·8	17·3	17·6	17·1	16·7	17·5	18·0	18·1	15·6
8 18	9 3	8 19	9 0	9 5	17·2	17·2	17·8	17·5	17·4	18·2	16·9	13·7	15·0	15·0
9 0	9 4	8 12	9 4	9 5	18·4	17·9	17·5	17·5	17·1	17·7	18·4	17·3	17·8	17·4
10 6	10 11	9 17	10 1	10 10	17·9	18·2	18·1	18·1	18·1	18·0	18·0	17·9	17·9	17·9

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The average returns from the different plots at all centres are rather remarkably uniform both as regards yield and sugar content of the beet. There is an indication, however, that the heavier dressings of superphosphate, kainit and nitrogen (in the form of sulphate of ammonia and nitrate of soda) had, on the average, a tendency to slightly increase the yield. The returns at all centres from Plot VIII which received a dressing containing calcium cyanamide and from Plot VI which received an equivalent quantity of nitrogen in the form of sulphate of ammonia show that, on the average, better results as regards both yield and sugar content were obtained from Plot VI. This result is confirmed by the fact that at 70 per cent. of the total number of centres the yield from Plot VI was greater than the yield from Plot VIII. It is worthy of note that having regard to the quantity of artificial manures applied to each plot the dressing which contained nitrogen in the form of calcium cyanamide produced relatively poorer returns than any of the other dressings of artificial manure.

The differences in the average sugar content of the beet from the plots at the various centres are so slight that no definite conclusions should be drawn as to the influence of the different manurial dressings on the sugar content.

Having regard, however, to the results obtained from the plots to which the standard dressing of 4 cwt. superphosphate, 4 cwt. kainit, and 1 cwt. sulphate of ammonia per statute acre was applied, it is evident that this mixture can be relied upon to give satisfactory returns on most soils, and pending the results of further manurial trials, the Department have recommended the use of this mixture, supplemented, where necessary, by a top-dressing of nitrate of soda at the rate of 1 cwt. per statute acre.

II.—EXPERIMENTS AT THE DEPARTMENT'S FARMS AND AT THE ALBERT AGRICULTURAL COLLEGE (UNIVERSITY COLLEGE, DUBLIN).

During the season of 1927 experiments with sugar beet were conducted at the Department's Farms at Athenry, Ballyhaise and Clonakilty and also at the Albert Agricultural College, Glasnevin, to determine the effects of :—

(1) Application of farmyard manure in winter and in spring.
(2) Top-dressing with nitrate of soda at rates in excess of 1 cwt. per statute acre applied to four varieties of sugar beet.
(3) Application of artificial manures at different seasons.
(4) Sowing of the crops in rows or drills of different widths.
(5) Singling of the plants to different distances apart.
(6) Singling of the crop at different stages of growth.
(7) Neglect of timely and thorough after-cultivation of the crop.

Experiments were also conducted on the farm at The Munster Institute, Cork, with the object of determining the effects of varying quantities of phosphates on the ripening of the crop.

Experiments at Athenry, Ballyhaise, Clonakilty and Glasnevin Farms.

On the Continent where sugar beet is extensively cultivated the general practice is to apply the farmyard manure in autumn or winter as it is generally believed that the application of the manure immediately before sowing encourages the production of forked or badly shaped roots. With a view to testing the effects of applying farmyard manure to the sugar beet crop in winter and in the drill in spring experiments were conducted at three centres in 1926. The results of these trials which were published in the Department's Journal, Vol. XXVII No. 4, indicated generally that the time of year at which the farmyard manure was applied to the beet crop did not appear to exercise any appreciable influence on the shape of the roots produced or on the yield and sugar content of the beet. In view, however, of the relatively small number of centres at which these experiments were conducted in 1926 it was decided to repeat the tests at four centres in 1927.

The experiments conducted at the above-mentioned centres in 1927 were arranged as shown on the plan on the opposite page which is exactly the same as the plan of the previous year's experiments. The procedure adopted in laying down the experiments at each centre was as follows :—

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PLAN OF EXPERIMENTS

at the Department's Farms at Athenry, Ballyhaise and Clonakilty and at the Albert Agricultural College, Glasnevin (University College, Dublin).

	Farmyard Manure applied in Spring.	Farmyard Manure applied in Winter.
Wohanka Variety.	6 Drills ... ... 3 cwt. of Nitrate of Soda in 3 separate dressings.	
	6 „ ... ... 2 „ „ „ 2 „ „	
	6 „ ... ... 1 „ „ „ 1 dressing.	
	6 „ ... ... Not top-dressed.	
Horning Variety.	6 „ ... ... 3 cwt. of Nitrate of Soda in 3 separate dressings.	
	6 „ ... ... 2 „ „ „ 2 „ „	
	6 „ ... ... 1 „ „ „ 1 dressing.	
	6 „ ... ... Not top-dressed.	
German Variety.	6 „ ... ... 3 cwt. of Nitrate of Soda in 3 separate dressings.	
	6 „ ... ... 2 „ „ „ 2 „ „	
	6 „ ... ... 1 „ „ „ 1 dressing.	
	6 „ ... ... Not top-dressed.	
Dutch Variety.	6 „ ... ... 3 cwt. of Nitrate of Soda in 3 separate dressings.	
	6 „ ... ... 2 „ „ „ 2 „ „	
	6 „ ... ... 1 „ „ „ 1 dressing.	
	6 „ ... ... Not top-dressed.	
Artificial Manures Applied at Different Seasons.	6 „ ... ... Equivalent of 4 cwt. 35% Super., in form of Basic Slag, applied in Winter. 4 cwt. Kainit, applied in Spring. 1 cwt. Sulphate of Ammonia, applied in Spring.	
	6 „ ... ... 4 cwt. Super. 35%, applied at time of Sowing. 4 cwt. Kainit, applied in Winter. 1 cwt. Sulphate of Ammonia, applied at time of Sowing.	
	6 „ ... ... Equivalent of 4 cwt. 35% Super., in the form of Basic Slag, applied at time of Sowing. 4 cwt. Kainit, applied at time of Sowing. 1 cwt. Sulphate Ammonia, applied at time of Sowing.	
	6 „ ... ... 4 cwt. Super. 35%, applied at time of Sowing. 4 cwt. Kainit, applied at time of Sowing. 1 cwt. Sulphate Ammonia, applied at time of Sowing.	
	6 „ ... ... 4 cwt. Super 35%, applied at time of Sowing. 4 cwt. Kainit, applied at time of Sowing. 2 cwt. Sulphate Ammonia, applied at time of Sowing.	
Width of Drills.	6 „ ... ... 21″ Drills. Singled, 9″ apart.	
	6 „ ... ... 24″ Drills. „ 9″ „	
	6 „ ... ... 18″ Rows or Drills. „ 9″ „	
Singling at Different Distances Apart.	3 „ ... ... 18″ Rows or Drills. Singled, 8″ apart.	
	3 „ ... ... 18″ „ „ 12″ „	
	3 „ ... ... 24″ Drills. „ 8″ „	
	3 „ ... ... 24″ „ „ 12″ „	
	3 „ ... ... 21″ „ „ 8″ „	
	3 „ ... ... 21″ „ „ 12″ „	
Singling at Different Stages of Growth	6 „ ... ... 21″ Drills. Singled a week or 10 days before normal date of thinning.	
	6 „ ... ... 21″ Drills. Singled at the normal season.	
	6 „ ... ... 21″ Drills. Singled a week or 10 days later than normal date of thinning.	
Methods of Cultivation.	6 „ ... ... 21″ Drills. Cultivated better than ordinary crop.	
	6 „ ... ... 21″ Drills. Cultivated not so well as the ordinary crop.	
	Farmyard Manure applied in Spring.	Farmyard Manure applied in Winter.

Variety and Top-dressing Experiments.

Manurial and Cultivation Experiments.

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A rectangular plot of lea oat stubble ground measuring 116 yards by 84 yards, *i.e.*, approximately two statute acres, was marked off at each centre. This plot was divided into two equal portions by a line parallel to the longer dimension, and one portion was dressed with farmyard manure at the rate of 15 tons per statute acre before the land was ploughed in winter. A similar quantity of farmyard manure was stored over winter in a heap in the open, and was applied to the other portion of the plot in the drills before sowing. In order to ensure that both plots would receive farmyard manure of the same quality, it was arranged at each centre that, as the manure was being carted out on to the plot which was being manured in winter, every alternate load should be placed in a heap adjacent to the corresponding plot to be dressed with farmyard manure in spring. The heap when completed was compactly built so as to prevent undue losses through exposure to the weather and, before the manure was applied in spring, it was re-weighed in order to determine the loss in weight during storage. The shrinkage in weight at each centre was found to be as follows :—

Athenry	...	...	...	12%
Ballyhaise	...	...	...	18%
Clonakilty	...	...	...	22%
Glasnevin	...	...	...	23%

In preparing the land for the sowing of the seed, which, with the exception of variety trials, was of the Dutch (Kuhn & Co. P.) variety, the drills were made across both plots, and the farmyard manure stored over winter was applied to the plot which had been reserved for that purpose. On the adjoining plots to which farmyard manure had been applied either in winter or in spring, the various tests, as previously described and as shown in the plan at page 27, were carried out in duplicate.

Varieties and Top-dressing.

One acre at each centre, half of which had received a dressing of farmyard manure in winter and the other half in spring, was set aside for top-dressing trials with four varieties, viz. :—Dutch (" Kuhn & Co. P.") German (" Klein Wanzleben Original Z ") Horning (" H. S.") and Wohanka. To each of these one-acre plots a dressing of artificial manures, consisting of 4 cwt. superphosphate (35%), 4 cwt. kainit and 1 cwt. sulphate of ammonia, was applied at the time of sowing. At all centres the drills were 21 inches in width, and the seed was dibbled in by hand to allow exactly 9 inches between the plants when singled. On the one-acre plot at each centre, 24 drills were sown with each of the four varieties of seed, and the area under each variety was divided into four sub-plots, each comprising six drills. These sub-plots were arranged as shown on the plan, to which reference has already been made.

One sub-plot of each variety received no top-dressing. The other three sub-plots received a top-dressing of nitrate of soda at the rate of 1 cwt. per statute acre, immediately after singling. Two sub-plots received a second dressing of nitrate of soda, at the same rate, about 14 days after the first top-dressing was applied, and one sub-plot received a third top-dressing, at the same rate, about a fortnight after the second top-dressing was applied.

Apart from the extra top-dressing of nitrate of soda, the plots sown with the different varieties of seed were treated in exactly the same manner as the similar plots laid down in the previous year. The general cultivation, weighing, sampling and analyses of the crop on these plots were the same as in the case of the variety trials carried out by the Agricultural Instructors already described in this report. At the Ballyhaise centre where the soil is very stiff and heavy, the seed did not germinate evenly, with the result that the crop remained somewhat patchy throughout the season. At Glasnevin, where the sowing of the seed coincided with a spell of dry harsh weather, the braird was somewhat irregular, and growth was retarded to such an extent that singling was unduly delayed. Later in the season, however, the crop made good progress. At the other two centres the crop on all the plots developed normally, and at no

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centre were the plants injured to any serious extent by pests, or diseases. At the Athenry and Ballyhaise centres the plants on the plots to which farmyard manure had been applied in autumn, presented a slightly better appearance, and appeared to have developed more foliage than the plants on the corresponding plots to which farmyard manure was applied in spring. From Glasnevin centre it was reported that the braird on the plot to which farmyard manure was applied in the autumn, was more uniform than that on the plot which was manured in spring.

At all four centres both the Wohanka and Horning varieties produced a greater number of bolters than the other two varieties, the Wohanka being the worst in this respect.

The dates of sowing, singling and application of the top-dressing of nitrate of soda, together with particulars as to the yield and sugar content of the beet on the various sub-plots at each centre which received farmyard manure in winter, and on the corresponding sub-plots to which farmyard manure was applied in spring, are shown in Tables VIII. and IX., respectively.

TABLE VIII.

RETURNS FROM PLOTS TO WHICH FARMYARD MANURE WAS APPLIED IN WINTER.

Centre.	Date of Sowing	Date of Singling	Dates of application of top-dressing of Nitrate of Soda.			Not Top-dressed.							
						Yield per Statute Acre (Factory Weight).				Sugar Content of Roots.			
			1st Application	2nd Application	3rd Application	Wohanka Variety	Horning Variety	German Variety	Dutch Variety	Wohanka Variety	Horning Variety	German Variety	Dutch Variety
						T. C.	T. C.	T. C.	T. C.	%	%	%	%
Athenry	21-5-27	12-7-27	29-7-27	9-8-27	20-8-27	10 1	10 13	8 13	9 6	17·7	16·6	17·5	18·1
Ballyhaise	19-5-27	7-7-27	12-7-27	19-7-27	19-7-27	5 18	6 3	7 6	6 15	17·2	17·1	17·2	17·0
Clonakilty	5-5-27	14-6-27	24-6-27	8-7-27	22-7-27	13 6	12 11	14 7	14 11	15·2	16·9	16·6	17·9
Glasnevin	11-5-27	23-6-27	24-6-27	—	—	10 10	8 1	7 3	10 3	14·3	15·9	16·4	15·5
Average (Four Centres) ...						9 19	9 7	9 7	10 4	16·1	16·6	16·9	17·1

Centre.	Date of Sowing	Date of Singling	Dates of application of top-dressing of Nitrate of Soda.			Top-dressed with 1 Cwt. Nitrate of Soda per Statute Acre.							
						Yield per Statute Acre (factory weight).				Sugar Content of Roots.			
			1st Application	2nd Application	3rd Application	Wohanka Variety	Horning Variety	German Variety	Dutch Variety	Wohanka Variety	Horning Variety	German Variety	Dutch Variety
						T. C.	T. C.	T. C.	T. C.	%	%	%	%
Athenry	21-5-27	12-7-27	29-7-27	9-8-27	20-8-27	9 16	10 11	9 6	8 18	17·4	16·4	16·6	16·9
Ballyhaise	19-5-27	7-7-27	12-7-27	19-7-27	19-7-27	6 0	6 11	7 4	7 0	17·1	16·8	17·5	18·2
Clonakilty	5-5-27	14-6-27	24-6-27	8-7-27	22-7-27	13 9	16 3	14 18	15 17	16·8	16·7	16·8	18·7
Glasnevin	11-5-27	23-6-27	24-6-27	—	—	11 5	12 13	6 18	9 6	14·5	13·8	16·4	16·0
Average (Four Centres) ...						10 2	11 9	9 11	10 5	16·5	15·9	16·8	17·5

Centre.	Date of Sowing	Date of Singling	Dates of application of top-dressing of Nitrate of Soda.			Top-dressed with 2 Cwt. Nitrate of Soda per Statute Acre, applied in Two Separate Dressings.							
						Yield per Statute Acre (factory weight).				Sugar Content of Roots.			
			1st Application	2nd Application	3rd Application	Wohanka Variety	Horning Variety	German Variety	Dutch Variety	Wohanka Variety	Horning Variety	German Variety	Dutch Variety
						T. C.	T. C.	T. C.	T. C.	%	%	%	%
Athenry	21-5-27	12-7-27	29-7-27	9-8-27	20-8-27	10 1	10 0	10 1	9 1	17·1	17·5	17·4	17·3
Ballyhaise	19-5-27	7-7-27	12-7-27	19-7-27	19-7-27	8 8	7 4	7 10	7 0	16·2	16·8	16·6	16·8
Clonakilty	5-5-27	14-6-27	24-6-27	8-7-27	22-7-27	3 9	14 11	14 7	15 9	16·0	16·8	17·0	16·8
Glasnevin	11-5-27	23-6-27	24-6-27	—	—	11 9	12 14	8 9	6 11	15·5	15·0	16·0	14·6
Average (Four Centres) ...						10 17	11 2	10 2	9 10	16·2	16·5	16·8	16·4

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TABLE VIII.—continued.

Centre.	Date of Sowing	Date of Singling	Dates of application of top-dressing of Nitrate of Soda.			Top-dressed with 3 Cwt. Nitrate of Soda per Statute Acre, applied in Three Separate Dressings.							
						Yield per Statute Acre (Factory Weight).				Sugar Content of Roots.			
			1st Application	2nd Application	3rd Application	Wohanka Variety	Horning Variety	German Variety	Dutch Variety	Wohanka Variety	Horning Variety	German Variety	Dutch Variety
						T. C.	T. C.	T. C.	T. C.	%	%	%	%
Athenry	21-5-27	12-7-27	29-7-27	9-8-27	20-8-27	9 11	10 16	10 0	8 1	17·4	14·8	16·1	15·9
Ballyhaise	19-5-27	7-7-27	12-7-27	19-7-27	26-7-27	7 10	6 19	7 2	7 5	15·6	16·8	17·0	17·5
Clonakilty	5-5-27	14-6-27	24-6-27	8-7-27	22-7-27	12 17	13 3	14 4	15 3	16·4	15·7	17·4	17·9
Glasnevin	11-5-27	23-6-27	24-6-27	—	—	9 10	11 17	7 11	7 0	15·5	15·9	15·8	15·5
Average (Four Centres) ...						9 17	10 11	9 14	9 7	16·2	15·8	16·8	16·7

TABLE IX.

Returns from Plots to which Farmyard Manure was applied in Spring.

Centre.	Date of Sowing	Date of Singling	Dates of application of top-dressing of Nitrate of Soda.			Not Top-dressed.							
						Yield per Statute Acre (factory weight).				Sugar Content of Roots.			
			1st Application	2nd Application	3rd Application	Wohanka Variety	Horning Variety	German Variety	Dutch Variety	Wohanka Variety	Horning Variety	German Variety	Dutch Variety
						T. C.	T. C.	T. C.	T. C.	%	%	%	%
Athenry	21-5-27	12-7-27	29-7-27	9-8-27	20-8-27	9 14	9 1	7 0	7 7	17·3	17·9	17·7	17·1
Ballyhaise	19-5-27	7-7-27	12-7-27	19-7-27	26-7-27	6 10	6 0	5 14	6 12	17·3	16·9	16·6	16·1
Clonakilty	5-5-27	14-6-27	24-6-27	8-7-27	22-7-27	13 18	14 7	13 6	15 3	16·6	17·5	18·0	17·3
Glasnevin	11-5-27	23-6-27	24-6-27	—	—	7 17	12 7	9 8	11 11	15·7	16·5	15·9	14·7
Average (Four Centres) ...						9 10	10 9	8 17	10 3	16·7	17·2	17·0	16·3

Centre.	Date of Sowing	Date of Singling	Dates of application of top-dressing of Nitrate of Soda.			Top-dressed with 1 Cwt. Nitrate of Soda per Statute Acre.							
						Yield per Statute Acre (factory weight).				Sugar Content of Roots.			
			1st Application	2nd Application	3rd Application	Wohanka Variety	Horning Variety	German Variety	Dutch Variety	Wohanka Variety	Horning Variety	German Variety	Dutch Variety
						T. C.	T. C.	T. C.	T. C.	%	%	%	%
Athenry	21-5-27	12-7-27	29-7-27	9-8-27	20-8-27	8 13	8 10	7 1	7 11	17·9	17·9	16·4	16·3
Ballyhaise	19-5-27	7-7-27	12-7-27	19-7-27	26-7-27	6 3	7 1	7 13	8 0	16·4	16·0	16·2	16·4
Clonakilty	5-5-27	14-6-27	24-6-27	8-7-27	22-7-27	13 13	14 9	14 11	15 13	16·1	17·1	17·8	18·0
Glasnevin	11-5-27	23-6-27	24-6-27	—	—	7 11	11 14	8 3	11 5	14·8	15·3	15·6	15·7
Average (Four Centres) ...						9 0	10 8	9 7	10 12	16·3	16·8	16·5	16·6

Centre.	Date of Sowing	Date of Singling	Dates of application of top-dressing of Nitrate of Soda.			Top-dressed with 2 Cwt. Nitrate of Soda per Statute Acre, applied in Two Separate Dressings.							
						Yield per Statute Acre (factory weight).				Sugar Content of Roots.			
			1st Application	2nd Application	3rd Application	Wohanka Variety	Horning Variety	German Variety	Dutch Variety	Wohanka Variety	Horning Variety	German Variety	Dutch Variety
						T. C.	T. C.	T. C.	T. C.	%	%	%	%
Athenry	25-5-27	12-7-27	29-7-27	9-8-27	20-8-27	8 0	9 7	8 13	7 16	17·3	17·7	17·5	16·3
Ballyhaise	19-5-27	7-7-27	12-7-27	19-7-27	26-7-27	7 15	7 9	7 10	7 0	16·2	16·9	16·3	15 9
Clonakilty	5-5-27	14-6-27	24-6-27	8-7-27	22-7-27	13 16	13 14	14 0	16 1	16·7	15·0	17·0	17·3
Glasnevin	11-5-27	23-6-27	24-6-27	—	—	8 18	7 17	10 10	9 13	15·2	15·5	16·5	15·7
Average (Four Centres) ...						9 12	9 12	10 3	10 2	16·3	16·3	16·8	16·3

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TABLE IX.—continued.

Centre.	Date of Sowing	Date of Singling	Dates of application of top-dressing of Nitrate of Soda.			Top-dressed with 3 Cwt. Nitrate of Soda per Statute Acre, applied in Three Separate Dressings.							
						Yield per Statute Acre (Factory Weight).				Sugar Content of Roots.			
			1st Application	2nd Application	3rd Application	Wohanka Variety	Horning Variety	German Variety	Dutch Variety	Wohanka Variety	Horning Variety	German Variety	Dutch Variety
						T. C.	T. C.	T. C.	T. C.	%	%	%	%
Athenry ·	21-5-27	12-7-27	29-7-27	9-8-27	20-8-27	8 7	8 0	9 3	6 11	17·1	17·0	17·5	16·0
Ballyhaise ·	19-5-27	8-7-27	12-7-27	19-7-27	26-7-27	7 2	7 11	8 4	6 17	16·9	15·6	16·0	16·3
Clonakilty ·	5-5-27	14-6-27	24-6-27	8-7-27	22-7-27	14 8	14 1	13 13	15 10	16·1	17·0	16·2	16·9
Glasvenin ·	13-5-27	23-6-27	24-6-27	—	—	7 18	9 0	9 11	8 15	14·7	16·4	15·9	15·2
Average (Four Centres) ...						9 9	9 13	10 3	9 8	16·2	16·5	16·4	16·1

The average returns produced by the Wohanka variety are slightly inferior to those produced by the other three varieties, and in view of the fact that this variety also produced the greatest number of " bolters," it does not appear to be as suitable for cultivation in this country as the other varieties included in the trials. The Horning variety, whilst slightly superior in yielding capacity, was inferior as regards sugar content to both the Dutch and the German varieties, and as it produced a relatively large number of bolters, it cannot be considered so suitable for cultivation in this country as either the Dutch or the German variety.

On the average, slightly better yields were obtained from the plots to which farmyard manure was applied in the winter than from the corresponding plots to which the manure was applied in the spring. This was most marked at the Athenry and Glasnevin centres. The time of application of the farmyard manure does not, however, appear to have exercised any appreciable influence on the sugar content of the beet, or on the shape of the roots.

The top-dressing of nitrate of soda at the rate of 1 cwt. per statute acre slightly increased the yield, but the heavier top-dressings did not, on the average produce any additional increased yield. On the whole, the top-dressings of nitrate of soda in excess of 1 cwt. per statute acre, reduced the sugar content of the beet but, except at the Ballyhaise centre, the reduction is almost negligible.

Different Dressings of Artificial Manures applied at different seasons.

With the object of comparing the effects of dressings of basic slag and kainit applied in winter and immediately before sowing with the standard dressing of artificial manures and a dressing consisting of 4 cwt. superphosphate, 4 cwt. kainit and 2 cwt. sulphate of ammonia per statute acre applied at the usual time, *i.e.*, in the drills at the time of sowing, a series of plots were laid down at each centre on the same lines as last season, and as shown on the plan on page 27. Apart from the differences in the composition and application of the dressings of artificial manures, the crop on all the plots was treated in exactly the same manner as the sub-plots in the variety and top-dressing trials which received a top-dressing of nitrate of soda at the rate of 1 cwt. per statute acre.

During the growing season, no outstanding difference was noticeable in the general appearance of plants on the different plots at any of the centres. The results from the portions of the plots to which farmyard manure was applied in winter and in spring are shown separately in Tables X and XI respectively.

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TABLE X.

Returns from Plots to which Farmyard Manure was applied in Winter.

	Artificial Manures applied per Statute Acre.	Yield per Statute Acre (Factory Weight).				Sugar Content of Roots.				Average.	
		Athenry	Ballyhaise	Clonakilty	Glasnevin	Athenry	Ballyhaise	Clonakilty	Glasnevin	Yield (Factory Weight)	Sugar Content
		T. C.	T. C.	T. C.	T. C.	%	%	%	%	T. C.	%
1.	The equivalent of 4 cwt. 35% Superphosphate in the form of High Grade Basic Slag applied in Winter. 4 cwt. Kainit, applied in the drills before sowing. 1 cwt. Sulphate of Ammonia, applied in the drills before sowing.	8 0	6 16	15 8	11 14	17·3	16·1	17·1	13·6	10 7	16·0
2.	4 cwt. 35% Superphosphate, applied in the drills before sowing. 4 cwt. Kainit, applied in Winter 1 cwt. Sulphate of Ammonia, applied in the drills before sowing.	9 10	7 1	15 6	11 10	17·5	17·3	16·3	14·4	10 17	16·4
3.	High Grade Basic Slag at the same rate as in Plot (1), but applied in the drills before sowing. 4 cwt. Kainit, applied in the drills before sowing. 1 cwt. Sulphate of Ammonia, applied in the drills before sowing.	8 10	7 8	15 13	9 3	17·0	17·4	16·7	16·1	10 3	16·8
4.	4 cwt. Superphosphate (35%), applied in the drills before sowing. 4 cwt. Kainit, applied in the drills before sowing. 1 cwt. Sulphate of Ammonia, applied in the drills before sowing.	8 18	7 3	18 1	9 10	16·5	16·9	16·6	16·0	10 18	16·5
5.	4 cwt. Superphosphate (35%), applied in the drills before sowing. 4 cwt. Kainit, applied in the drills before sowing. 2 cwt. Sulphate of Ammonia, applied in the drills before sowing.	8 0	7 10	17 13	10 11	16·6	17·7	16·4	15·2	11 1	16·5

TABLE XI.

Returns from Plots to which Farmyard Manure was applied in Spring.

	Artificial Manures applied per Statute Acre.	Yield per Statute Acre. (Factory Weight)				Sugar Content of Roots.				Average.	
		Athenry	Ballyhaise	Clonakilty	Glasnevin	Athenry	Ballyhaise	Clonakilty	Glasnevin	Yield (Factory Weight).	Sugar Content
		T. C.	T. C.	T. C.	T. C.	%	%	%	%	T. C.	%
1.	The equivalent of 4 cwts. 35% Superphosphate in the form of High Grade Basic Slag, applied in Winter. 4 cwt. Kainit, applied in the drills before sowing. 1 cwt. Sulphate of Ammonia, applied in the drills before sowing.	7 10	7 4	14 19	9 18	17·0	18·0	16·7	16·3	9 18	17·0
2.	4 cwt. Superphosphate (35%), applied in the drills before sowing. 4 cwt. Kainit, applied in Winter 1 cwt. Sulphate of Ammonia, applied in the drills before sowing.	7 17	6 12	7 3	9 12	17·1	16·0	17·4	16·0	10 6	16·6
3.	High Grade Basic Slag at the same rate as in Plot (1), but applied in the drills before sowing. 4 cwts. Kainit, applied in the drills before sowing. 1 cwt. Sulphate of Ammonia, applied in the drills before sowing.	8 7	7 10	16 16	9 5	17·0	17·4	16·6	15·9	10 7	16·7
4.	4 cwt. Superphosphate (35%), applied in the drills before sowing. 4 cwt. Kainit, applied in the drills before sowing. 1 cwt. Sulphate of Ammonia, applied in the drills before sowing.	7 16	7 8	16 11	8 18	17·7	16·4	15·7	14·4	10 3	16·0
5.	4 cwt. Superphosphate (35%), applied in the drills before sowing. 4 cwt. Kainit, applied in the drills before sowing. 2 cwt. Sulphate of Ammonia, applied in the drills before sowing.	8 3	8 6	15 9	7 4	16·4	16·3	16·7	14·3	9 15	15·9

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As there is remarkably little difference in the average returns from the various sub-plots, it may be inferred that good results may in general be expected where the standard dressing consisting of 4 cwt. superphosphate, 4 cwt. kainit, and 1 cwt. sulphate of ammonia per statute acre is applied, and that no advantage is to be gained by applying portion of this dressing in winter, or by substituting basic slag for superphosphate in the mixture. As in the case of the variety experiments, slightly better yields were obtained from the portions of the plots where the farmyard manure was applied in winter.

Width of Drills.

As in the previous season, a series of plots in which the drills were of varying width, were laid down at each centre. The general arrangement of the plots was as shown on the plan at page 27 of this report. In all respects, except in the width of the drills, the crop on the plots was treated in exactly the same manner as that on the sub-plots in the variety and top-dressing trials which was top-dressed with nitrate of soda at the rate of 1 cwt. per statute acre. From one centre it was reported that some difficulty was experienced in avoiding injury to the plants when cultivating, with the ordinary implements, between the drills which were 18 inches apart. In the case of the drills 21 inches in width no such difficulty arose at any centre.

Weighings and analyses were obtained from both portions of each plot to which farmyard manure was applied either in winter or in spring, and the results are shown separately in Tables XII and III, respectively.

TABLE XII.

RETURNS FROM PLOTS TO WHICH FARMYARD MANURE WAS APPLIED IN WINTER.

CENTRE.	Yield per Statute Acre (Factory Weight).			Sugar Content of Roots.		
	18-Inch Rows.	21-Inch Rows.	24-Inch Rows.	18-Inch Rows.	21-Inch Rows.	24-Inch Rows.
	T. C.	T. C.	T. C.	%	%	%
Athenry ...	8 16	8 3	7 13	18·1	17·9	17·4
Ballyhaise ...	6 0	8 3	7 10	16·6	17·1	14·9
Clonakilty ...	16 6	17 16	15 13	16·5	16·5	15·3
Glasnevin ...	12 8	9 8	9 7	15·6	15·9	15·8
Average (Four Centres) ...	10 18	10 18	10 1	16·7	16·8	15·9

TABLE XIII.

RETURNS FROM PLOTS TO WHICH FARMYARD MANURE WAS APPLIED IN SPRING.

CENTRE.	Yield per Statute Acre (Factory Weight).			Sugar Content of Roots.		
	18-Inch Rows.	21-Inch Rows.	24-Inch Rows.	18-Inch Rows.	21-Inch Rows.	24-Inch Rows.
	T. C.	T. C.	T. C.	%	%	%
Athenry ...	8 10	7 3	7 0	18·2	17·6	16·6
Ballyhaise ...	7 8	7 12	6 18	16·0	16·7	16·0
Clonakilty ...	16 17	16 18	17 6	16·5	16·6	16·9
Glasnevin ...	9 7	8 0	8 0	15·7	15·2	13·7
Average (Four Centres) ...	10 1	9 18	9 16	16·6	16·8	15·8

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On the average there is practically no difference in the returns both as regards yield and sugar content of the crops from the sub-plots where the drills were 18 inches and 21 inches wide respectively. The results from both these series of sub-plots were, however, definitely superior to those obtained from the sub-plots where the drills were 24 inches wide.

The yields and sugar content were on the average higher on the portions of the plots to which the farmyard manure was applied in winter than on the corresponding portions where the manure was applied in spring.

Singling of the Plants and different distances apart.

Plots on which the plants were singled to 8 inches and 12 inches apart, respectively, were again arranged at each centre. The general arrangement of the sub-plots is shown in the plan on page 27. Apart from the singling of the plants to different distances apart, the crop on these plots was treated in exactly the same manner as crop on the plots in the "width of drills" test, conducted at the same centres. As in the other tests, the results from both portions of each plot to which farmyard manure was applied either in winter or in spring are shown separately in Tables XIV and XV, respectively.

TABLE XIV.

RETURNS FROM PLOTS TO WHICH FARMYARD MANURE WAS APPLIED IN WINTER.

CENTRE.	Distance apart of Singling.	Yield per Statute Acre (Factory Weight).			Sugar Content of Roots.		
		18-inch Drills.	21-inch Drills.	24-inch Drills.	18-inch Drills.	21-inch Drills.	24-inch Drills.
		T. C.	T. C.	T. C.	%	%	%
Athenry ...	8 inches ...	8 17	9 4	9 18	17·3	17·0	17·5
Ballyhaise ...	8 inches ...	7 10	7 12	6 10	16·9	17·0	17·0
Clonakilty ...	8 inches ...	14 13	14 11	15 19	16·3	15·6	17·0
Glasnevin ...	8 inches ...	8 15	13 4	9 5	15·5	16·9	13·9
Average (Four Centres) ...		9 19	11 3	10 8	16·5	16·6	16·3
Athenry ...	12 inches ...	9 1	8 8	8 6	17·8	17·0	17·1
Ballyhaise ...	12 inches ...	8 6	7 14	6 4	16·7	16·1	17·6
Clonakilty ...	12 inches ...	17 4	16 3	15 9	16·4	15·7	16·7
Glasnevin ...	12 inches ...	9 15	11 11	8 14	12·5	14·4	14·7
Average (Four Centres) ...		11 1	10 19	9 13	15·8	15·8	16·4

TABLE XV.

RETURNS FROM PLOTS TO WHICH FARMYARD MANURE WAS APPLIED IN SPRING.

CENTRE.	Distance apart of Singling.	Yield per Statute Acre (Factory Weight).			Sugar Content of Roots.		
		18-inch Drills.	21-inch Drills.	24-inch Drills.	18-inch Drills.	21-inch Drills.	24-inch Drills.
		T. C.	T. C.	T. C.	%	%	%
Athenry ...	8 inches ...	8 4	6 14	8 10	18·0	16·7	17·5
Ballyhaise ...	8 inches ...	7 5	6 3	8 0	16·1	16·7	15·5
Clonakilty ...	8 inches ...	14 14	15 4	16 13	17·5	17·1	16·7
Glasnevin ...	8 inches ...	7 16	10 10	8 13	14·0	16·0	15·0
Average (Four Centres) ...		9 9	9 13	10 9	16·4	16·6	16·2
Athenry ...	12 inches ...	8 16	6 13	6 13	17·9	17·3	17·0
Ballyhaise ...	12 inches ...	7 15	6 18	6 0	16·0	17·0	16·1
Clonakilty ...	12 inches ...	17 10	15 7	15 3	16·0	16·2	16·5
Glasnevin ...	12 inches ...	5 5	10 10	8 1	13·8	13·9	15·2
Average (Four Centres) ...		9 16	9 17	8 19	15·9	16·1	16·2

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On the plots where the drills were 18 inches apart, better yields were obtained, where the plants were singled to 12 inches apart than when singled to 8 inches apart, while in the case of the drills 24 inches wide, the reverse was the case.

On the plots where the drills were 21 inches in width, the difference in the distance between the plants in the drills did not influence the yield. As regards the sugar content of the samples drawn from the different plots, slightly better results on the average were obtained from the crop grown in drills measuring 18 inches and 21 inches in width, when the plants were singled to 8 inches apart as compared with 12 inches apart but the average sugar content of the beet from the drills 24 inches wide was apparently not influenced by the distance between the plants in the rows.

As in the other trials conducted at these centres, slightly better yields were obtained where the farmyard manure was applied in winter.

Singling at different stages of growth.

As shown on the plan at page 27, this experiment comprised three plots of six drills each, at each centre. The crop on the middle plot at each centre was singled to 9 inches apart at the same time as the general crop of sugar beet grown on the same field was being singled, *i.e.*, when the plants had reached the four-leaf stage. The crop on one of the other plots was singled to the same distance apart about 10 days earlier, and on the third plot the plants were singled in the same manner about 10 days later than the crop on the middle plot. Apart from the differences in the dates of singling, these plots received exactly the same treatment as the sub-plots in the variety and top-dressing trials at the same centres which received a top-dressing of nitrate of soda at the rate of 1 cwt. per statute acre. Weighings and analyses were obtained from both portions of each plot to which farmyard manure was applied either in winter or in spring, and the results are shown separately in Tables XVI and XVII, respectively.

TABLE XVI.

RETURNS FROM PLOTS TO WHICH FARMYARD MANURE WAS APPLIED IN WINTER.

CENTRE.	Date of Sowing.	Date of Singling.			Yield per Statute Acre (Factory Weight)			Sugar Content of Roots.		
		"Early"	"Normal"	"Late"	"Early"	"Normal"	"Late"	"Early"	"Normal"	"Late"
					T. C.	T. C.	T. C.	%	%	%
Athenry	21/5/27	5/7/27	13/7/27	23/7/27	8 11	8 1	7 8	17·0	16·7	17·1
Ballyhaise	19/5/27	27/6/27	9/7/27	19/7/27	6 4	7 10	6 14	16·7	17·0	16·6
Clonakilty	5/5/27	8/6/27	20/6/27	30/6/27	16 16	16 6	16 9	16·5	15·4	16·5
Glasnevin	13/5/27	3/6/27	24/6/27	5/7/27	9 18	11 10	9 13	14·4	15·9	15·9
Average (Four Centres)					10 7	10 17	10 1	16·2	16·2	16·5

TABLE XVII.

RETURNS FROM PLOTS TO WHICH FARMYARD MANURE WAS APPLIED IN SPRING.

CENTRE.	Date of Sowing.	Date of Singling.			Yield per Statute Acre (Factory Weight).			Sugar Content of Roots.		
		"Early"	"Normal"	"Late"	"Early"	"Normal"	"Late"	"Early"	"Normal"	"Late"
					T. C.	T. C.	T. C.	%	%	%
Athenry	21/5/27	5/7/27	13/7/27	23/7/27	6 14	8 3	7 4	17·1	17·5	17·2
Ballyhaise	19/5/27	27/6/27	9/7/27	19/7/27	5 14	6 11	7 5	15·3	14·8	15·8
Clonakilty	5/5/27	8/6/27	20/6/27	30/6/27	15 7	15 19	15 10	16·1	16·9	16·5
Glasnevin	13/5/27	13/6/27	24/6/27	5/7/27	9 1	9 10	10 0	15·5	16·4	17·2
Average (Four Centres)					9 4	10 1	10 0	16·0	16·4	16·7

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On the average there is but little difference in the returns from the different plots. Slightly better yields were, however, obtained where the plants were singled at the "normal" date, *i.e.*, when they had reached the four-leaf stage of growth than where singling was carried out at an "early" or at a "late" date. The date of singling does not appear to have appreciably influenced the sugar content of the roots. In this experiment also slightly better yields were obtained from the proportions of the plots to which the farmyard manure was applied in winter.

Methods of Cultivation.

The arrangement of this experiment was exactly similar to that adopted last season, and was as follows :—

Two plots of six drills each were laid down at each centre. The two plots were treated similarly at each centre, except in regard to after-cultivation of the crops. In each case one of the plots was cultivated in a manner which may be regarded as better than that which would generally be accorded to the sugar beet crop grown under ordinary conditions. During the same period the other plot received less attention as regards after-cultivation than would be given under ordinary conditions. Particulars regarding the after-cultivation of the plots at each centre, and the results obtained from weighings and analyses in respect of the portions of the plots to which farmyard manure was applied either in winter or in spring are shown separately in Tables XVIII and XIX, respectively.

TABLE XVIII.

RETURNS FROM PLOTS TO WHICH FARMYARD MANURE WAS APPLIED IN WINTER.

Centre.	Treatment of "Better Cultivated Plot."	Treatment of "Badly Cultivated Plot."	Yield per Statute Acre.		Sugar Content of Roots.	
			"Better Cultivated Plot."	"Badly Cultivated Plot."	"Better Cultivated Plot."	"Badly Cultivated Plot."
			T. C.	T. C.	%	%
Athenry	Hand-hoed twice Horse-hoed six times	Hand-hoed once Horse-hoed twice	9 16	7 16	17·4	17·5
Ballyhaise	Horse-hoed six times Hand-hoed twice Hand-weeded once	Horse-hoed twice Hand-hoed once	6 17	6 10	16·7	17·1
Clonakilty	Hand-hoed once Horse-hoed five times Hand-weeded once	Hand-hoed once Horse-hoed three times Hand-weeded once	17 17	16 17	16·8	16·9
Glasnevin	Hand-hoed twice Horse-hoed four times before Singling	No cultivation before Singling	11 3	11 0	13·0	14·7
Average (Four Centres)			11 8	10 11	16·0	16·5

TABLE XIX.

RETURNS FROM PLOTS TO WHICH FARMYARD MANURE WAS APPLIED IN SPRING.

Centre.	Treatment of "Better Cultivated Plot."	Treatment of "Badly Cultivated Plot."	Yield per Statute Acre.		Sugar Content of Roots.	
			"Better Cultivated Plot."	"Badly Cultivated Plot."	"Better Cultivated Plot.'	"Badly Cultivated Plot."
			T. C.	T. C.	%	%
Athenry	Hand-hoed twice Horse-hoed six times	Hand-hoed once Horse-hoed twice	9 10	8 0	17·5	17·8
Ballyhaise	Horse-hoed six times Hand-hoed twice Hand-weeded twice	Horse-hoed twice Hand-hoed once	6 8	6 12	15·6	15·0
Clonakilty	Hand-hoed once Horse-hoed five times Hand-weeded once	Hand-hoed once Horse-hoed three times Hand-weeded once	17 7	13 13	16·7	17·2
Glasnevin	Horse-hoed four times Hand-hoed twice before Singling	No cultivation prior to Singling	9 18	10 4	15·3	15·5
Average (Four Centres)			10 16	9 12	16·3	16·4

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From all sub-plots, with a single exception, better yields were obtained from the plots which received extra attention as regards cultivation after the crop was sown. Whilst there was little difference in the average sugar content of the samples from the different plots at each centre, it is rather remarkable that, with one exception, a higher sugar content was obtained from the " badly cultivated " crop than from the " better cultivated " one. On the average, however, the increased yield due to extra cultivation would more than compensate for the lower sugar content of the beet grown on the " better cultivated " plots. Here again better results were obtained from the portions of the plots to which the farmyard manure was applied in winter.

Experiments at the Munster Institute Farm.

As it has been suggested that phosphates exercise a considerable influence on the maturity or ripening of the sugar beet crop, and that the ripening of the crop can be hastened by the application of extra dressings of phosphatic manures, it was decided to conduct a trial at The Munster Institute Farm to determine the effects of different quantities of superphosphate on the yield and sugar content of the sugar-beet crop. The experiment was arranged as follows :—To three adjacent plots of similar size a uniform dressing of farmyard manure was applied. In addition, Plot I received a dressing of artificial manures consisting of a mixture of 6 cwt. superphosphate (35%), 4 cwt. kainit, and 1 cwt. sulphate of ammonia per statute acre. The second plot was dressed with a similar dressing plus an additional 2 cwt. of superphosphate (35%) per statute acre. The third plot was dressed in the same manner as Plot I but in addition, an extra 4 cwt. superphosphate (35%) per statute acre was applied. The Dutch (Kuhn P.), variety of seed was dibbled in at the same rate per acre on all plots.

The seedling beet on these three plots was so severely attacked by mangel fly that the leaves of the plants became somewhat stunted and brown in colour. Although it was difficult, in these circumstances, to make reliable observations it appeared at the time of thinning that the plants on Plots II and III, which received the extra amounts of superphosphate, were slightly more vigorous than those on the remaining plot. No difference was, however, noted in the appearance of the crop on the three plots during the later stages of growth.

Particulars of the yield and sugar content of the beet on the different sub-plots are shown in Table XX.

TABLE XX.

No. of Plot	Manuring per Statute Acre.			Date of Sowing.	Date of Singling.	Date of Lifting and Weighing.	Yield per Statute Acre (Factory Weight).	Sugar Content of Roots.
	Superphosphate 35%	Kainit.	Sulphate of Ammonia.					
	cwt.	cwt.	cwt.				T. C.	%
I	6	4	1	29 Apl.	11 June	16 Nov.	10 18	15·9
II	8	4	1	do.	do.	do.	10 14	15·5
III	10	4	1	do.	do.	do.	11 7	16·7

As the returns from these plots may have been influenced by the severe attacks of mangel fly, no definite conclusions should be drawn from the results of this experiment as to the effects of the extra dressings of superphosphate on the yield and sugar content of the crop. It is evident, however, from this trial that even a relatively heavy dressing of superphosphate is not likely to exercise any appreciable influence on the ripening of the crop as indicated by its general appearance.

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SUMMARY OF THE RESULTS OF THE PRINCIPAL EXPERIMENTS WITH SUGAR BEET CONDUCTED IN THE YEAR 1927.

(1) Of the five varieties tested on a large scale, the Dutch and German varieties were equal as regards yield and sugar content, and in these respects they were superior to the Danish and French varieties. The Wohanka variety was distinctly inferior as regards yield to any of the other varieties, but in sugar content it was slightly better than even the Dutch and German varieties.

(2) The average returns from the large-scale variety trials conducted under the supervision of the County Instructors in Agriculture at 127 centres were :—

	Yield (Factory Weight) tons.	cwt.	Sugar Content. %
Dutch	11	2	17·6
German	11	2	17·6
Danish	10	18	17·0
French	10	16	17·0
Wohanka	10	4	17·7

(3) Slightly better yields were obtained where farmyard manure was ploughed in during winter. The application of well-rotted farmyard manure in the drill before sowing did not, however, appear to affect, adversely, the shape of the roots.

(4) A top-dressing of nitrate of soda at the rate of 1 cwt. per statute acre applied after the crop was singled, increased the average yield by 9 cwt. per statute acre, but decreased the average sugar content of the beet by 0·14%. The increase in the average yield was due very largely to the rather marked effect of the top-dressing on the crop at a number of centres where the beet was sown under unfavourable conditions or where mangel fly attacked the crop to a serious extent.

(5) The best results as regards both yield and sugar content were obtained where the drills were 21 inches or less in width.

(6) Better results were obtained where the plants were singled at the stage when they had developed four rough leaves than when the singling was performed at either an earlier or a later stage of growth.

SUMMARY OF THE RESULTS OF THE PRINCIPAL EXPERIMENTS WITH SUGAR BEET CARRIED OUT IN EACH OF THE YEARS 1925, 1926 and 1927.

(1) Of the four varieties of sugar beet included in the trials conducted during the three seasons, the Dutch (Kuhn & Co. P.) and the German (Klein Wanzleben Original Z) varieties were superior both as regards yield and sugar content to the Danish (Scandinavian Seed Co's K 7866), and the French (Vilmorin's Improved Selection B) varieties. While the yield and sugar content of the Dutch and German varieties were practically identical, the Dutch variety was distinctly superior to the German variety as regards the tendency to bolt, and it is, therefore, more suitable than the latter variety for cultivation in this country.

(2) A top-dressing of nitrate of soda at the rate of 1 cwt. per statute acre applied after the crop was singled, did not lower appreciably the sugar content of the beet. The increased yield resulting from this top-dressing depended largely on the condition of the soil and the growth of the crop at the time it was applied. Under favourable conditions of soil and growth, the top-dressing did not materially increase the yield, but in unfavourable seasons, or under adverse conditions, as for example, where the crop was attacked by pests or diseases, the top-dressing of nitrate of soda was the means of carrying the plants over a critical period in the early stages of growth. The top-dressings of nitrate of soda in excess of one cwt. per statute acre slightly depressed the sugar content of the beet without producing any compensating increase in yield.

HCAB HAAH

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(DEPARTMENT OF LANDS AND AGRICULTURE)

REPORT

ON THE

SUGAR BEET EXPERIMENTS, 1928. in Irland.



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PUBLISHED BY THE STATIONERY OFFICE.

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SUGAR BEET EXPERIMENTS, 1928.

PREVIOUS TRIALS.

Reports on the results of experiments on the cultivation of sugar beet which were conducted by the Department in each of the years 1925, 1926 and 1927 appeared in the following issues of the Department's Journal: Vol. XXVI., No. 1; Vol. XXVII., No. 1; and Vol. XXVIII., No. 1, and also in pamphlet form.

THE 1928 EXPERIMENTS.

In the 1928 season the Department again arranged for the conduct of experiments with sugar beet under the supervision of the Agricultural Instructors, also at the Albert Agricultural College (University College, Dublin) and at the Department's Farms at Athenry, Ballyhaise, Clonakilty and the Munster Institute. These experiments embraced trials with varieties, manures and sugar factory waste lime, and also tests in the cultivation, harvesting and storing of the crop and in the production of ensilage from beet tops.

I.—EXPERIMENTS CONDUCTED BY THE AGRICULTURAL INSTRUCTORS.

Variety Trials.

The variety and top-dressing trials conducted by the Agricultural Instructors in 1925, 1926 and 1927 had shown that the varieties Kuhn (P) and Klein-Wanzleben (Z) were definitely superior as regards both yield and sugar content to the other varieties tested, and these trials had also revealed the results to be expected from the application to the beet crop of a top-dressing of nitrate of soda at the rate of 1 cwt. per statute acre. Having regard to these results it was decided to discontinue the top-dressing trials with nitrate of soda and to test the relative merits of the varieties Kuhn (P) and Klein-Wanzleben (Z) by comparing each of them with a strain of the same variety, Kuhn (Pa) and Klein-Wanzleben (E) respectively, which it was anticipated would produce an appreciably heavier crop of roots containing a slightly lower percentage of sugar. Accordingly the experiments at each centre were confined to trials of these four varieties.

In all respects other than those mentioned above these variety trials were conducted by the Agricultural Instructors in 1928 on lines similar to those adopted in the case of the sugar beet trials carried out in the three preceding years, particulars of which were set out in the report for each year. The general conditions of the scheme of experiments were as follows:—

(1) That the area of the experimental plot at each centre should be one statute acre, except in the case of plots laid down in Counties Cavan, Donegal, Galway, Leitrim, Longford, Mayo, Monaghan, Roscommon, Sligo, where the area of each plot should be one-quarter statute acre.

(2) That the experimental plot at each centre should be sub-divided into 4 equal parts and cropped with four varieties of sugar beet, namely,—Kuhn (P), Kuhn (Pa), Klein Wanzleben (Z) and Klein Wanzleben (E).

(3) That the sugar beet should be grown on land which in the previous season had been under tillage, preferably under corn, save that in districts where it is customary to grow roots after lea the beet might occupy the position usually taken by the root crop.

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(4) That sugar beet grown on land which in the previous season had borne a corn crop should be manured with farmyard manure at the rate of about twelve tons per statute acre; and if considered necessary a similar dressing to be given in the case of plots laid down on "manured" land, *i.e.*, land under roots, potatoes or green crop in 1927.

(5) That the following dressing of artificial manures should be applied at the time of sowing the crop, irrespective of the previous crop or manuring—

4 cwt. Superphosphate (35%) 4 cwt. Kainit 1 cwt. Sulphate of Ammonia	Per statute acre.

(6) That the land on which the plots were to be laid down should be ploughed deeply, care being taken not to bring to the surface sub-soil containing substances deleterious to plant growth.

(7) That the seed bed should be as finely prepared as is customary in the case of the turnip crop.

(8) That the width of the drills should not exceed 22 inches.

(9) That the seed should be sown at the rate of 18 lb. per statute acre, and not later in each district than is customary in the case of mangels, or as soon thereafter as a proper seed bed could be prepared.

(10) That the drills should be horse-hoed at least once within a month from the date of sowing the crop and that, if necessary, this operation should be repeated before the crop was singled.

(11) That the plants should be singled to nine inches apart as soon as they had developed four leaves, exclusive of the cotyledons or primary seed leaves.

(12) That subsequent to singling, and until the leaves had met across the drills, the crop should be hand-hoed and horse-hoed as often as might be necessary to check completely the growth of weeds, and to maintain the surface soil in a loose, friable condition.

(13) That the crop should be moulded up when the foliage of the plants had reached such a stage that further cultivation was no longer necessary or practicable.

(14) That the yield of the crop on the various sub-plots should be determined as soon as the crop had reached maturity.

(15) That representative samples drawn from the various sub-plots should be forwarded to the State Laboratory for analysis.

In accordance with this Scheme experiments were conducted at 142 centres throughout the Saorstát. The number of experimental centres in each county is shown in Table I.

[TABLE.

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TABLE I.

County.	Number of Centres.
LEINSTER.	
Carlow	4
Dublin	4
Kildare	4
Kilkenny	4
Laoighis	4
Longford	3
Louth	4
Meath	4
Offaly	4
Westmeath	3
Wexford	4
Wicklow	4
	— 46
MUNSTER.	
Clare	6
Cork	20
Kerry	7
Limerick	8
Tipperary, N.	4
,, S.	4
Waterford	4
	— 53
CONNAUGHT.	
Galway	8
Leitrim	4
Mayo	8
Roscommon	8
Sligo	3
	— 31
ULSTER.	
Cavan	4
Monaghan	4
Donegal	4
	— 12
TOTAL	142

Weather Conditions.

From November, 1927, to the middle of February, 1928, the rainfall was excessive. From 18th February to 10th March there was a period of dry weather, after which the weather again became wet and continued so until 11th April. The dry period which followed was broken by heavy rains during the 3rd week of April, after which the weather became unusually warm. May was, on the whole, a dry and fairly warm month, but the nights were cool and often frosty. Much-needed rain fell on the 17th, 26th and 27th days of this month. The weather during the four weeks following 10th June was almost continuously wet, cool and cloudy. The greater part of July was fine and fairly warm, but the weather in August was rather broken. During September and the first ten days of October the weather was generally quite good but from 15th October until the end of the year temperatures and rainfall were rather above normal.

Preparation of the Land for Seeding.

On account of the excessive rainfall during the period from November, 1927, to April, 1928, the ploughing and preparation of land for sugar beet was in a backward state when the weather became dry and settled after

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11th April. The land then dried out very rapidly and heavy soils, in particular, were prepared with difficulty. At nearly 60 per cent. of the centres farmyard manure was put in the drills immediately before the seed was sown and at nearly half of the remaining centres the sugar beet crop was grown after a " manured " crop and artificial manures only were applied.

Seeding.

Up to the beginning of the present century the scientific breeding of sugar beet seed was directed primarily towards the production of the highest possible percentage of sugar in the beet. Within recent years, however, considerable attention has been devoted by seedsmen to the development of strains or types of sugar beet which produce a larger tonnage of roots per acre with only a slight decrease in the percentage of sugar and purity of juice as compared with their original types bred specially for a high sugar content.

Arrangements having been made to test the relative merits of the two above-mentioned types of seed, as produced by Messrs. Kuhn & Co., Naarden, Holland, and by Messrs. The Klein-Wanzleben Sugar Factory, Germany, supplies of seed of the four varieties at the rate of 18 lbs. per acre were supplied to the plotholders at all centres. Before the seed was despatched to the plotholders representative bulk samples of each of the four varieties were drawn and tested for germination at the Department's Seed Testing Station with the following results:—

Variety.	*Germination per cent.*
Kuhn (P)	137
Kuhn (Pa)	140
Klein-Wanzleben (Z)	146
Klein-Wanzleben (E)	176

The weather during the last fortnight of April was quite favourable for the sowing of beet but only six per cent. of the plots were sown during that period, mainly on account of difficulty in preparing the land and the interference of other work which had been greatly delayed by wet weather. During the first ten days of May 47 per cent. of the plots was sown and during the second 10 days of the month a further 33 per cent. was sown. The remaining 14 per cent. of the plots was sown during the last eleven days of May, only one plot being sown in June. As a result of the dry conditions of weather and soil, which were general during the first half of May, germination of the seed was irregular at many centres. A regular stand of plants was, however, obtained at 85 per cent. of the total number of centres at which trials were conducted.

Singling and After Cultivation.

Singling of the crop at the majority of centres was carried out when the plants had developed four leaves exclusive of the two primary seed leaves. On the average, the plants reached this stage of growth within six or seven weeks after the date of sowing. Under favourable conditions of weather and soil the crop was ready for singling within about five weeks after sowing, but in many cases dry weather in May delayed germination of the seed and very cool, wet weather in June retarded growth of the braird. As a result the crop was not singled, in a number of cases, until eight weeks or more after it was sown. The wet weather in June rendered the control of weeds rather difficult, but only a few cases were reported where the crop received inadequate attention as regards after-cultivation and the moulding up of the drills before the leaves met across the furrows.

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Harvesting.

In this country the maturity of sugar beet is not very clearly indicated, as in other countries, by the appearance of the crop, for in autumn and early winter there is little yellowing of the outer leaves, and growth does not cease. Typical samples of sugar beet have been carefully drawn at centres representative of the entire country from each season's crops, at fortnightly intervals from the end of August to the middle of the following February. These samples have served for the determination of the rate of growth (weight of roots), the sugar content and purity of juice, throughout the autumn and winter. The data so obtained indicate that the optumum quantity of sugar is attained in November, and, accordingly, it was decided to complete, so far as possible in the month of November, the recording of the yield (tonnage) from the 1928 experimental plots and the sugar content of their produce.

The procedure adopted in ascertaining the yield of the crop on the various sub-plots was as follows:—An area of two statute perches representative of the general crop on each sub-plot was accurately measured off. The beets were lifted by hand, with the aid of a fork where necessary. Those which had bolted or were abnormally small were discarded. All loosely adhering soil was removed by scraping the roots with the back of the topping knife, after which the leaves and crown were cut off squarely at the point where the lowest leaf had originally appeared. When the roots from the measured area of two statute perches were scraped and topped, one quarter, by weight, of the roots was selected, having due regard to size and shape. From the roots, so selected, any branches or fangs, or portions thereof, of the thickness of an ordinary lead pencil were cut off, after which each root was thoroughly cleaned by washing and scrubbing. From the weight of such washed roots the "factory weight" for the produce of the whole sub-plot was then calculated.

After the roots had been weighed to ascertain the yield, a thoroughly representative sample consisting of not less than nine of the topped and washed roots from each sub-plot was despatched to the State Laboratory in Dublin, where, immediately after arrival, each sample was analysed for sugar content in accordance with the usual practice adopted by beet sugar factories.

Of the 142 centres where experiments were laid down, complete returns were obtained from 129 centres.

From 13 centres at which the experiments were conducted complete results were not obtained for the following reasons:—At one centre in each of the counties Donegal, Galway, Leitrim, and Longford, and at two centres in Cavan, the seed germinated poorly and the crop was patchy, chiefly on account of the unsuitability of the soil. At one centre in Kerry and at another in Roscommon the crop was affected in a similar manner by dry weather between the time of sowing and singling, and at one centre in Cork the crop was very patchy as a result of an attack of phoma or crown rot. In all of the foregoing cases no weighings or samples were taken. At two centres in Cork and one in Roscommon the experiments were not conducted in accordance with the scheme, and although returns were obtained from the two centres in Cork these returns are not included in the Tables. At one centre in Co. Kerry, where all the farm crops and stock were sold, it was impossible to obtain any returns from the sugar beet experiments.

Detailed particulars in respect of all centres from which complete returns were obtained are shown in Table III., pages 8-13, and a summary of the results appearing in Table III. is shown in Table II., page 7.

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TABLE No. II.

SHOWING AVERAGE RETURNS FOR EACH COUNTY AND PROVINCE IN RESPECT OF CENTRES SHOWN IN TABLE No. III.

PROVINCE.	COUNTY.	Number of Centres.	AVERAGE YIELD PER STATUTE ACRE (Factory Weight).				AVERAGE SUGAR CONTENT OF ROOTS.			
			Klein-Wanzleben Variety.		Kuhn Variety.		Klein-Wanzleben Variety.		Kuhn Variety.	
			(Z) Strain.	(E) Strain.	(P) Strain.	(Pa) Strain.	(Z) Strain.	(E) Strain.	(P) Strain.	(Pa) Strain.
			T. C.	T. C.	T. C.	T. C.	%	%	%	%
LEINSTER ...	CARLOW	4	12 12	13 10	11 19	13 0	18·2	17·5	18·4	18·4
	DUBLIN	4	9 9	10 19	8 17	9 0	18·1	17·3	18·0	18·2
	KILDARE ...	4	10 7	11 8	10 0	11 9	18·2	17·9	18·2	18·1
	KILKENNY ...	4	11 15	10 14	10 17	10 16	17·9	18·7	18·7	18·8
	LAOIGHIS ...	4	8 18	9 9	9 11	10 2	18·6	18·4	18·4	18·7
	LONGFORD ...	2	10 13	10 1	11 5	9 6	17·7	17·9	17·5	17·9
	LOUTH	4	7 12	8 17	8 6	8 2	17·6	17·3	18·1	18·0
	MEATH	4	11 7	12 1	12 14	12 11	17·5	17·3	17·6	17·6
	OFFALY	4	10 2	11 12	10 17	10 6	18·1	17·4	18·0	18·0
	WESTMEATH ...	3	10 5	10 18	10 9	10 0	17·1	16·4	16·9	17·1
	WEXFORD ...	4	10 12	11 15	11 2	11 2	18·2	18·1	18·2	18·4
	WICKLOW ...	4	9 2	9 15	9 9	9 5	17·8	17·4	17·9	18·0
MUNSTER ...	CLARE	6	11 3	12 3	10 14	10 15	17·4	17·1	17·8	17·8
	CORK	17	9 16	10 16	9 13	9 11	18·1	17·4	17·9	18·2
	KERRY	5	13 3	13 13	13 13	13 9	17·7	16·8	17·7	17·2
	LIMERICK ...	8	10 9	12 9	11 15	10 18	17·6	17·4	17·6	17·6
	TIPPERARY, N.R. ...	4	8 12	9 5	9 0	8 2	17·0	17·1	17·4	17·4
	TIPPERARY, S.R. ...	4	11 8	12 1	12 18	12 12	17·6	16·9	17·8	17·6
	WATERFORD ...	4	11 4	13 7	11 9	12 8	17·9	17·1	17·9	18·0
CONNAUGHT ...	GALWAY	7	12 2	12 9	12 14	12 9	17·3	16·9	17·3	17·0
	LEITRIM ...	3	9 2	9 1	8 13	8 10	17·3	17·1	17·4	17·7
	MAYO	8	8 12	8 11	7 17	8 9	17·1	16·9	17·0	16·9
	ROSCOMMON ...	6	7 19	8 17	9 1	8 13	17·3	16·5	17·2	17·2
	SLIGO	3	9 6	9 16	9 9	9 2	16·7	16·4	17·0	17·3
ULSTER ...	CAVAN	2	7 6	10 6	10 6	10 4	17·0	17·4	17·2	17·7
	DONEGAL ...	3	7 18	8 5	7 8	7 10	17·2	17·0	17·3	17·4
	MONAGHAN ...	4	9 1	9 8	9 5	9 1	17·4	17·0	17·3	17·1
PROVINCIAL AVERAGES:—										
	LEINSTER ...	45	10 4	10 19	10 8	10 9	17·9	17·6	18·0	18·1
	MUNSTER ...	48	10 11	11 14	10 18	10 14	17·7	17·2	17·8	17·8
	CONNAUGHT ...	27	9 10	9 17	9 13	9 12	17·2	16·8	17·2	17·1
	ULSTER	9	8 5	9 4	8 17	8 16	17·2	17·1	17·2	17·3
AVERAGES FOR AN SAORSTAT ...		129	10 1	10 18	10 6	10 5	17·7	17·3	17·7	17·7

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TABLE

SHOWING RESULTS OF VARIETY TRIALS CONDUCTED

No.	NAME AND ADDRESS OF PLOTHOLDER.	Nature of Soil	Crop grown on land in 1927.	MANURING					Time of application of F.Y.M.	Date of Sowing
				Farm-yard Manure	Super-phos-phate 35%	Kainit	Sul-phate of Am-monia	Nitrate of Soda.		
				Tons	Cwt.	Cwt.	Cwt.	Cwt.		
	CARLOW.									
177	Brennan, John, Drummond, St. Mullins	Granite Loam ...	Lea Oats	12	4	4	1	—	Winter	8 May
40	Burgess, Edmund, Rathmore Park, Rathvilly.	Light Loam ...	Potatoes ...	—	4	4	1	—	—	5 May
44	Hughes, Joseph F., Clashganny, Borris	Medium Loam ...	Lea Oats ...	14	4	4	1	—	Winter	8 May
102	Doyle, Thomas, Ballinastraw, Ardattin, Tullow.	Medium Loam ...	Lea Oats ...	12	4	4	1	—	Winter	7 May
	DUBLIN.									
138	Lawlor, J. P., Irishtown House, Clondalkin.	Clay ...	Oats	12	4	4	1	—	Spring	16 May
96	Sheridan, M. J., Bealinstown, Swords	Clay Loam ...	Lea Oats ...	12	4	4	1	—	Spring	14 May
1	Malone, Miss, Hillsboro' House, Lucan	Light Loam ...	Lea Oats ...	12	4	4	1	—	Spring	3 May
27	Burke, T., Santry Hall, Santry ...	Clay Loam ...	Cabbages ...	12	4	4	1	—	Spring	14 May
	KILDARE.									
127	Weld, Bury, Somerton, Naas ...	Light Loam ...	Turnips ...	—	4	4	1	—	—	22 May
95	Cope, Samuel H., Abbeyview, Castledermot.	Loam	Turnips ...	—	4	4	1	—	—	16 May
16	Kavanagh, Thomas, Rickardstown, Kildangan.	Dark Loam ...	Potatoes ...	—	4	4	1	—	—	24 May
23	Dempsey, Michael, Ballygaddy, Rathangan.	Sandy Loam ...	Lea Oats ...	13	4	4	1	—	Spring	21 May
	KILKENNY.									
165	Fogarty, Michael, Warrenstown, Johnstown.	Sandy Loam ...	Oats	12	4	4	1	—	Winter	14 May
70	Murphy, Martin J., Rathcheugh, Danesfort.	Medium Loam ...	Potatoes ...	—	4	4	1	—	—	16 May
11	Butler, Patrick, Ballycoura, Ballyraggett.	Sandy Loam ...	Barley ...	—	4	4	1	—	—	7 May
4	Dore, Ted, Palmerston, Kilkenny ...	Light Loam ...	Turnips ...	—	4	4	1	—	—	25 April
	LAOIGHIS.									
75	Walsh (Junr.), James, Ballykealy, Durrow.	Heavy Loam ...	Turnips ...	—	4	4	1	—	—	8 May
53	Harte, Pat, Auster, Ballacolla ...	Loose Loam ...	Oats ...	14	4	4	1	—	Winter	8 May
54	Meany, James, Cooltoran, Portlaoighise	Deep Loose Loam ...	Barley ...	15	4	4	1	1	Winter	30 April
26	Dowling, John, Derrdavy, Mountmellick	Loose Loam ...	Wheat ...	12-15	4	4	1	—	Winter	1 May
	LONGFORD.									
148	Hopkins, Patrick, Lksnacusha, Lanesboro'.	Limestone ...	Lea	14	4	4	1	—	Spring	25 April
132	Sweeney, Thomas, Lisnafeera, Edgeworthstown	Heavy Loam ...	Lea Oats ...	12	4	4	1	—	Spring	15 May
	LOUTH.									
42	Malone, Michael, Rathcor, Riverstown, Dundalk.	Medium Clay ...	Barley	12	4	4	1	1	Winter	8 May
91	McKevitt, Thomas, Carrickrobin, Kilketley, Dundalk.	Light Clay ...	Barley	12	4	4	1	1	Winter	4 May
41	Murphy, Mrs. E., Johnstown, Riverstown, Dundalk.	Stiff Clay ...	Barley	12	4	4	1	1	Winter	8 May
14	Halpenny, Thomas, John Street, Ardee	Clay Loam ...	Barley	12	4	4	1	1	Spring	9 May
	MEATH.									
123	Gregan, Rd., Bennettstown, Dunboyne	Clay Loam ...	Lea Oats ...	15	4	4	1	—	Winter	1 June
118	Loughran, William, Dowestown, Kilcarne, Navan.	Clay Loam ...	Potatoes ...	—	4	4	1	—	—	4 May
116	Redpath, Alex, Boyne Lodge, Trim ...	Clay Loam ...	Potatoes ...	—	4	4	1	—	—	25 May
111	Gerrard, Major T. C., Gibbstown, Navan.	Clay Loam ...	Potatoes ...	—	4	4	1	—	—	18 May
	OFFALY.									
140	Kinnarney, Patrick, Hawkswood, Killeigh, Tullamore.	Heavy Moor ...	Lea Oats ...	12	4	4	1	—	—	14 May
130	Crombie, Bernard, Knock, Daingean	Heavy Loam ...	Potatoes ...	—	4	4	1	—	—	21 May
112	Foy, John, Welsh Island, Geashill ...	Medium Loam ...	Turnips	—	4	4	1	—	—	21 May
86	Scally, Joseph, Ballyteague, Ballycommon, Daingean.	Light Loam ...	Barley	10	4	4	1	—	Winter	15 May
	WESTMEATH.									
147	Longford, Lord, Pakenham Hall, Castlepollard.	Heavy Loam ...	Oats	12	4	4	1	—	Spring	4 May
174	Cole, James, Larkfield, Mullingar ...	Medium Loam ...	Oats	12	6	6	1½	—	Spring	15 May
172	Daly, Denis, Walshestown, Mullingar	Heavy Loam ...	Potatoes ...	12	4	4	1	—	Winter	8 May
	WEXFORD.									
48	Kinsella, William, Crosstown, Wexford	Heavy Clay ...	Lea Oats ...	12 to 15	4	4	1	—	Winter	24 May
43	Furlong, John J., Littlegraigue, Duncormick.	Clay Loam ...	Lea Oats ...	12 to 15	4	4	1	—	Winter	24 May
28	Pettit, Thomas, Ballyduskar, Killinick	Sandy Loam ...	Oats	15	4	4	1	—	Winter	14 May
19	Deacon, Henry, Coolaught, Clonroche	Shingly Loam ...	Turnips	—	4	4	1	—	—	14 May

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No. III.

BY THE AGRICULTURAL INSTRUCTORS.

Date of Singling	Average width of drills	"Stand" of Crop	Date of Weighing Crop	Date of Analysis of Sample	Yield per Statute Acre (Factory Weight)				Sugar Content of Roots.			
					Klein Wanzleben Variety		Kuhn Variety		Klein Wanzleben Variety		Kuhn Variety	
					(Z) Strain	(E) Strain	(P) Strain	(Pa) Strain	(Z) Strain	(E) Strain	(P) Strain	(Pa) Strain
	Inches				T. C.	T. C.	T. C.	T. C.	%	%	%	%
6 June	22	Regular	14 Dec.	17 Dec.	14 4	15 8	14 7	15 2	17·8	17·0	17·8	17·9
29 May	24	Regular	5 Nov.	8 Nov.	12 6	12 17	11 10	11 6	18·2	17·1	18·6	18·9
24 May	20	Regular	6 Nov.	9 Nov.	12 17	13 9	10 0	12 17	18·4	17·9	18·8	18·7
22 May	22	Regular	14 Nov.	20 Nov.	11 1	12 6	11 17	12 14	18·2	17·9	18·5	18·1
12 July	24	Regular	27 Nov.	29 Nov.	8 6	8 17	7 12	7 17	17·9	17·3	17·4	18·0
9 July	22	Regular	16 Nov.	19 Nov.	10 7	11 14	9 0	9 6	18·3	17·6	18·6	18·8
3 July	22	Regular	29 Oct.	30 Oct.	9 13	11 10	8 16	8 15	18·2	16·9	18·0	18·4
6 July	23	Regular	7 Nov.	7 Nov.	9 9	11 14	10 0	10 2	17·8	17·3	17·8	17·7
3 July	22	Regular	24 Nov.	26 Nov.	10 13	9 19	9 10	10 14	18·5	18·3	18·5	18·4
3 July	21	Regular	15 Nov.	19 Nov.	10 9	11 3	10 0	10 18	18·2	19·1	18·2	18·1
30 June	20	Regular	2 Nov.	5 Nov.	10 6	12 3	10 0	12 7	18·1	17·2	18·2	17·6
26 June	22	Regular	5 Nov.	6 Nov.	10 0	12 7	10 8	11 18	17·8	17·1	17·9	18·1
7 July	21	Regular	3 Dec.	6 Dec.	9 6	10 0	9 9	9 9	17·5	17·7	18·0	17·6
25 June	22	Regular	9 Nov.	13 Nov.	11 15	10 15	10 9	10 0	18·5	18·9	18·7	18·7
15 June	22	Regular	31 Oct.	2 Nov.	12 0	10 12	11 3	11 18	18·5	19·4	19·1	19·6
6 June	21	Regular	31 Oct.	1 Nov.	13 18	11 9	12 8	11 15	17·0	18·7	18·9	19·4
20 June	23	Regular	9 Nov.	13 Nov.	8 12	8 17	8 0	7 17	19·0	19·2	18·8	19·3
17—23 June	23	Regular	7 Nov.	9 Nov.	7 10	7 14	8 3	9 1	18·2	16·9	18·0	18·0
13 June	23	Patchy	5 Nov.	9 Nov.	7 8	7 14	8 3	8 0	18·0	18·7	17·8	18·5
11 June	23	Patchy	3 Nov.	7 Nov.	12 3	13 11	13 17	15 10	19·1	18·7	19·0	18·9
5 June	24	Regular	29 Nov.	3 Dec.	11 19	11 0	12 11	11 8	17·2	18·1	16·4	17·6
20 June	26	Patchy	23 Nov.	28 Nov.	9 7	9 2	9 18	7 4	18·2	17·7	18·5	18·2
30 June	23	Fairly Regular	7 Nov.	8 Nov.	6 14	7 17	7 4	7 0	17·0	17·6	18·3	18·3
27 June	23	Regular	15 Nov.	17 Nov.	7 13	9 9	9 12	9 15	17·2	16·7	17·6	16·9
20 July	22	Very Patchy	6 Nov.	8 Nov.	6 4	7 13	7 3	6 8	17·5	16·9	17·9	18·0
26 June	25	Fairly Regular	2 Nov.	3 Nov.	9 17	10 10	9 6	9 4	18·7	17·9	18·5	18·7
9 July	22	Regular	23 Nov.	26 Nov.	9 16	10 2	10 12	10 17	17·6	17·0	16·8	16·4
13 June	21	Regular	22 Nov.	26 Nov.	13 3	14 2	14 9	12 17	17·6	17·4	17·7	18·0
26 June	21	Regular	21 Nov.	23 Nov.	10 10	9 16	11 15	11 3	18·0	17·0	18·0	17·7
9 June	22	Regular	20 Nov.	22 Nov.	12 0	14 2	13 19	15 8	16·7	17·6	17·7	18·1
6 July	24	Regular	27 Nov.	29 Nov.	10 17	12 0	11 6	11 2	18·2	17·2	17·8	17·6
12 July	23½	Regular	26 Nov.	28 Nov.	11 10	14 0	12 10	12 4	18·6	17·5	18·2	18·5
4 July	22½	Regular	21 Nov.	22 Nov.	10 8	11 5	10 13	10 5	18·3	17·4	18·0	18·1
18 July	23	Regular	13 Nov.	16 Nov.	7 14	9 2	9 0	7 11	17·2	17·3	18·1	17·6
7 June	24	Patchy	29 Nov.	3 Dec.	8 1	8 6	8 16	7 19	16·8	16·3	16·2	16·9
18 June	23	Regular	11 Dec.	12 Dec.	10 18	12 7	10 12	10 16	17·0	16·0	17·1	17·1
15 June	24	Regular	30 Nov.	11 Dec.	11 16	12 1	11 18	11 6	17·4	17·0	17·5	17·3
13 July	22	Rather Patchy.	8 Nov.	9 Nov.	9 15	10 10	8 12	11 0	18·0	17·9	18·2	17·9
7 August	22	Fairly Regular.	7 Nov.	9 Nov.	9 15	12 0	10 10	10 0	18·2	18·3	18·5	18·6
2 July	22	Regular	6 Nov.	7 Nov.	12 0	13 0	14 8	12 19	18·0	18·2	16·9	18·1
6 July	22	Regular	3 Nov.	5 Nov.	10 16	11 10	10 16	10 10	18·5	17·9	19·0	18·8

HCFB HAAF

TABLE.

SHOWING RESULTS OF VARIETY TRIALS CONDUCTED

No.	NAME AND ADDRESS OF PLOTHOLDER.	Nature of Soil	Crop grown on land in 1927.	MANURING					Time of application of F.Y.M.	Date of Sowing
				Farm-yard Manure	Super-phos-phate 35%	Kainit	Sul-phate of Am-monia	Nitrate of Soda.		
				Tons	Cwt.	Cwt.	Cwt.	Cwt.		
	WICKLOW.									
126	Doyle, Patrick, Tuckmill, Baltinglass	Medium Loam ...	Potatoes ...	12	4	4	1	—	Spring	8 May
93	Kehoe, John, Callowhill, Newtown-mountkennedy.	Medium Loam ...	Oats	12	4	4	1	—	Spring	19 May
104	Burke, Patrick, Lackeragh, Baltinglass	Rich Clay Loam ...	Potatoes ...	12	4	4	1	—	Spring	21 May
69	Lavan, Lawrence, Ballyknockin, Glen-ealy.	Medium Loam ...	Oats	12	4	4	1	—	Spring	11 May
	CLARE.									
2	Enright, John, Craggalough House, Sixmilebridge.	Medium Loam ...	Turnips and Potatoes	12	4	4	1	—	Spring	3 May
6	Hartigan, Patrick, Crussa, Newmarket-on-Fergus.	Medium Loam ...	Turnips	12	4	4	1	—	Spring	15 May
57	Meehan, Geo. Crussa, Newmarket-on-Fergus.	Medium Loam ...	Potatoes and Mangels.	12	4	4	1	—	Spring	19 May
45	Hehir, John, Clover Hill, Bunratty ...	Clay Loam ...	Oats	12	4	4	1	1	Spring	5 May
108	Studdert, W. F., Doonmore Villa, Doonbeg.	Peaty Loam ...	Potatoes ...	10	4	4	1	—	Winter	7 May
51	Bourke, Mrs. J., Leadmore, Kilrush ...	Deep Loam ...	Potatoes ...	10 to 11	4	4	1	—	Spring	19 May
	CORK.									
167	O'Driscoll, T. J., Derrymileen, Ennis-keane.	Light Loam ...	Oats	12	4	4	1	—	Spring	12 May
162	McCarthy, P. J., Garralacka, Clona-kilty.	Deep Loam ...	Oats	12	4	4	1	—	Spring	11 May
151	Murphy, William, Ardcoolug, Timo-league.	Sandy Loam ...	Oats	12	4	4	1	—	Spring	2 May
97	Wycherley, J., Ardagh, Rosscarbery, Clonakilty.	Deep Loam ...	Oats	12	4	4	1	—	Spring	4 May
84	Hegarty, P. J., Liscahane, Millstreet ...	Deep Heavy Clay	Oats	12	4	4	1	1	Spring	15 May
5	Barry, Timothy, Castlemagner, Lom-bardstown.	Medium Loam ...	Oats	12	4	4	1	—	Spring	16 May
71	O'Mahony, D., Ballyrushen, Castle-magner.	Medium Clay Loam	Hay	12	4	4	1	—	Spring	7 May
39	Madden, Paul, Tulladuff, Liscarrol, Mallow.	Heavy Clay ...	Oats	12	4	4	1	—	Spring	14 May
17	McGrath, P., Ballymaw, Waterfall ...	Heavy Sandstone Loam.	Lea Oats ...	12	4	4	1	—	Spring	9 May
36	Bryan, Wm. H., Maryville, Enniskean	Gravelly Loam ...	Lea Oats ...	15	4	4	1	—	Winter	7 May
52	Bolster, S. H., Ballyloughley, Bandon	Heavy Loam ...	Lea Oats ...	12	4	4	1	—	Spring	12 May
55	Foley-Turpin, Mrs. G., Youngrove Estate, Midleton.	Dark Loam ...	Oats	12	4	4	1	—	Spring	5 May
50	Daly, M. C. C., Richard, Ballymartin, Dungourney, Midleton.	Medium Sandstone Loam.	Turnips	12	4	4	1	—	Spring	7 May
32	O'Brien, Mrs. H., Loughatalia, Ballina-curra.	Medium Limestone Loam.	Oats	12	4	4	1	—	Spring	8 May
137	Lysaght, S. R., Hazelwwood, Mallow	Medium Loam ...	Oats	12	4	4	1	—	Winter	3 May
90	Fahy, J. W., Mount Ruby, Mallow ...	Clay Loam ...	Oats	12	4	4	1	—	Winter	7 May
60	Maigneir Ursal Riobaird, Caislean Mág Cróine, Cill Uird, Mainnstir, Fea-rmusge.	Medium Loam ...	Lea Oats ...	20	4	4	1	—	Autumn	15 May
	KERRY.									
164	O'Driscoll, Christopher, Lerrig, Ardfert	Gravelly Loam ...	Oats	(Sea-weed) 12	4	4	1	—	—	27 April
13	Dillon, Matthew, Ardconnell, Ardfert	Gravelly Loam ...	Oats	12	4	4	1	—	Spring	27 April
153	Reynolds, R. B., Fahagh Court, Beau-fort.	Stiff Loam ...	Wheat	18	4	4	1	—	Spring	12 May
117	Walsh, Rev. Bro., St. Joseph's Institute, Tralee.	Rich Loam ...	Oats	—	6	6	1½	—	—	16 May
121	Woulfe, Maurice J., Knockeen, Castle-island.	Rich Loam ...	Oats	18	4	4	1	—	Spring	3 May
	LIMERICK.									
38	Ryan, E., Knockanerra House, Murroe	Sandy Loam ...	Oats	12	4	4	1	—	Spring	8 May
37	Croker, Courtney, Ballinagarde, Bally-neety.	Limestone Loam ...	Potatoes ...	12	4	4	1	—	Winter	25 April
62	McCormack, Richard, Griston, Bally-landers.	Clay	Oats	12	4	4	1	—	Spring	8 May
63	McSweeney, Con, Tully, Darragh, Kil-finane.	Gravel Loam ...	Sugar Beet ...	12	4	4	1	—	Spring	12 May
160	Fitzgerald, John, Wilton, Rathkeale ...	Medium Loam ...	Oats	15	4	4	1	1	Spring	8 May
159	McNamara, Thomas, Knockanes, Adare	Heavy Loam ...	Oats	15	4	4	1	1	Spring	10 May
136	Mulcahy, Patrick, Ballinahown, Ardagh.	Light Sandstone Loam.	Oats	15	4	4	1	1	Spring	1 May
161	Fitzgerald, Michael, Ballyfolin, Kil-finny.	Medium Loam ...	Sugar Beet ...	10	4	4	1	1	Spring	24 May
	TIPPERARY, N.R.									
181	Boylan, Thomas, Croghan, Birr ...	Rich Black Loam	Potatoes ...	—	4	4	1	—	—	7 May
163	Russell, James, Boulerea, Templetuohy, Templemore.	Do. ...	Barley	—	4	4	1	—	—	14 May
18	Maher, D., Loughanavotha, Roscrea	Sharp Clay on Gravel	Turnips	—	4	4	1	—	—	22 May
3	Gray, Thos. W., Kevinstown, Borris-okane.	Medium Clay Loam	do.	—	4	4	1	—	—	23 May

FIGTB HAH

No. III—*continued.*

BY THE AGRICULTURAL INSTRUCTORS.

Date of Singling	Average width of drills	"Stand" of Crop	Date of Weighing Crop	Date of Analysis of Sample	Yield per Statute Acre (Factory Weight)				Sugar Content of Roots.			
					Klein Wanzleben Variety		Kuhn Variety		Klein Wanzleben Variety		Kuhn Variety	
					(Z) Strain	(E) Strain	(P) Strain	(Pa) Strain	(Z) Strain	(E) Strain	(P) Strain	(Pa) Strain
	Inches				T. C.	T. C.	T. C.	T. C.	%	%	%	%
2 July	24	Regular	24 Nov.	26 Nov.	9 14	10 2	9 7	9 12	18·6	17·8	18·3	18·3
6 July	24	Slightly Patchy.	14 Nov.	19 Nov.	8 5	8 15	8 10	8 6	18·0	17·3	17·3	17·6
12 July	24	Regular	17 Nov.	20 Nov.	10 2	11 6	10 18	10 11	17·2	17·4	18·2	18·1
27 June	24	Slightly Patchy.	9 Nov.	13 Nov.	8 8	8 16	9 0	8 9	17·5	16·9	17·6	18·0
13 June	22	Regular	29 Oct.	31 Oct.	12 8	11 19	11 19	11 16	18·6	17·9	18·4	18·1
21 June	22	Regular	30 Oct.	1 Nov.	12 13	13 2	12 18	12 4	18·0	18·0	19·1	18·7
25 June	22	Regular	8 Nov.	12 Nov.	11 13	13 8	11 14	10 18	18·0	17·0	18·0	18·4
20 June	22	Regular	6 Nov.	9 Nov.	9 17	11 6	9 18	10 0	17·5	17·3	17·4	18·2
23 June	24	Regular	20 Nov.	22 Nov.	9 1	11 7	7 6	8 3	15·6	15·9	16·7	15·5
23 June	24	Regular	7 Nov.	9 Nov.	11 4	11 14	10 10	11 9	16·6	16·7	17·3	17 8
28 July to 5 Aug.	24½	Very Patchy	5 Dec.	7 Dec.	7 16	7 6	5 4	4 12	18·0	17·3	17·5	17·7
20 to 25 July.	25	Regular	1 Dec.	4 Dec.	10 1	10 12	9 11	8 14	17·9	16·0	17·3	17·1
12 to 18 July.	25	Regular	29 Nov.	3 Dec.	10 4	11 8	9 16	8 17	17·4	17·4	17·7	17·6
17 to 21 July.	26	Fairly Patchy.	13 Nov.	19 Nov.	10 2	10 16	9 5	8 16	17·3	16·4	16·6	17·0
27 June	21½	Fairly Regular	12 Nov.	15 Nov.	8 3	9 14	8 19	9 7	18·5	17·3	18·1	18·4
19 June	24	Regular	30 Oct.	1 Nov.	12 12	13 7	13 3	12 3	18·1	16·6	17·7	18·4
26 June	22	Regular	8 Nov.	13 Nov.	13 11	13 18	12 17	12 19	19·1	18·0	19·0	18·5
25 June	22½	Fairly Regular.	6 Nov.	8 Nov.	8 13	11 4	9 1	8 13	18·5	17·6	17·0	18·2
27 June to 4 July	23½	Fairly Regular.	2 Nov.	5 Nov.	7 4	9 19	8 3	8 19	17·5	16·3	17·1	17·7
Last week in June	22¾	Fairly Regular.	6 Nov.	8 Nov.	11 7	13 6	13 16	12 14	19·0	18·1	19·2	19·1
First week in July	22	Fairly Regular	8 Nov.	9 Nov.	9 11	7 11	7 4	8 9	18·4	17·9	18·1	17·9
16 to 20 June	21¼	Patchy	8 Nov.	10 Nov.	5 13	8 15	6 15	5 15	18·1	17·8	18·1	18·8
20 June	22½	Slightly Patchy.	8 Nov.	9 Nov.	7 3	7 6	6 3	5 14	17·5	17·5	18·1	18·5
6 to 11 June.	21	Regular	6 Nov.	8 Nov.	13 6	16 3	12 8	14 3	18·9	18·5	18·7	18·5
18 June	19½	Regular	26 Nov.	28 Nov.	10 15	11 16	10 18	10 19	18·2	17·6	18·2	18·7
27 June	21	Regular	13 Nov.	17 Nov.	12 1	13 5	12 2	12 9	17·0	17·4	17·7	18·1
23 June	22	Regular	8 Nov.	12 Nov.	8 5	10 4	8 8	8 6	18·8	18·1	17·4	18·3
16 to 18 June.	22½	Regular	1 Dec.	4 Dec.	13 8	15 17	13 0	13 19	16·7	16·7	17·7	16·6
15 June	22¼	Regular	31 Oct.	2 Nov.	17 7	16 12	17 10	16 8	18·6	17·5	17·6	18·3
16 June	22	Regular	30 Nov.	3 Dec.	10 12	10 12	12 0	10 18	18·0	17·8	18·4	17·8
10 June	25	Regular	21 Nov.	23 Nov.	13 6	14 0	12 8	14 0	17·6	16·0	17·6	16·1
12 June	24	Regular	22 Nov.	26 Nov.	11 2	11 3	13 5	12 0	17·4	16·0	17·4	17·4
2 July	22	Regular	5 Nov.	8 Nov.	8 12	9 15	10 18	10 12	18·5	17·6	18·4	18·2
8 June	22	Regular	6 Nov.	8 Nov.	13 3	15 7	16 0	14 6	18·1	17·3	17·8	16·8
6 July	22	Regular	8 Nov.	12 Nov.	7 10	9 3	9 3	8 6	18·1	17·1	18·0	17·5
12 July	22	Regular	9 Nov.	12 Nov.	6 5	9 0	7 0	7 0	17·7	17·4	17·4	17·2
27 June	28	Patchy	30 Nov.	4 Dec.	8 7	10 13	8 9	9 1	17·0	17·6	18·2	18·2
22 June	28	Regular	28 Nov.	4 Dec.	10 10	12 14	12 2	11 16	18·4	17·4	17·7	18·9
8 June	27	Regular	19 Nov.	28 Nov.	13 6	16 14	15 5	13 2	16·7	17·7	17·0	16·2
26 June	24	Regular	29 Nov.	4 Dec.	15 18	16 5	15 3	13 4	16·6	17·1	16·0	17·4
20 June	22	Very Regular	21 Dec.	28 Dec.	9 17	10 9	11 3	9 7	15·7	16·4	16·5	16·3
4 July	22	do.	1 Dec.	4 Dec.	11 17	12 3	10 14	10 9	17·6	17·8	17·4	18·0
9-12 July	22	Slightly Patchy	2 Nov.	5 Nov.	6 1	6 4	6 12	6 8	18·1	17·1	17·9	18·2
3 July	24	Patchy	30 Oct.	31 Oct.	6 12	8 4	7 10	6 5	16·8	17·0	17·8	17·0

HICRB HAAH

TABLE

SHOWING RESULTS OF VARIOUS TRIALS CONDUCTED

No.	NAME AND ADDRESS OF PLOTHOLDER.	Nature of Soil	Crop grown on land in 1927.	MANURING					Time of application of F.Y.M.	Date of Sowing
				Farm-yard Manure	Super-phos-phate 35%	Kainit	Sul-phate of Am-monia	Nitrate of Soda.		
	TIPPERARY, S.R.			Tons	Cwt.	Cwt.	Cwt.	Cwt.		
120	Delaney, Samuel, Ballycullen, Mullinahone.	Medium Clay ...	Lea Oats ...	12	4	4	1	—	Spring	23 May
115	Burke, William, Kilmore, Clonmel ...	Medium Clay ...	Potatoes ...	12	4	4	1	—	Winter	19 May
94	Shine, Edmund, Garryroe, Ardfinnan	Medium Clay ...	Turnips	12	4	4	1	—	Spring	22 May
31	O'Connor, Patrick, Nicholastown, Knocklofty.	Medium Clay ...	Lea Oats ...	12	4	4	1	—	Spring	21 May
	WATERFORD.									
135	Egan, Patrick, Ballygeggan, Dungarvan	Deep Drift Loam ...	Oats	14	4	4	1	—	Winter	8 May
105	Connors, Nicholas, Park, Stradbally, Kilmacthomas.	Red Sandstone ...	Lea Oats ...	—	6	6	2	—	—	7 May
34	Kiersey, John, Ballyhussa, Kilmacthomas.	Shingly Sandstone Loam.	Lea Oats ...	—	8	6	2	—	—	4 May
7	Toole, Patrick, Liccaun, Dunmore East	Red Sandstone ...	Swedes	—	4	4	1	—	—	26 April
	GALWAY.									
146	Trayers, James, Renville, Oranmore	Sandy	Oats	12	4	4	1	—	Spring	14 May
58	Keane, Patrick, Derrydonnel, Athenry	Light Limestone Loam.	Oats	10 to 12	4	4	1	—	Spring	14 May
83	Mullen, Martin, Ardskea, Ballyglunin	Moory Loam ...	Lea Oats ...	12	4	4	1	—	Spring	12 May
176	Taylor, B., Ardrahan	Strong Loam ...	Oats	15	4	4	1	1	Spring	4 May
170	Kane, Joseph, Coorhean, Loughrea	Limestone Loam ...	Potatoes ...	15	4	4	1	1	Spring	7 May
173	Connaughton, John, Bolaroe, Killimor	Dark Sandy Loam	Oats	15	4	4	1	1	Spring	8 May
179	O'Kelly, J. D., Gurtray, Portumna ...	Strong Loam ...	Oats	15	4	4	1	1	Spring	4 May
	LEITRIM.									
171	Mulvey, James, Ballinawing, Carrick-on-Shannon.	Loam	Potatoes ...	12	4	4	1	—	Spring	21 May
155	Bradshaw, Alex H., Drumkillvey, Mohill.	Clay Loam ...	Lea Oats ...	15	4	4	1	1	Spring	7 and 8 May.
74	Mulligan, John, Drumhanny, Mohill	Heavy Peat ...	Potatoes ...	12	4	4	1	—	Spring	4 May
	MAYO.									
131	Lowther, Patrick, Rathglass, Ballina	Deep Rich Loam ...	Potatoes ...	12	4	4	1	1	Spring	2 May
156	Clarke, John, Ballymanagh, Ballina ...	Rich Loam ...	Potatoes ...	12	4	4	1	1	Spring	2 May
157	Brennan, Patrick, Derreen, Ballysokeery, Ballina.	Medium Loam ...	Potatoes ...	12	4	4	1	1	Spring	2 May
154	McLoughlin, John, Moyne, Killala ...	Clay Loam ...	Potatoes ...	12	4	4	1	1	Spring	3 May
78	Bexley, James P., Mossbrook, Claremorris.	Damp Loam ...	Potatoes ...	—	4	4	1	1	—	3 May
76	Moran, Bryan, Curradrish, Castlebar	Loam	Potatoes ...	—	4	4	1	1	—	14 May
22	Bourke, Thomas, Carrowtootagh, Clogher, Westport.	Sandy Loam ...	Potatoes ...	—	4	4	1	1	—	3 May
20	O'Donohoe, Thomas, Cross East, Claremorris.	Medium Loam ...	Wheat	12	4	4	1	1	Spring	5 May
	ROSCOMMON.									
129	Harrison, Laurence, Cam, Brideswell, Athlone.	Limestone Clay ...	Oats	15	4	4	1	—	Spring	3 May
12	Scally, John, Golliagh, Lanesboro' ...	Deep Limestone Clay	Potatoes ...	13	4	4	1	—	Spring	7 May
15	Rourke, Michael, Camogue, Tulsk ...	Deep Limestone Clay	Potatoes ...	15	4	4	1	—	Winter	7 May
133	Nolan, Michael, Carrantogher, Elphin	Heavy Clay ...	Oats	15	4	4	1	—	Spring	16 May
134	Poynton, Joseph, Hermitage, Croghan, Boyle.	Clay Loam ...	Potatoes ...	20	4	4	1	—	Spring	24 April
143	Barrett, John, Carrickmore, Boyle ...	Heavy Clay ...	Potatoes ...	15	4	4	1	—	Spring	14 May
	SLIGO.									
66	Marley, Michael, Corkamore, Skreen	Medium Loam ...	Oats	14	4	4	1	—	Spring	4 May
67	Hood, Robert, Mount Edward, Grange	Medium Loam ...	Oats	12	4	4	1	—	Spring	16 May
63	Chambers, Edward, Chaffpool, Ballymote.	Medium Loam ...	Oats	12	4	4	1	—	Spring	10 May
	CAVAN.									
110	Pat. Smith, Drumcarbin House, Crossdoney.	Deep Loam ...	Oats	12 tons per st. acre.	4	4	1	Yes	Spring	15 May
175	Michael Bough, Ryefield, Virginia ...	Deep Loam ...	Oats	15 tons per st. acre.	4	4	1	No	Spring	4 May
	DONEGAL.									
29	John A. Patterson, Drumoghill, Manorcunningham.	Rich Medium Loam	Oats	12	4	4	1	No	Spring	23 May
30	H. S. Robinson, Milltown, Newtowncunningham.	Light Loam ...	Oats	12	4	4	1	No	Spring	4 May
47	Jas. P. McIvor, Quigley's Point ...	Light Loam ...	Oats	12	4	4	1	No	Spring	22 May
	MONAGHAN.									
82	Thomas Kenny, Dunogue, Carrickmacross.	Gravelly Loam ...	Lea Oats ...	12	4	4	1	No	Spring	15 May
83	Geo. McKittrick, Lurgans, Carrickmacross.	Loam	Lea Oats ...	12	4	4	1	No	Spring	15 May
114	Mental Hospital Farm, Monaghan ...	Heavy Loam ...	Oats	12	4	4	1	No	Spring	15 May
139	John Bennett, Annaghery Monaghan	Loam	Lea Oats ...	12	4	4	1	No	Spring	16 May

HCRB HAH

No. III.—*continued.*

BY THE AGRICULTURAL INSTRUCTORS.

Date of Singling	Average width of drills	"Stand" of Crop	Date of Weighing Crop	Date of Analysis of Sample	Yield per Statute Acre (Factory Weight)				Sugar Content of Roots.			
					Klein Wanzleben Variety		Kuhn Variety		Klein Wanzleben Variety		Kuhn Variety	
					(Z) Strain	(E) Strain	(P) Strain	(Pa) Strain	(Z) Strain	(E) Strain	(P) Strain	(Pa) Strain
	Inches				T. C.	T. C.	T. C.	T. C.	%	%	%	%
22 June	22	Regular	23 Nov.	26 Nov.	10 11	11 1	11 17	12 4	17·3	17·7	18·0	17·2
22 June	22	Regular	21 Nov.	23 Nov.	12 10	13 0	17 0	14 8	18·0	17·3	17·5	17·9
23 June	22	Regular	15 Nov.	19 Nov.	9 0	11 14	11 0	11 14	18·2	15·6	18·6	18·0
19 June	22	Regular	5 Nov.	8 Nov.	13 10	12 10	11 16	12 2	16·7	16·8	17·2	17·2
11 June	21	Regular	26 Nov.	28 Nov.	12 14	14 7	13 15	14 16	18·2	17·3	18·1	18·1
26 June	21	Regular	14 Nov.	20 Nov.	10 15	14 1	10 15	12 10	17·9	17·2	17·4	17·9
3-5 July	22	Regular	5 Nov.	8 Nov.	7 12	9 9	7 15	9 9	17·8	16·0	17·7	17·1
12-14 June	22	Regular	30 Oct.	2 Nov.	13 15	15 9	13 9	12 18	17·7	17·8	18·5	18·7
20 June	22	Regular	29 Nov.	3 Dec.	9 6	10 15	9 11	10 3	17·3	17·0	17·2	17·1
22 June	22	Regular	9 Nov.	12 Nov.	13 9	14 17	15 15	13 2	18·3	18·0	18·0	18·1
21 June	22	Regular	13 Nov.	17 Nov.	10 1	11 13	12 7	12 1	17·2	17·5	17·7	17·3
22 June	18	Regular	12 Dec.	17 Dec.	11 15	10 15	11 1	12 0	16·1	16·0	16·4	15·0
22 June	18	Regular	30 Nov.	11 Dec.	12 0	10 15	11 0	12 4	18·4	18·4	18·5	17·3
29 June	18	Regular	7 Dec.	12 Dec.	15 0	16 10	16 5	16 2	16·0	15·6	16·1	16·7
26 May	18	Regular	17 Dec.	20 Dec.	13 2	12 0	13 0	11 10	17·8	16·1	17·5	17·9
20 July	26	Regular	7 Dec.	11 Dec.	8 1	8 10	8 4	7 12	16·5	16·7	17·0	17·3
19 July	24	Regular	30 Nov.	4 Dec.	8 18	8 2	8 12	8 10	18·5	18·2	17·8	18·3
10 July	26	Regular	9 Nov.	13 Nov.	10 6	10 12	9 3	9 9	17·0	16·5	17·3	17·6
2 July	24	Regular	26 Nov.	28 Nov.	10 10	10 10	9 8	10 0	17·7	17·0	17·3	17·6
6 July	24	Regular	1 Dec.	4 Dec.	9 8	9 5	8 14	10 0	17·3	16·7	17·0	17·0
30 June	24	Regular	1 Dec.	4 Dec.	9 5	8 15	8 10	9 5	17·6	17·8	17·7	16·8
4 July	24	Regular	1 Dec.	4 Dec.	8 10	8 8	8 2	8 12	17·3	16·7	17·3	16·9
26 June	24	Patchy	13 Nov.	14 Nov.	5 6	5 3	5 0	5 2	17·5	17·0	16·7	16·6
—	24	Regular	12 Nov.	13 Nov.	8 5	8 3	7 12	7 14	17·6	16·7	16·7	16·2
—	24	Patchy	5 Nov.	6 Nov.	7 15	8 0	7 2	7 5	16·7	16·9	16·7	16·8
—	24	Regular	2 Nov.	5 Nov.	9 18	10 5	8 5	9 15	15·4	16·6	16·2	17·0
3-4 July	24	Regular	26 Nov.	28 Nov.	9 11	10 9	11 5	9 2	17·5	17·2	18·0	17·7
26 June	25	Regular	31 Oct.	2 Nov.	8 3	11 3	11 13	10 5	17·4	16·2	17·5	17·2
9 July	24	Regular	2 Nov.	3 Nov.	10 17	9 13	11 17	11 6	17·1	16·0	16·3	16·6
Mid-July	22	Regular	27 Nov.	28 Nov.	6 0	6 7	3 18	5 6	17·8	17·3	17·5	17·7
Mid-July	26	Patchy	27 Nov.	28 Nov.	5 7	6 11	6 11	8 7	17·7	16·9	17·7	17·6
Mid-July	26	Patchy	29 Nov.	30 Nov.	7 15	8 19	8 19	7 11	16·5	15·6	15·9	16·1
27 June	24	Regular	8 Nov.	13 Nov.	11 12	13 4	11 19	11 1	16·6	14·6	16·3	16·5
2 July.	24	Regular	8 Nov.	13 Nov.	9 3	8 18	8 11	8 5	17·4	17·1	17·4	17·7
4 July	25	Regular	8 Nov.	13 Nov.	7 2	7 6	7 16	7 19	16·0	17·5	17·3	17·8
9 July	24	Fairly Regular.	21 Nov.	22 Nov.	4 6	8 12	7 9	7 15	17·3	17·4	17·2	17·4
25 June	25	Regular	12 Dec.	13 Dec.	10 6	12 0	13 3	12 12	16·7	17·4	17·1	17·9
11 July	22	Regular	6 Nov.	8 Nov.	8 10	8 18	7 5	8 6	17·2	17·3	17·7	17·5
29 June	21	Regular	5 and 6 Nov.	8 Nov.	7 3	7 14	6 16	6 8	17·1	16·5	17·0	17·4
13 July	20	Regular	7 Nov.	9 Nov.	8 0	8 2	8 4	7 16	17·3	17·2	17·2	17·3
28 June	24	Regular	13 Nov.	15 Nov.	9 9	9 12	9 19	9 14	17·5	17·6	17·6	17·7
28 June	24	Regular	13 Nov.	15 Nov.	9 8	9 15	10 3	10 1	17·8	17·1	17·5	17·6
25 June	23½	Regular	21 Nov.	23 Nov.	9 14	10 5	9 2	8 18	16·6	15·7	17·0	16·4
26 June	23½	Regular	28 Nov.	29 Nov.	7 12	7 18	7 15	7 10	17·5	17·4	17·0	16·5

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The results shown in the foregoing tables were obtained from 129 centres at which 516 sub-plots were laid down. The returns from these 516 sub-plots show that the average yield of beet was 10 tons 8 cwts. (factory weight) per statute acre and the average sugar content of the samples was 17·6 per cent. A comparison of the returns from the two standard varieties Kuhn (P) and Klein-Wanzleben (Z) shows that, on the average, the Kuhn (P) variety was slightly superior in yield to the Klein-Wanzleben (Z) variety and that there was no difference between these two varieties as regards sugar content. As previously explained, however, the main object of these variety trials was to compare the two standard varieties Kuhn (P) and Klein-Wanzleben (Z) with a type of each of these varieties which was expected to produce a considerably heavier crop of roots containing a slightly lower percentage of sugar. In these respects the Kuhn (Pa) type proved to be disappointing, as the average returns indicate that there is practically no difference in either the yield or sugar content of this variety as compared with its correlated type Kuhn (P). A similar comparison of the returns from the Klein-Wanzleben types (Z) and (E) reveals differences in yield and sugar content which are recognised as characteristic of the two types. The average yield of the Klein-Wanzleben (E) type was 15 cwt. per acre more but the sugar content was 0·5 per cent. less than in the case of the (Z) type. On the basis of these figures the yield of roots per acre from the (E) type was over 7 per cent. greater than from the (Z) type and allowing for the lower sugar content of the (E) type, the yield of sugar per acre therefrom was over 4 per cent. greater than from the (Z) type. Though it will be necessary to continue these trials over a period of years before a definite conclusion can be drawn as to the relative merits of these two types of sugar beet, it may be observed that an increase in the yield of sugar per acre resulting from a higher yield of roots containing a lower percentage of sugar is counterbalanced to some extent by higher expenses for transport.

Influence of place in rotation.

At the 129 centres from which complete returns were received the sugar beet was grown after a corn crop at 83 centres and after potatoes or a manured root crop at 46 centres. From the results of these experiments no definite conclusion can be formed as to the influence of the preceding crop on the yield or sugar content of the beet, but it is clearly shown that sugar beet can be grown successfully in a variety of positions in the rotation.

Soils.

At the majority of centres at which the experiments were conducted the soil was described as either medium or heavy loam.

At six centres the soil was said to be of a moory or peaty nature, and at twenty-four centres the soils were described as light or sandy loams. Whilst the average returns, both as regards yield and sugar content, obtained from the different types of soil showed no marked difference, a slightly higher average yield was obtained from the beet grown on heavy and peaty soils and a slightly higher average sugar content was present in the beet grown on the lighter soils. In general, however, such differences would appear to be seasonal and may be attributed to the effects of the moisture content of the soil at critical periods during the growth of the crop.

Manuring.

At the centres where farmyard manure was applied directly to the sugar beet crop it was ploughed in during winter at 25 centres and it was applied in the drills immediately before the seed was sown at 79 centres. On the plots where the farmyard manure was applied in winter the beet was somewhat superior, both in yield and sugar content to the beet grown on the plots to which farmyard manure was applied in spring, but this, of course,

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may have been largely due to factors other than the time of application of the farmyard manure.

At twenty centres where the beet followed a root crop or potatoes and was grown on artificial manures only and at five centres where the beet was grown after a corn crop and was manured with artificials only, the average yield and sugar content of the beet was slightly above the general average.

Bolting and Forking.

Although bolting did not occur to any great extent in the 1928 crop, the returns afford further evidence that bolting is influenced by the date of sowing and by subsequent weather conditions. Bolting was most prevalent in the case of crops where growth was retarded in the very early stages as a result of dry weather in May followed by a prolonged period of wet weather and low night temperatures during June. Brairds which were well advanced in growth before the end of May produced fewer bolted plants than crops sown somewhat later. The Klein-Wanzleben (Z) type produced rather more bolted plants than the (E) type of this variety. The Kuhn (P) and (Pa) types, which were very similar as regards bolting, produced on the average less than a third of the number of bolted plants produced by the Klein-Wanzleben (Z) type. In fact, at the majority of centres bolting was practically absent in the Kuhn varieties.

In nearly all cases the shape of the roots was satisfactory, but at a number of centres a rather large proportion was forked. The experiments provide some evidence that forking may be associated with soils of the heavy, peaty and gravelly types. On the other hand, the results indicate that the application of 12 tons of well-rotted farmyard manure per acre in the drills immediately before sowing did not result in the production of an undue proportion of forked roots.

Pests and Diseases.

The crop at almost all centres was remarkabiy free from attack by insects and other pests. The yield was materially affected by mangel fly at only a few centres. A severe attack of black aphis was reported at two centres, but the yield of the crops appeared to be but slightly affected. The weather, particularly in September, was unfavourable to the development of fungoid diseases affecting the leaves of sugar beet and no damage of this nature was reported. Phoma, or crown rot, was reported as having caused damage at only four centres.

Manurial Experiments.

In view of the general practice regarding the manuring of the sugar beet and mangel crops, it was decided, in the case of the sugar beet experiments conducted by the Department in 1925, that the manurial dressing per statute acre to be applied to all experimental plots should be as follows:—

12 tons farmyard manure.
4 cwt. superphosphate (35 per cent.).
4 ,, kainit.
1 ,, sulphate of ammonia.

The above mixture of artificial manures gave such satisfactory results when applied to the experimental plots in 1925 that it has been adopted as the standard manurial dressing for both experimental and commercial crops of sugar beet grown since that year. In order, however, to determine whether this standard dressing of artificial manures or some modification thereof was likely to give the most satisfactory results when applied to sugar beet, a series of manurial trials with various mixtures of artificial manures was conducted by the Department in 1926 and somewhat similar series of manurial trials were carried out in 1927 and 1928. The results of these manurial trials in 1926 and 1927 were included in the reports on the sugar

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beet experiments in 1926 and 1927 which were published in the Department's Journal, Vol. XXVII., No. 1,, Vol. XXVIII, No. 1., and also in pamphlet form.

In 1928, as in the previous years, these trials were confined to Counties Carlow, Kildare, Kilkenny, Laoighis, Offaly, Tipperary (N.R.), Waterford, Wexford and Wicklow, where the bulk of the supplies of sugar beet for the Carlow factory were grown. The experiments were conducted at four centres in each county, except County Wicklow, where the trials were carried out at only two centres. The plots were laid down at almost all centres on land which in the previous season had been cropped with lea oats. In all cases a dressing of farmyard manure was applied uniformly at the rate of 12 tons per statute acre, either during the winter before the land was ploughed or in the drills in the spring. At each centre five-eighths of a statute acre was divided into ten uniform plots, each comprising five drills. The following dressings of artificial manures were applied to the respective plots at each centre:—

PLOT.	MANURES.	
I.	3 cwt. superphosphate (35%) 4 „ kainit 1 „ sulphate of ammonia	per statute acre.
II.	5 cwt. superphosphate (35%) 4 „ kainit 1 „ sulphate of ammonia	per statute acre.
III.	4 cwt. superphosphate (35%) 3 „ kainit 1 „ sulphate of ammonia	per statute acre.
IV.	4 cwt. superphosphate (35%) 5 „ kainit 1 „ sulphate of ammonia	per statute acre.
V.	4 cwt. superphosphate (35%) 4 „ kainit 1 „ sulphate of ammonia	per statute acre.
VI.	5 cwt. superphosphate (35%) 5 „ kainit 1¼ „ sulphate of ammonia	per statute acre.
VII.	4 cwt. superphosphate (35%) 4 „ kainit 2 „ sulphate of ammonia	per statute acre.
VIII.	4 cwt. superphosphate (35%) 4 „ kainit Nitro-chalk sufficient to supply the same quantity of nitrogen as is contained in one cwt. of sulphate of ammonia.	per statute acre.
XI.	4 cwt. superphosphate 35(%) 4 „ kainit 1 „ nitrate of soda	per statute acre.
X.	4 cwt. superphosphate (35%) 4 „ kainit 2 „ nitrate of soda	per statute acre.

The artificial manures were applied immediately before the seed was sown, except in the case of Plots IX. and X., to which the nitrate of soda was applied as a top-dressing. Plot IX. received a top-dressing at the rate of 1 cwt. per statute acre, immediately after the crop was singled, and Plot X. received a similar top-dressing at the same time. In addition, the latter plot received a second top-dressing at the same rate a week or two later.

The Kuhn (P) variety of seed was sown on all the plots at all centres.

The general cultivation of the crop on these plots was the same as in the case of the variety trials already referred to. Throughout the growing season very little difference was noted at most centres in the appearance of the crop on the various sub-plots except that in the case of Plot VII.,

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which received the dressing of 2 cwt. of sulphate of ammonia, and Plot X., which received the dressing of 2 cwt. of nitrate of soda per statute acre, the growth of foliage was, as a rule, somewhat more vigorous throughout the growing season than in the case of the other plots. It was reported that at the time when weighings were taken for the determination of yield there was very little outward indication of ripeness of the crop on any of the plots, and at the majority of the centres this was particularly noticeable in the case of Plots VII. and X. which received the heavier dressings of nitrogenous manures.

The procedure adopted with regard to the weighing, sampling and analysis of the produce of these plots was the same as in the case of the variety trials conducted by the Agricultural Instructors, except that plants which had bolted were included in the quantities weighed for the determination of the yield.

Of the 34 centres at which experiments were laid down complete returns are available from 31 centres. Reliable returns could not we obtained from three centres where the crops were very patchy.

Detailed particulars in respect of the 31 centres from which complete returns were obtained are shown in Table IV. (on pages 18 and 19).

The average returns from the different plots at all centres are surprisingly uniform. The standard manurial dressing applied at the normal rate produced on the average a slightly higher yield than any of the other dressings excepting that containing two cwt. of sulphate of ammonia. The larger quantity of the standard mixture or dressing, *i.e.*, 11¼ cwts. (Plot VI.), as against 9 cwts. (Plot V.) per statute acre, produced a heavier crop of beet —an increase which more than sufficed to defray the cost of the additional manure. On the other hand the lighter dressings of superphosphate and kainit and the application of nitrogen in the form of a top-dressing of nitrate of soda at the rate of one cwt. per statute acre produced a lower yield than did the standard dressing. The average yield of the crops on the plots which received nitro-chalk was somewhat lower but the sugar content was slightly higher than in the case of the plots to which the standard dressing was applied, and the returns afford some evidence that nitro-chalk may prove to be a satisfactory source of nitrogen for sugar beet when grown on land which is deficient in lime. The heavier dressing of kainit, as well as the dressing which contained nitro-chalk, produced crops having an average sugar content slightly higher than that produced by the standard dressing, but the dressings containing extra superphosphate and extra nitrogen, in the form of either sulphate of ammonia or nitrate of soda, produced crops having an average sugar content slightly lower than that produced by the standard dressing.

Having regard to the results obtained from the plots to which the standard dressing of 4 cwt. superphosphate, 4 cwt. kainit, and 1 cwt. sulphate of ammonia per statute acre was applied, it is evident that this mixture can be relied upon to give satisfactory returns on most soils, and pending the results of further manurial trials, the Department recommend the use of this mixture, with a proviso that a top-dressing of nitrate of soda at the rate of about one cwt. per statute acre should be applied a few days after the crop is singled, or even before singling, where the crop is attacked by insect pests or where growth has been seriously interfered with through adverse weather conditions or other causes.

Trials with Sugar Factory Waste Lime.

In the process of manufacturing beet sugar large quantities of burnt lime are used, and from this process there results a by-product commonly known as "waste lime." This by-product as it leaves the filter presses in the factory contains approximately 50 per cent. of water, 10 per cent. of lime in the form of calcium carbonate, and small quantities of nitrogen and phosphates.

Waste lime is usually available to beet growers, especially in the vicinity of the factory, at a very low price and is, therefore, used extensively in some countries chiefly as a cheap source of lime for agricultural purposes. It is rather difficult to handle when fresh, on account of its wet, sticky

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TABLE No.

SHOWING RESULTS OF MANURIAL TRIALS

No.	NAME AND ADDRESS OF PLOTHOLDER.	Nature of Soil	Crop grown on land in 1927	Date of Sowing	Date of Singling	Date of Weighing Crop	Date of Analysis of Samples	YIELD PER STATUTE ACRE				
								cwt. 3 Super. 4 Kainit 1 Sulph. Amm.	cwt. 5 Super. 4 Kainit 1 Sulph. Amm.	cwt. 4 Super. 3 Kainit 1 Sulph. Amm.	cwt. 4 Super. 5 Kainit 1 Sulph. Amm.	cwt. 4 Super. 4 Kainit 1 Sulph. Amm.
	CO. CARLOW.							T. C.	T. C.	T. C.	T. C.	T. C.
150	Dowling, William, Ballyhacket, Tullow.	Strong Loam	Lea Oats	5 May	30 May	21 Nov.	3 Dec.	12 11	12 11	13 8	13 3	14 2
168	Griffin, P. J., Slanequarter, Tullow	Medium Loam	Wheat	3 May	4 June	6 Dec.	10 Dec.	13 2	13 7	14 5	14 4	14 11
72	Doyle, Edward, Craans, Tullow ...	Light Loam (Moory)	Lea Oats	4 May	22 May	8 Nov.	13 Nov.	11 5	11 5	11 0	11 0	11 7
101	Doyle, James, Ballinagrane, Borris	Medium Loam	Lea Oats	2 May	24 May	16 Nov.	20 Nov.	9 14	11 12	10 14	10 8	12 0
	CO. KILDARE.											
142	Duffy, Patrick, Mountrice, Monasterevan.	Dark Loam	Lea Oats	18 May	12 July	27 Nov.	29 Nov.	10 0	10 18	10 5	10 15	10 14
81	McNally, Andrew, Grouse Lodge, Monasterevan.	Clay Loam	Lea Oats	15 May	2 July	13 Nov.	15 Nov.	8 7	8 16	8 14	9 7	9 4
61	Malone, Simon J., Clonmoyle ...	Clay Loam	Lea Oats	19 May	4 July	8 Nov.	12 Nov.	9 16	10 8	9 18	10 4	10 2
46	Cunningham, Michael, Round Tower House, Kildare.	Deep Loam	Lea Oats	23 May	2 July	7 Nov.	9 Nov.	10 13	11 0	10 13	11 5	10 16
	CO. KILKENNY.											
106	Comerford, Stephen, Loughinney, Woodsgift.	Medium Loam	Oats	21 May	3 July	16 Nov.	20 Nov.	8 2	8 12	7 19	8 12	8 2
56	Mathers, James, Ratheash, Clifden	Medium Loam	Wheat	4 May	14 June	8 Nov.	10 Nov.	10 6	11 3	10 6	9 15	10 3
35	Hughes, Nicholas, Balief, Woodsgift.	Medium Loam	Oats	7 May	19 June	6 Nov.	8 Nov.	10 12	10 12	9 0	11 9	10 12
	LAOIGHIS.											
65	Costelloe, Michael, Upper Lea, Portarlington.	Heavy Loam	Barley	8 May	8 July	8 Nov.	12 Nov.	11 5	10 8	10 4	9 7	10 3
25	Shiel, Laurence, Cuffsborough, Ballacolla.	Light Loam	Oats	7 May	18 June	2 Nov.	7 Nov.	11 6	11 8	12 0	11 17	12 3
9	Carey, John, Tentoul, Ballacolla ...	Loam	Barley	7 May	15 June	30 Oct.	2 Nov.	9 7	9 15	10 6	8 18	10 5
10	Neary, Joseph, Cullohill, Rathdowney	Medium Loam	Oats	3 May	14 June	29 Oct.	2 Nov.	8 14	10 6	9 9	8 17	9 13
	OFFALY.											
141	Mahon, John, Enehan, Portarlington	Heavy Moor	Lea Oats	18 May	28 June	28 Nov.	29 Nov.	11 2	11 12	11 3	12 15	12 10
73	Keegan, William, Sragh, Tullamore	Deep Loam	Lea Oats	19 May	19 July	10 Nov.	13 Nov.	11 10	11 12	10 12	10 8	10 12
98	Carroll, Lawrence, Clonad, Killeigh, Tullamore.	Stiff Alluvial Soil	Lea Oats	16 May	12 July	15 Nov.	19 Nov.	11 18	12 13	11 8	10 6	10 15
	CO. TIPPERARY, N.R.											
182	Donohoe, John, Bushey Park, Borrisokane.	Clay Loam	Oats	16 May	9 July	11 Jan.	15 Jan.	10 0	10 7	10 9	10 10	12 3
189	Horan, Hugh, Knockshegowna, Shinrone, Roscrea.	Strong Clay	Lea Oats	8 May	26 June	19 Dec.	21 Dec.	6 11	6 17	7 3	7 13	7 4
169	Tooher, P., Curraduff, Birr ...	Strong Clay Loam	Oats	18 May	3 July	7 Dec.	10 Dec.	10 0	10 8	9 10	10 2	9 16
	CO. WATERFORD.											
166	Power, Mrs. Mary, Ballyknock, Dungarvan.	Shingly Loam	Lea Oats	7 May	16 June	5 Dec.	7 Dec.	13 9	14 3	13 6	14 7	13 4
122	Higgins, John, Kilgnovan, Dungarvan	Deep Sandy Loam	Oats	25 April	5 June	20 Nov.	26 Nov.	15 9	16 18	17 9	15 14	16 18
109	Butler, John, Liecaun, Dunmore East	Medium, Red Sandstone Loam	Lea Oats	14 May	3 July	17 Nov.	22 Nov.	10 15	12 2	11 12	11 14	10 19
64	O'Donovan, Michael, Gurrane, Modeley's, Cappoquin.	Shingly Red Sandstone Loam	Lea Oats	5 May	26 June	8 Nov.	12 Nov.	9 6	10 6	10 6	11 0	11 9
	CO. WEXFORD.											
103	O'Neill, Mrs. M., Shanoo, Bridgetown	Clay Loam	Lea Oats	12 May	23 June	14 Nov.	20 Nov.	13 10	15 0	14 5	14 12	14 0
92	Scallan, Peter, Clonroche ...	Shingly Loam	Lea Oats	19 May	1 July	15 Nov.	19 Nov.	12 10	14 5	14 0	14 0	13 15
80	Furlong, Thomas, Knockreigh, Adamstown.	Shingly Loam	Lea Oats	18 May	9 July	13 Nov.	15 Nov.	7 0	7 5	7 18	8 5	8 15
21	Fortune, Richard, Doononey, Adamstown.	Sandy Loam	Lea Oats	14 May	6 July	5 Nov.	6 Nov.	9 10	10 5	10 0	9 5	10 15
	CO. WICKLOW.											
158	Burke, Patrick, Lackeragh, Baltinglass	Deep Clay Loam	Oats	14 May	5 July	30 Nov.	4 Dec.	11 5	12 0	11 15	11 17	12 7
49	Owens, Patrick, Tinorin, Baltinglass	Medium Loam	Oats	7 May	27 June	7 Nov.	9 Nov.	11 5	11 11	11 3	11 2	11 8
	AVERAGES FOR 31 PLOTS ...	—	—	—	—	—	—	10 13	11 5	10 19	11 1	11 6

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CONDUCTED BY THE AGRICULTURAL INSTRUCTORS.

(FACTORY WEIGHT).					SUGAR CONTENT OF ROOTS.									
cwt. 5 Super. 5 Kainit 1¼ Sulph. Amm.	cwt. 4 Super. 4 Kainit 2 Sulph. Amm.	cwt. 4 Super. 4 Kainit Nitro-chalk.	cwt. 4 Super. 4 Kainit 1 Nitrate of Soda	cwt. 4 Super. 4 Kainit 2 Nitrate of Soda	cwt. 3 Super. 4 Kainit 1 Sulph. Amm.	cwt. 5 Super. 4 Kainit 1 Sulph. Amm.	cwt. 4 Super. 3 Kainit 1 Sulph. Amm.	cwt. 4 Super. 5 Kainit 1 Sulph. Amm.	cwt. 4 Super. 4 Kainit 1 Sulph. Amm.	cwt. 5 Super. ·5 Kainit 1¼ Sulph. Amm.	cwt. 4 Super. 4 Kainit 2 Sulph. Amm.	cwt. 4 Super 4 Kainit Nitro-Chalk	cwt. 4 Super. 4 Kainit 1 Nitrate of Soda	cwt. 4 Super. 4 Kainit 2 Nitrate of Soda
T. C.	T. C.	T. C.	T. C.	T. C.	%	%	%	%	%	%	%	%	%	%
16 0	15 8	14 17	15 8	16 0	18·3	18·5	18·4	18·2	17·5	17·9	17·5	17·8	17·6	17·6
15 11	14 6	14 16	15 8	15 14	18·6	18·5	18·1	18·8	18·2	19 0	18·7	18·6	18·4	18·6
12 2	11 16	12 12	11 2	11 16	19·0	18·6	18·1	18·7	18·7	18·1	18·1	18·2	18·3	18·1
13 16	13 2	12 8	12 3	12 16	17·9	18·7	18·3	18·4	18·4	18·7	18·0	18·5	18·3	18·3
11 1	11 0	10 12	9 18	10 15	16·8	16·6	17·1	18·8	17·6	17·5	18·1	17·9	18·4	18·0
9 12	9 15	9 0	9 3	9 9	18·3	17·7	18·3	18·5	18·3	18·5	18·2	18·3	17·8	17·3
11 1	10 16	10 3	9 17	10 4	18·0	16·8	17·7	17·8	17·9	17·6	17·5	18·3	18·6	17·4
11 13	11 0	10 8	9 13	9 19	17·2	17·4	17·8	17·8	17·1	17·0	17·1	17·5	17·5	17·6
8 8	7 18	7 14	7 15	8 0	18·0	19·0	18·7	18·6	18·9	18·3	18·4	19·1	18·9	19·1
10 9	11 0	10 3	9 18	11 6	19·6	19·4	18·9	19·5	19·0	18·6	18·9	19·2	19·1	18·6
11 12	10 18	10 3	11 6	11 12	18·7	18·6	18·4	18·6	18·5	18·5	18·1	18·8	18·4	18·1
10 5	12 4	11 18	9 17	10 0	18·7	18·7	19·1	18·0	18·4	18·7	18·6	19·3	19·0	18·5
12 17	11 3	10 17	11 14	12 3	18·3	18·6	18·9	18·3	18·4	18·5	18·7	18·2	18·7	19·0
10 11	10 11	10 17	10 16	9 15	19·0	19·1	18·7	18·8	18·7	18·5	18·9	19·2	18·6	18·9
9 10	9 14	9 6	8 15	10 3	18·7	18·4	18·9	19·0	18·9	18·8	19·0	19·0	19·1	18·1
12 17	12 0	11 0	11 7	11 4	18·2	17·7	17·4	17·7	17·6	17·7	17·9	17·6	17·7	17·7
9 16	10 14	10 13	9 15	9 10	17·7	17·3	17·4	17·8	17·7	17·8	17·8	17·7	16·8	17·4
9 18	10 12	9 17	10 2	10 0	17·8	17·8	18·7	18·1	18·1	18·1	17·7	17·9	17·9	16·8
10 0	10 6	11 4	10 17	10 6	19·0	17·7	18·5	18·8	19·0	18·9	18·0	18·0	18·5	18·1
7 17	7 14	6 16	6 13	8 6	18·0	18·0	17·2	17·6	17·0	17·8	17·1	17·3	17·2	17·6
9 18	9 11	8 12	7 14	9 4	17·8	18·1	18 0	18 4	18·3	18·5	17·8	18·3	17·7	18·0
13 6	12 18	12 0	13 0	13 6	18·8	18·3	18·0	18·3	18·5	18·9	18·5	18·4	18·4	18·8
18 6	18 6	16 12	17 9	16 6	16·9	17·3	17·0	17·0	17·3	17·3	17·6	17·2	17·0	16·2
12 3	12 9	11 3	11 19	10 15	16·8	16·7	16·2	16·8	17·1	17·1	16·9	18·0	17·5	17·3
10 1	9 14	9 15	10 0	9 10	19·2	19·4	18·7	18·3	18·9	18·8	18·4	19·0	18·6	18·7
15 2	14 12	14 12	13 15	13 10	17·8	18·0	17·9	18·0	17·2	17·4	16·9	17·0	16·9	17·0
14 5	13 0	14 5	12 5	12 18	17·5	17·6	18·1	18·4	18·1	17·5	17·4	17·7	18·2	17·7
7 15	7 15	10 10	9 10	10 12	17·7	17·0	17·8	17·7	17·0	16·7	17·2	17·2	17·1	16·6
10 12	11 15	10 15	10 5	10 5	16·5	16·6	17·9	18·2	18·1	18·0	18·1	18 3	18·5	18·0
12 10	12 4	11 17	12 1	12 5	16·6	17·5	17·2	17·6	17·1	17·9	17·2	18·1	17·6	16·6
11 18	11 10	10 12	10 16	11 9	18·3	17·2	17·6	17·8	18·1	18·0	17 5	18·4	18·4	18·1
11 13	11 9	11 3	10 19	11 5	18·1	17·9	18·0	18·2	18·1	18·1	17·9	18·2	18·1	17·9

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condition, but after exposure for some time to the air in dry weather, it can be spread on the land without very much difficulty.

In order to ascertain the effects on the sugar beet crop when waste lime from the Carlow factory was applied to the land, in the autumn or winter before the beet crop was grown, a series of trials was conducted by the Agricultural Instructors at thirteen centres in the counties from which the Carlow Sugar Factory draws its main supplies of beet. The procedure adopted in carrying out the experiments was as follows:—

In each field a representative plot of ground, either one acre or half acre in area, was measured off and was dressed, in the autumn or winter season, before the beet crop was sown, with sugar factory waste lime at the rate of, approximately, 4 tons per statute acre.

The measured area in each field, as well as a similar area alongside to which no lime was applied, was sown with sugar beet in 1928, and subsequently the two plots were treated in exactly the same manner. At two centres an additional plot adjoining the other two plots was dressed with burnt lime at the rate of 2 tons per statute acre.

The methods of after-cultivation, weighing and sampling of the crop on the different plots, were the same as in the case of the variety experiments conducted by the Agricultural Instructors.

At two centres the crop was reported as being somewhat patchy, and at one centre the crop was attacked by phoma. The effects of this disease were more severe on the plot which received waste lime than on the plot to which no lime was applied. At four centres it was observed that the foliage of the plants on the limed plot was more vigorous than that on the unlimed plot, but the reverse was the case at two other centres. At five centres the growers complained that the waste lime was difficult to handle and spread, but in other cases where it was stored under cover for some weeks prior to use, no great difficulty was experienced in distributing it uniformly over the plot.

The returns from the different centres are shown in Table V. on page 21.

Although the average returns as regards yield and sugar content are slightly better from the waste lime plots than from the plots which received no lime, the differences in the returns are not significant.

The returns from individual centres show marked variations which may, possibly, indicate corresponding variations in the lime requirements of these soils for the growing of sugar beet.

It would appear that the question of using waste lime for the sugar beet crop depends, in the first instance, on whether the particular soil is in need of lime and, secondly, whether waste lime will provide as economical a source of supply as burnt lime having regard to the much more concentrated and active nature of the latter and the ease with which it can be handled and distributed as compared with sugar factory waste lime.

II.—EXPERIMENTS AT THE DEPARTMENT'S FARMS AND AT THE ALBERT AGRICULTURAL COLLEGE (UNIVERSITY COLLEGE, DUBLIN).

During the season of 1927 experiments with sugar beet were conducted at the Department's farms at Athenry, Ballyhaise, and Clonakilty and also at the Albert Agricultural College, Glasnevin. These experiments comprised variety tests and, in addition, a series of trials arranged to determine the effects of:—

(1) The application of farmyard manure in winter and in spring.

(2) The application of nitrate of soda in drills at time of sowing and as a top-dressing after singling.

(3) The application of artificial manures at different seasons.

(4) Sowing the crops in rows or drills of different widths.

(5) Singling the plants to different distances apart.

(6) Singling the crops at different stages of growth.

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TABLE V.

Showing Results of Trials with Sugar Factory Waste Lime.

Name and Address of Plotholder.	Nature of Soil	Quantity of Waste Lime applied per statute acre.	Manuring per Statute Acre.				Yield per Statute Acre (Factory Weight).			Sugar Content of Roots		
			Farm Yard Manure	Superphosphate 35%	Kainit	Sulphate of Ammonia	No Lime	Sugar Factory Waste Lime	Burnt Lime*	No Lime	Sugar Factory Waste Lime	Burnt Lime*
		T. C.	Tons.	Cwt.	Cwt.	Cwt.	T. C.	T. C.	T. C.	%	%	%
County Carlow.												
oyle, Ed., Craans, Tullow ...	Light moory loam.	4 0	12	4	4	1	9 8	10 12	—	19·1	18·8	—
County Kilkenny.												
athers, Jas., Rathcash, Clifden	Medium loam.	4 0	12	4	4	1	10 0	9 15	—	18·6	18·1	—
Laoighis.												
enna, John, Pallas, Portlaoighise.	Heavy loam	4 10	15	4	4	1	9 4	10 3	—	17·0	17·9	—
w'ing, John, Derrydavey, Mountmellick.	Light Peaty loam.	4 14	12	4	4	1	10 11	10 5	—	18·8	18·7	—
Offaly.												
urke, Patrick, Ballykilmurry, Tullamore.	Heavy clay loam.	4 0	12	4	4	1	8 4	8 5	—	15·3	16·3	—
alion, Jas., Sragh, Tullamore	Medium loam.	4 0	12	4	4	1	8 7	8 5	—	17·2	17·5	—
County Tipperary, N.R.												
eeson, Tim, Moanahincha, Roscrea.	Black loam	4 0	—	4	4	1	6 7	5 8	7 13	17·5	17·0	17·4
oher, Patk., Curraduff, Birr ...	Black loam	4 0	—	4	4	1	7 17	6 11	—	17·5	17·6	—
County Waterford.												
ynn, Thomas, Coolnagower, Dungarvan.	Deep Drift loam.	4 0	14	4	4	1	10 3	10 12	—	17·3	18·3	—
County Wexford.												
ttit, Thomas, Ballyduskar, Killinick.	Sandy loam.	6 0	12	4	4	1	13 6	15 0	—	18·1	17·6	—
allan, P. Clonroche ...	Shingly loam.	4 0	15	4	4	1	11 18	12 5	12 10	17·4	17·8	17·7
County Wicklow.												
een, Peter, Croneyhorn, Shillelagh.	Clay loam	4 0	12	4	4	1	9 8	9 18	—	18·2	18·5	—
urke, Patrick, Lackeragh, Baltinglass	Clay loam	4 0	12	4	4	1	10 6	10 17	—	17·1	17·1	—
Average (13 centres) ...		—	—	—	—	—	9 12	9 17	—	17·6	7·8	—

* Burnt lime was applied at two centres at the rate of two tons per statute acre.

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Experiments were also conducted on the farm at the Munster Institute, Cork, with the object of determining the effects of varying quantities of phosphates on the yield and sugar content of the crop.

Experiments at Athenry, Ballyhaise, Clonakilty and Glasnevin Farms.

The experiments conducted at the above-mentioned centres in 1928 were arranged as shown on the plan on page 23 and the procedure adopted in laying down the experiments at each centre was as follows:—

Two plots of one statute acre each were marked off at each centre. One plot was set aside for cultivation tests and trials with artificial manures while the second plot was reserved for variety trials and a comparative test of the effects of farmyard manure when applied to the land in winter and in spring.

The first plot was dressed uniformly with well rotted farmyard manure applied in the drill at the rate of 15 tons per statute acre. The plot intended for variety trials was divided into two equal portions by a line parallel to the longer dimension, and one half was dressed with farmyard manure at the rate of 15 tons per statute acre before the land was ploughed in winter. A similar quantity of farmyard manure was stored over winter in a heap in the open, and was applied to the other half of the plot in the drills before sowing. In order to ensure that both sub-plots would receive farmyard manure of the same quality, it was arranged at each centre that, as the manure was being carted out on to the sub-plot which was being manured in winter, every alternate load should be placed in a heap adjacent to the corresponding sub-plot to be dressed with farmyard manure in spring. The heap when completed was compactly built so as to prevent undue losses through exposure to the weather and, before the manure was applied in spring, it was re-weighed in order to determine the loss in weight during storage. The shrinkage in weight at each centre was found to be as follows:—

Athenry	...	11 per cent.
Ballyhaise	...	22 per cent.
Clonakilty	...	16 per cent.
Glasnevin	...	7 per cent.

In preparing the land for the sowing of the seed in the variety trials, the drills were made across both sub-divisions of this one-acre plot, and the farmyard manure stored over winter was applied to the portion of this plot which had been reserved for that purpose. On the adjoining acre plot to which farmyard manure was applied in spring, the other tests, as previously described and as shown in the plan on page 23 were carried out with seed of the Kuhn (P) variety.

Trials with Varieties and with Farmyard Manure applied in Winter and in Spring.

The one-acre plot at each centre reserved for variety trials, half of which had received a dressing of farmyard manure in winter, and the other half in spring, was set aside for trials with eight varieties, viz.:—Kuhn (P), Kuhn (Pa), Klein-Wanzleben (Z), Klein-Wanzleben (E), Schreiber, Dippe, Garton and Marsters. A dressing of 4 cwt. superphosphate (35 per cent.), 4 cwt. kainit and 1 cwt. sulphate of ammonia per statute acre was applied at each centre to the entire plot at the time of sowing. At all centres the drills were 21 inches in width, and the seed was dibbled in by hand to allow exactly 9 inches beween the plants when singled. At each centre 12 drills were sown with each of the eight varieties of seed.

The general cultivation, weighing, sampling and analysis of the crop on these plots were the same as in the case of the variety trials carried out by the Agricultural Instructors already described in this report. At the Ballyhaise centre, where the soil is very stiff and heavy, the crop was somewhat retarded by wet weather in June, but later in the season the crop made good progress. At the other three centres the crops on all the plots developed normally, and at no centre were the plants injured to any serious extent by pests or diseases. At none of the centres was there any

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PLAN OF EXPERIMENTS

at the Department's Farms at Athenry, Ballyhaise and Clonakilty and at the Albert Agricultural College, Glasnevin (University College, Dublin).

	Farmyard Manure Applied in Spring.	Farmyard Manure Applied in Winter.	
Varieties	12 Drills ... ... Kuhn (P)	Variety	Variety Experiments.
	12 ,, ... Kuhn (Pa)	,,	
	12 ,, ... Klein-Wanzleben (Z)	,,	
	12 ,, ... Klein-Wanzleben (E)	,,	
	12 ,, ... Schreiber	,,	
	12 ,, ... Dippe	,,	
	12 ,, ... Gartons	,,	
	12 ,, ... Marsters	,,	
Artificial Manures Applied at Different Seasons.	5 ,, ... Equivalent of 4 cwt. 35% Super., in form of Basic Slag, applied in Winter 4 cwt. Kainit, applied in Spring. 1 cwt. Sulphate of Ammonia, applied in Spring.		Manurial and Cultivation Experiments.
	5 ,, ... 4 cwt. Super. 35%, applied at time of Sowing. 4 cwt. Kainit, applied in Winter. 1 cwt. Sulphate of Ammonia, applied at time of sowing.		
	5 ,, ... Equivalent of 4 cwt. 35% Super., in the form of Basic Slag, applied at time of sowing. 4 cwt. Kainit, applied at time of sowing. 1 cwt. Sulphate Ammonia, applied at time of sowing.		
	5 ,, ... 4 cwt. Super. 35%, applied at time of sowing 4 cwt. Kainit, applied at time of sowing. 1 cwt. Sulphate Ammonia, applied at time of sowing.		
	5 ,, ... 4 cwt. Super 35%, applied at time of sowing. 4 cwt. Kainit, applied at time of sowing. 2 cwt. Sulphate Ammonia, applied at time of sowing.		
Width of Drills.	6 ,, ... 21″ Drills.	Singled, 9″ apart.	
	6 ,, ... 24″ ,,	,, 9″ ,,	
	6 ,, ... 18″ ,,	,, 9″ ,,	
Singling at Different Distances Apart.	3 ,, ... 18″ Drills	Singled, 8″ apart.	
	3 ,, ... 18″ ,,	,, 12″ ,,	
	3 ,, ... 24″ ,,	,, 8″ ,,	
	3 ,, ... 24″ ,,	,, 12″ ,,	
	3 ,, ... 21″ ,,	,, 8″ ,,	
	3 ,, ... 21″ ,,	,, 12″ ,,	
Singling at Different Stages of Growth.	5 ,, ... 21″ ,,	Singled at the "two-leaf" stage of growth.	
	5 ,, ... 21″ ,,	,, ,, "four-leaf" stage of growth.	
Methods of Applying Nitrate of Soda.	5 ,, ... 4 cwt. Super. 35%, applied in drills at time of sowing 4 cwt. Kainit, ,, ,, ,, 1 cwt. Sulphate of Ammonia ,, ,, 1 cwt. Nitrate of Soda ,, ,,		per statute acre.
	5 ,, ... 4 cwt. Super. 35%, applied in drills at time of sowing 4 cwt. Kainit, ,, ,, ,, 1 cwt. Sulphate of Ammonia ,, ,, 1 cwt. Nitrate of Soda applied as a top-dressing after singling.		,,
	5 ,, ... 4 cwt. Super, 35%, applied in drills at time of sowing. 4 cwt. Kainit, ,, ,, ,, 1 cwt. Sulphate of Ammonia, ,, ,,		,,
	5 ,, ... 4 cwt. Super. 35%, applied in drills, at time of sowing. 4 cwt. Kainit, ,, ,, ,, 149 lb. Nitrate of Soda ,, ,,		,,
	5 ,, ... 4 cwt. Super. 35%, applied in drills at time of sowing 4 cwt. Kainit, ,, ,, ,, 149 lb. Nitrate of Soda ,, ,, 1 cwt. Nitrate of Soda, applied as a top-dressing after singling.		

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apparent difference during the growing season in the crops to which farmyard manure was applied in winter and in spring; the crops grew and ripened uniformly and the number of bolted plants was almost negligible.

Particulars as to the yield and sugar content of the beet on the various sub-plots at each centre which received farmyard manure in winter, and on the corresponding sub-plots to which farmyard manure was applied in spring, are shown in Tables VI. and VII. respectively.

TABLE VI.

RETURNS FROM PLOTS TO WHICH FARMYARD MANURE WAS APPLIED IN WINTER.

VARIETY.	Yield per Statute Acre.				Sugar Content of Roots.				Average yield.	Average Sugar Content.
	Athenry.	Ballyhaise.	Clonakilty.	Glasnevin.	Athenry.	Ballyhaise.	Clonakilty.	Glasnevin.		
	T. C.	T. C.	T. C.	T. C.	%	%	%	%	T. C.	%
Kuhn (P.)	12 4	10 14	10 15	10 18	17·2	17·0	17·1	17·9	11 3	17·3
Kuhn (Pa.)	11 17	10 8	10 12	12 7	17·0	17·5	17·1	17·7	11 6	17·3
K.W.O. (Z.)	12 0	11 8	10 2	9 6	16·8	17·5	16·7	17·5	10 14	17·1
K.W.O. (E.)	12 0	10 7	11 18	10 5	16·4	16·9	16·9	16·9	11 3	16·8
Schreiber ...	12 11	9 2	9 14	9 15	16·6	17·9	17·0	18·1	10 5	17·4
Dippe ...	12 10	9 0	10 13	9 14	17·1	18·0	17·8	17·5	10 9	17·6
Marsters ...	13 14	10 8	11 6	10 17	16·9	16·5	17·6	18·4	11 11	17·4
Gartons ...	12 4	9 1	11 1	9 1	17·0	16·0	17·9	18·0	10 7	17·2

TABLE VII.

RETURNS FROM PLOTS TO WHICH FARMYARD MANURE WAS APPLIED IN SPRING.

VARIETY.	Yield per Statute Acre. (Factory Weight).				Sugar Content of Roots.				Average yield.	Average Sugar Content
	Athenry	Ballyhaise.	Clonakilty.	Glasnevin.	Athenry	Ballyhaise.	Clonakilty.	Glasnevin.		
	T. C.	T. C.	T. C.	T. C.	%	%	%	%	T. C.	%
Kuhn (P.)	14 10	11 8	9 18	12 5	17·4	17·2	17·5	18·4	12 0	17·6
Kuhn (Pa.)	12 14	9 8	9 16	11 12	17·3	17·0	17·8	18·3	10 18	17·6
K.W.O. (Z.)	12 7	10 12	9 4	10 6	17·4	17·7	18·4	18·1	10 12	17·9
K.W.O. (E.)	13 3	10 13	11 2	12 0	17·0	17·3	16·8	17·1	11 15	17·1
Schreiber ...	13 0	10 8	11 0	10 5	16·7	17·6	17·5	18·0	11 3	17·5
Dippe ...	12 10	9 4	11 6	9 12	17·1	17·1	18·0	17·4	10 8	17·4
Marsters ...	15 0	9 1	11 10	8 14	17·2	16·8	17·8	18·1	11 1	17·5
Garton ...	14 10	9 0	10 7	8 5	16·1	16·5	18·2	19·0	10 11	17·4

The average yields produced by the varieties Klein-Wanzleben (Z), Schreiber, Dippe and Garton are appreciably lower than those produced by the other four varieties. Although the average yield of the Klein-Wanzleben (E) variety was slightly superior to that of any other variety, excepting Kuhn (P), it was inferior as regards average sugar content to any of the other varieties included in the trials at these centres.

On the average, slightly better yields were obtained from the plots to which farmyard manure was applied in spring than from the corresponding plots to which farmyard manure was applied in winter. This result was very marked at the Athenry centre. The average sugar content of the beet on the plots to which farmyard manure was applied in spring was also slightly higher than that of the beet on the plots to which farmyard manure was applied in winter.

Nitrate of Soda Applied in Drills at Time of Sowing and as a Top-dressing.

With the object of comparing the effects of nitrate of soda, when applied in the drill at the time the sugar beet seed is sown and when applied as a top-dressing immediately after the crop is singled, a series of plots was laid down at each centre as shown on the plan on page 23. The series of plots was also designed to afford a comparison of the values of sulphate of ammonia and nitrate of soda when used for sugar beet along

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with superphosphate and kainit. As regards cultivation all plots were, of course, treated in identical manner.

During the growing season no difference was observed in the general appearance of the plants on the different plots except at one centre where the crop on the plot to which nitrate of soda was applied as a top-dressing produced a heavier growth of leaves than was produced on the other plots. The returns from the different plots at each centre are shown in Table VIII.

TABLE VIII.

	Artificial Manures applied per Statute Acre.	Yield per Statute Acre (Factory Weight).				Sugar Content of Roots.				Average.	
		Athenry	Ballyhaise	Clonakilty	Glasnevin	Athenry	Ballyhaise	Clonakilty	Glasnevin	Yield (Factory Weight)	Sugar Content
		T. C.	T. C.	T. C.	T. C.	%	%	%	%	T. C.	%
1.	4 cwt. Superphospate 35% applied in the drills at time of sowing. 4 cwt. Kainit applied in the drills at time of sowing. 1 cwt. Sulphate of Ammonia applied in the drills at time of sowing. 1 cwt. Nitrate of Soda applied in the drills at time of sowing.	11 0	9 2	11 1	10 10	16·6	17·7	17·7	16·9	10 8	17·2
2.	4 cwt. Superphosphate 35% applied in the drills at time of sowing. 4 cwt. Kainit applied in the drills at time of sowing. 1 cwt. Sulphate of Ammonia applied in the drills at time of sowing. 1 cwt. Nitrate of Soda applied as a top-dressing after singling.	12 0	8 11	10 8	11 5	16·4	17·3	17·6	17·9	10 11	17·3
3.	4 cwt. Superphosphate 35% applied in the drills at time of sowing. 4 cwt. Kainit applied in the drills at time of sowing. 1 cwt. Sulphate of Ammonia applied in the drills at time of sowing.	12 2	8 13	10 11	10 8	16·4	17·4	17·1	17·5	10 8	17·1
4.	4 cwt. Superphosphate 35% applied in the drills at time of sowing 4 cwt. Kainit applied in the drills at time of sowing. 149 lb. Nitrate of Soda applied in the drills at time of sowing.	12 0	9 9	10 18	16 8	16·9	17·9	17·3	17·4	10 9	17·4
5.	4 cwt. Superphosphate 35% applied in the drills at time of sowing. 4 cwt. Kainit applied in the drills at time of sowing. 149 lb. Nitrate of Soda applied in the drills at time of sowing. 1 cwt. Nitrate of Soda applied as a top-dressing after singling.	12 1	10 0	9 16	10 10	15·9	17·2	17·3	17·6	10 12	17·0

It will be seen that the returns from the comparable plots were not very uniform at the five centres and that, on the average, there was little difference in the results obtained from the standard dressing of artificial manures and from the various manurial dressings containing nitrate of soda, irrespective of whether this latter ingredient of the mixture was applied before the seed was sown or as a top-dressing.

Winter and Spring Applications of Artificial Manures.

With the object of comparing the effects of dressings of basic slag and kainit applied in winter and in spring immediately before sowing with the standard dressing of artificial manures and a dressing consisting of 4 cwt. superphosphate, 4 cwt. kainit and 2 cwt. sulphate of ammonia per statute acre applied at the usual time, *i.e.*, in the drills at the time of sowing, a series of plots was laid down at each centre on the same lines as in the past two seasons, and as shown on plan on page 23. The crops on all the plots were otherwise treated in exactly the same manner as the sub-plots in the variety trials, conducted at the same centres, which received an application of farmyard manure in the drills at the time of sowing.

During the growing season, no outstanding difference was noticeable in the general appearance of the plants on the different plots at any of the centres.

Particulars as to yield and sugar content of the beet on the various plots at each centre are shown in Table IX.

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TABLE IX.

	Artificial Manures applied per Statute Acre.	Yield per Statute Acre. (Factory Weight).				Sugar Content of Roots.				Average	
		Athenry	Ballyhaise	Clonakilty	Glasnevin	Athenry	Ballyhaise	Clonakilty	Glasnevin	Yield (Factory Weight).	Sugar Content
		T. C.	T. C.	T. C.	T. C.	%	%	%	%	T. C.	%
1.	The equivalent of 4 cwt. 35% Superphosphate in the form of High Grade Basic Slag applied in Winter. 4 cwt. Kainit, applied at time of sowing. 1 cwt. Sulphate of Ammonia, applied at time of sowing.	12 0	10 8	12 3	8 14	7·1	16·7	17·0	17·3	10 16	17·0
2.	4 cwt. 35% Superphosphate applied at time of sowing. 4 cwt. Kainit applied in Winter 1 cwt. Sulphate of Ammonia Applied at time of sowing.	11 3	11 8	11 15	10 7	17·1	16·6	16·9	16·9	11 3	16·9
3.	The equivalent of 4 cwt. 35% Superphosphate in the form of High Grade Basic Slag as in Plot (1), but applied at time of sowing. 4 cwt. Kainit applied at time of sowing. 1 cwt. Sulphate of Ammonia applied at time of sowing.	11 10	10 15	10 19	9 12	16·7	16·9	16·9	17·7	10 14	17·1
4.	4 cwt. Superphosphate 35% applied at time of sowing. 4 cwt. Kainit applied at time of sowing. 1 cwt. Sulphate of Ammonia applied at time of sowing.	13·4	9 12	10 15	9 15	16·9	17·5	18·0	17·3	10 16	17·4
5.	4 cwt. Superphosphate 35%, applied at time of sowing. 4 cwt. Kainit, applied at time of sowing. 2 cwt. Sulphate of Ammonia applied at time of sowing.	12 17	10 0	11 11	10 4	16·7	16·4	17·7	17·1	11 3	17·0

As there is little difference in the average returns from the various sub-plots, it may be inferred that good results may, in general, be expected where the standard dressing consisting of 4 cwt. superphosphate, 4 cwt. kainit, and 1 cwt. sulphate of ammonia per statute acre is applied, and that no appreciable advantage is to be gained by applying portion of this dressing in winter, or by substituting basic slag for superphosphate in the mixture.

Width of Drills.

As in the three previous seasons, a series of plots in which the drills were of varying width, was laid down at each centre. The general arrangement of the plots was as shown on the plan on page 23. In all respects, except in the width of the drills, the crop on the plots was treated in exactly the same manner as that on the sub-plots in the variety trials, conducted at the same centres, which received an application of farmyard manure in the drills at the time of sowing. From one centre it was reported that some difficulty was experienced in avoiding injury to the plants when cultivating, with the ordinary implements, between the drills which were 18 inches apart. In the case of the drills 21 inches in width no such difficulty arose at any centre, and at two centres it was considered that 24-inch drills were wasteful, and encouraged the growth of weeds. The results of these trials are shown in Table X.

TABLE X.

Centre.	Yield per Statute Acre (Factory Weight).			Sugar Content of Roots.		
	18-Inch Rows.	21-Inch Rows.	24-Inch Rows.	18-Inch Rows.	21-Inch Rows.	24-Inch Rows.
	T. C.	T. C.	T. C.	%	%	%
Athenry ...	10 8	12 8	12 0	17·5	17·5	17·1
Ballyhaise ...	9 2	9 12	10 8	17·3	17·7	17·6
Clonakilty ...	11 7	9 5	9 16	18·4	17·6	17·7
Glasnevin ...	9 12	9 10	8 10	17·3	16·9	16·5
Average (Four Centres) ...	10 2	10 4	10 4	17·6	17·4	17·2

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On the average there is practically no difference in the yield of the crops grown on drills of different widths. The average sugar content of the crop grown on 18-inch drills is slightly the best and the roots grown on 21-inch drills show a somewhat better return in this respect than those grown on 24-inch drills.

Singling of the Plants to different distances apart.

Plots on which the plants were singled to 8 inches and 12 inches apart, respectively, were again laid down at each centre. The general arrangement of the sub-plots is shown in the plan on page 23. Apart from the singling of the plants to different distances apart, the crop on these plots was treated in exactly the same manner as the crop on the plots in the " width of drills " test, conducted at the same centres. The results of these trials are shown in Table XI.

TABLE XI.

Centre.	Distance apart of Singling.	Yield per Statute Acre (Factory Weight).			Sugar Content of Roots.		
		18-Inch Rows.	21-Inch Rows.	24-Inch Rows.	18-Inch Rows.	21-Inch Rows.	24-Inch Rows.
		T. C.	T. C.	T. C.	%	%	%
Athenry ...	8 inches ...	10 10	10 10	10 13	17·1	17·4	17·0
Ballyhaise ...	8 inches ...	9 8	10 5	8 0	17·5	18·4	17·4
Clonakilty ...	8 inches ...	10 15	10 19	9 15	17·6	17·0	17·4
Glasnevin ...	8 inches ...	10 17	10 15	8 0	18·1	17·6	17·5
Average (Four Centres) ...		10 8	10 12	9 2	17·6	17·6	17·3
Athenry ...	12 inches ...	10 10	12 10	9 0	17·1	17·1	17·0
Ballyhaise ...	12 inches ...	8 12	9 9	8 12	18·2	18·3	18·4
Clonakilty ...	12 inches ...	10 5	10 3	9 15	17·7	17·1	17·2
Glasnevin ...	12 inches ...	11 5	9 0	9 11	17·1	17·3	17·6
Average (Four Centres) ...		10 3	10 6	9 5	17·5	17·5	17·6

On the plots where the drills were 18 inches and 21 inches in width, slightly better average yields were obtained where the plants were singled to 8 inches instead of 12 inches apart, but where the drills were 24 inches wide the reverse was the case. As regards sugar content very slight differences were shown in the average returns from the different series of plots.

Singling at Different Stages of Growth.

In 1925, 1926 and 1927 a series of experiments was conducted at either three or four centres in each year to determine the effects, on the yield and sugar content of the beet crop, resulting from the singling of the plants at three different stages of growth. Full particulars in regard to the plan of these experiments, together with the results obtained in 1927 and the conclusion drawn from the returns for the entire period of three years, were published in the Department's Journal, Vol. XXVIII., No. I.

Whilst better results were obtained where the plants were singled at the stage when they had developed four rough leaves than where the singling was performed at either an earlier or a later stage of growth it was considered desirable to obtain more definite data in regard to the effects of early singling. For this purpose a series of experiments was again conducted at four centres in 1928, as shown on the plan on page 23. On one plot at each centre the plants were singled when they had developed two rough leaves and on an adjoining plot when they had developed four rough leaves. Save that these plots were singled at different stages of growth they received exactly the same treatment.

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The results in regard to yield and sugar content are shown in Table XII.

TABLE XII.

Centre.	Yield per Statute Acre (Factory Weight).		Sugar Content of Roots.	
	Plants singled at two-leaf stage	Plants singled at four-leaf stage	Plants singled at two-leaf stage	Plants singled at four-leaf stage
	T. C.	T. C.	%	%
Athenry	12 0	10 14	17·5	17·4
Ballyhaise	9 0	8 12	18·0	18·3
Clonakilty...	10 8	10 13	17·5	17·3
Glasnevin	10 8	11 5	17·3	17·4
Average	10 9	10 6	17·6	17·6

It will be observed that on the average of the four centres there was practically no difference between the yields from the crops singled when only two rough leaves had developed and from those singled when four such leaves had grown, and that the crops had the same sugar content.

Experiments at the Munster Institute Farm.

A trial was again conducted at this centre to determine the effects of different quantities of superphosphate on the yield and sugar content of the beet crop. On land which in the previous two years was in grass three adjacent plots were set aside for this experiment. Plot I. received the standard dressing of artificial manures consisting of 4 cwt. superphosphate (35%), 4 cwt. kainit and 1 cwt. sulphate of ammonia. Plot II. received a similar dressing plus an additional 2 cwt. of superphosphate (35%). Plot III. was dressed in the same manner as Plot 1, but, in addition, an extra 4 cwt. of superphosphate (35%) was applied. None of the plots received farmyard manure in preparation for the beet crop. The Kuhn (P) variety of seed was dibbled in at intervals of 9 inches, in 21-inch drills, on all plots and the general cultivation of the crop was the same as that prescribed in the case of the variety experiments conducted by the Agricultural Instructors.

The leaves of the plants on Plot III. which received the heaviest dressing of superphosphate (8 cwts. per statute acre) commenced to ripen about a fortnight earlier, but less uniformly, than those on Plots I. and II. In other respects there was no difference in the appearance of the crop on the different plots. Particulars of the yield and sugar content of the beet on the different plots are shown in Table XIII.

TABLE XIII.

No. of Plot	Manuring per Statute Acre.			Date of Sowing.	Date of Singling.	Date of Lifting and Weighing.	Yield per Statute Acre (Factory Weight).	Sugar Content of Roots.
	Superphosphate 35%	Kainit.	Sulphate of Ammonia.					
	cwt.	cwt.	cwt.				T. C.	%
I	4	4	1	16 May	15 June	3 Nov.	14 8	16·5
II	6	4	1	do.	do.	do.	13 0	17·8
III	8	4	1	do.	do.	do.	12 3	17·1

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The results of this experiment are somewhat irregular but, taken in conjunction with the returns from similar tests carried out at this centre in 1927 and other trials conducted by Agricultural Instructors in 1926, 1927 and 1928, they show that under normal conditions exceptionally heavy dressings of phosphate have very little influence on the ripening of the crop or in increasing the yield obtained. In fact in some instances a heavy dressing of superphosphate has decreased the yield.

III.—OTHER EXPERIMENTS.

Experiments in the Storing of Sugar Beet.

Soon after the Beet Sugar Factory at Carlow commenced operations in November, 1926, it became obvious that beet growers in this country would, in many cases, find it necessary or desirable to store beet temporarily before delivery to the factory. The Department, therefore, instituted two series of experiments in the winter of 1926 for the purpose of ascertaining the extent of the changes which occur in the weight and sugar content of beet roots and in the purity of the juice, when sugar beet is stored in much the same manner as mangels are usually stored in this country.

At each of the Department's farms at Athenry, Ballyhaise, and Clonakilty, during the month of November, about 3 tons of properly crowned and washed sugar beet were weighed carefully and stored immediately thereafter in a clamp. The clamp at each centre was 4 feet high, relatively narrow and long, and was covered loosely with a layer of wheaten straw approximately 6 inches in depth. At the beginning of the following February, after the roots had been in storage for approximately 10 weeks, the entire quantity of roots was again weighed in order to ascertain the loss in weight. At the beginning and the end of the period representative samples of the roots in each clamp were tested for sugar content and for purity of juice. In the winters of 1927 and 1928 this experiment was again carried out on similar lines at each of these three centres.

At three centres in the vicinity of the Carlow Sugar Factory experiments were carried out, during the winter of 1926-'27, in order to determine the rate of loss in weight and sugar content of beet when dumped from a cart on a headland in a continuous heap and covered loosely with a 6-inch layer of straw, *i.e.*, the method which was at the time most favoured by farmers for the temporary storage of beet. At each centre a cart load of beet was made into a clamp resembling a section of a heap as described above, and in the centre of each clamp were placed a number of samples of roots taken in each case from one portion of the field and specially selected for uniformity of size and shape. Each sample consisted of 10 roots, which were enclosed in half-inch-mesh wire netting after they had been carefully crowned, trimmed, washed and weighed. The sugar content of one sample from each clamp was determined when the clamp was made and other samples were tested at the end of each fortnight over a period of 8 weeks. When each sample was withdrawn from the clamp it was re-weighed to determine any alteration in weight, and at the end of the period the loss or gain in weight and percentage of sugar which had occurred in respect of all the beet in the clamp during each fortnight were calculated from the weights and analyses of the different samples. In the winters of 1927 and 1928 these experiments were repeated with slight modifications. In 1927 somewhat larger clamps were made at 4 centres. In 1928 four clamps were made at one centre and the number of roots in each sample was increased to twenty.

In 1928 the Irish Sugar Manufacturing Company, Limited, co-operated by affording the necessary facilities for carrying out a more elaborate experiment than those conducted at different centres in 1926 and 1927. The object of this experiment was similar to those conducted in the previous

two seasons and, in addition, it was decided to test the effects of different methods of covering the clamps as well as to study the causes of variations in losses resulting from the storing of beet, which had been revealed by the results obtained in previous years.

It is generally accepted that in order to conserve the maximum amount of sugar in stored beet, the conditions of storage must be so controlled that the water content of the beet is kept normal; that on the other hand the beet is under optimum conditions for growth and respiration when it contains its normal amount of water; that these processes tend to consume the reserve of sugar in the beet, but that this difficulty is overcome by subjecting the beet of normal water content to a low temperature. The fulfilment of the above requirements for the storing of beet under field conditions would appear to be limited chiefly to a choice of the site, the covering, and the size of the clamp. The experiments at Carlow in 1928 were, therefore, designed to compare the effects of covering clamps of beet with straw, with beet tops and with a more impervious covering which, for experimental purposes, consisted of a heavy cloth extending over the side of the clamp and beneath a light layer of straw. The effect of the situation of the clamp on losses in the weight and sugar content of beet was tested by placing two clamps in a sheltered position and two others in an exposed position as regards sun and prevailing winds.

Owing to slight mishaps, the returns from all the centres where experiments in the storing of beet were carried out in 1926 are not comparable, and these experiments may be regarded as preliminary in nature. The average returns for the two years 1927 and 1928 in respect of sugar beet storage trials carried out at the Department's farms and the similar trials conducted in County Carlow are shown in Table XIV.

TABLE XIV.

RESULTS FROM EXPERIMENTS IN THE STORING OF SUGAR BEET CONDUCTED DURING THE TWO SEASONS, 1927-'28 AND 1928-'29.

Year.	Centre.	Number of Clamps.	Period of Storage.	Average Rise or Fall in percentage of Sugar in Roots.	Average percentage of Loss in Weight of Roots.	Average percentage of Loss in Weight of Sugar.
			days	per cent.	per cent.	per cent.
1927-'28	Department's Farms.	3	70–80	+ 0·3	— 6·7	— 5·0
1928-'29	Do. do.	3	73	— 0·7	— 3·0	— 6·8
1927-'28	Carlow ...	4	42	— 0·7	— 4·6	— 6·8
1928-'29	Do. ...	4	56	— 0·5	— 2·1	— 5·3

The experiments to determine the effects of storing beet under different conditions are being continued. The results so far obtained indicate that, in the case of beet stored over a period of 8 to 10 weeks in the ordinary narrow clamp covered lightly with straw, there is a decrease of sugar amounting to approximately six per cent. of the total weight of sugar in the beet.

ENSILAGE FROM BEET TOPS AND WET PULP.

" Beet tops " are the crowns, together with the adhering leaves, after the roots have been severed at the point where the lowest leaves have grown " Wet pulp " is the residue of the finely sliced beet roots after the sugar has been extracted from them. Beet tops and wet pulp form two valuable feeding stuffs, either in the fresh state or when made into ensilage. The sugar factory at Carlow is equipped for the drying of the entire output of wet pulp and the demand for the Company's " Sugar Pulp," which is prepared by mixing wet pulp and molasses and artificially drying the product,

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is such that very little of the pulp is sold in the wet condition. Beet tops, however, are a by-product on the farm and the profits derived from beet growing in Continental countries are said to depend, to no small extent, on the use which is made of this by-product. In those countries it is the general practice to feed beet tops as much as possible during the period when the crop is being harvested and to make ensilage of the surplus. Occasionally the tops are ploughed in as a green manure, but they are not regarded as having as high a value for this purpose as for feeding to cattle and other live stock.

In order to obtain definite information in regard to the making of beet-top ensilage in this country, experiments were carried out at the Department's farms at Athenry, Ballyhaise and Clonakilty in 1926 and 1927 and at Athenry in 1928. The experiments at Athenry and Clonakilty in 1926 and 1927 consisted in the making of ensilage from tops varying in quantity from 4 to 13 tons in the fresh state.

At each centre a pit was dug approximately 2 feet in depth, 4 feet in width, and of sufficient length to contain the quantity of tops available, when the heap was built to a height of 4 feet from the level of the bottom of the pit. Provision was made for the drainage of the pit, and the beet tops were packed firmly therein when in fresh clean condition. The top of the heap was covered with a thin layer of grass, and over this was spread a layer of soil. When the heap had subsided the top was rounded off with an additional layer of soil and the sides of the heap were banked with soil. After the lapse of a period, varying from 3 to 4 months, the entire contents of the silo was weighed and divided into sound and unsound ensilage, according to its appearance. The palatability of the sound ensilage was then tested by offering it to different kinds of live stock.

The experiments at Ballyhaise in 1926 and 1927 were carried out on the same lines as those at the two other farms with the exception that wet pulp was mixed with beet tops in nearly equal quantities, and a thick layer of wet pulp instead of soil was placed on top of the heap.

At Athenry, in November, 1928, approximately 13 tons of fresh beet tops were stored in a small wooden silo. The tops were well trampled until subsidence ceased. A considerable quantity of liquid drained from the silo. At the end of two months when the silo was opened the contents were so decomposed that stock would not eat it. Results not quite so unfavourable were obtained at this and the two other centres in previous years, but in no case were the results regarded as economic or even encouraging. The proportion of the output which appeared to be suitable for feeding purposes was at all centres relatively small and when offered to live stock it was either consumed sparingly or refused altogether.

As results similar to the above have been obtained in a number of cases where beet growers in this country have attempted to make ensilage from beet tops and wet pulp, it is evident that the making of ensilage from beet tops involves considerable risk and it will generally be found more economical to feed them in the fresh condition.

The Effect on the Sugar Content of Checking Growth by Severing the Taproot before Harvesting.

Sugar beet does not ripen so rapidly or decisively in this climate as in warmer and drier countries. It has been proved by experiments in this country that under ordinary favourable conditions the growth of sugar beet continues at a very slow rate throughout the winter months. Growth increases perceptibly, and is usually accompanied by a reduction in the sugar content of the root, during periods of warm wet weather, which occur frequently during the winter months.

An exceptionally high sugar content, obtained in the winter of 1927 from beet which had been lifted with a plough but had been left otherwise undisturbed in the land for a period of fully one month thereafter, drew attention to the possibility that this treatment may have increased the sugar

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content by almost completely checking the growth and thereby promoting the ripening of the plants. At another centre, in the following winter, a plot of beet was treated as described above and the results of repeated analyses showed that the percentage of sugar was invariably greater in the treated beet than in similar beet which had not been so treated.

Accordingly, in the autumn and winter of 1928 a series of 14 similar trials were conducted at six centres in four counties. The percentage of sugar in the beets was increased in every case where the taproots had been severed by running a lifting plough under the beet some time before the roots were pulled and crowned. The interval between the date of severing the roots with the lifting plough and the date of harvesting varied, at the different centres, from 7 to 57 days. The additional increase in the percentage of sugar in the treated beet as compared with that in the untreated beet was, in nearly all cases, at the rate of quite 0.25 per week, the average increase being slightly above that amount. At one centre, however, where the soil was a light loam and the beet plants had a ripe appearance the average rate of the additional increase, in trials extending over 8 weeks, was only half the above rate per week.

These trials are being continued.

SUMMARY OF THE RESULTS OF THE PRINCIPAL EXPERIMENTS WITH SUGAR BEET CONDUCTED IN THE YEAR 1928.

(1) The average returns from the two varieties Kuhn (P) and Klein-Wanzleben (Z), as compared with corresponding returns from a strain of each of these varieties, which was expected to produce a heavier crop of roots containing a lower percentage of sugar, shows that the two strains of Kuhn seed, Kuhn (P) and Kuhn (Pa), are almost if not quite the same as regards yield, percentage of sugar in roots, and general appearance. The two strains of Klein-Wanzleben seed, however, differ considerably in these respects and, whilst the (E) strain of this variety produced the better yield this result was counter-balanced to a considerable extent by its lower sugar content.

(2) In the manurial trials conducted by the Agricultural Instructors the standard dressing of artificial manures consisting of 4 cwt. superphosphate (35%), 4 cwt. kainit, and 1 cwt. sulphate of ammonia per statute acre, applied immediately before sowing the sugar beet seed, gave quite satisfactory returns as compared with the results obtained from certain modifications of this dressing; but the application of an additional 25 per cent. of the standard dressing gave a profitable increase in the average value of the crop per acre.

(3) A dressing of sugar factory waste lime at the rate of four tons per statute acre applied to the land in the autumn or winter before beet was grown, increased very slightly the average yield and sugar content of the crops. The results of these trials indicate that a dressing of waste lime may produce a profitable increase in the returns from the sugar beet crop when the soil is in need of lime, but that the use of burnt lime may in some cases be more economical on account of its more concentrated nature and the greater ease with which it can be handled and distributed over the field.

(4) The results of experiments in the storing of beet indicate that, in the case of beet stored over a period of 8 to 10 weeks in the ordinary narrow clamp covered lightly with straw, there is a decrease of sugar amounting to approximately six per cent. of the total weight of sugar in the beet.

(5) It is evident that the making of ensilage from beet tops, either alone or when mixed with wet pulp, involves considerable risk of loss and that it will generally be found more economical to feed the tops in the fresh condition.

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SUMMARY OF THE RESULTS OF THE MANURIAL AND CULTIVATION EXPERIMENTS WITH SUGAR BEET CARRIED OUT IN EACH OF THE YEARS 1926, 1927 and 1928.

(1) The time of the year at which farmyard manure is applied for the sugar beet crop, *i.e.*, whether the manure is ploughed in during winter or is applied in the drills immediately before the seed is sown, does not appear to exercise any appreciable influence on the shape of the roots produced or on the value of the crop as determined by its yield and sugar content.

(2) A dressing of artificial manures consisting of 4 cwt. superphosphate (35%), 4 cwt. kainit, and 1 cwt. sulphate of ammonia per statute acre applied immediately before sowing the sugar beet seed gives quite satisfactory returns as compared with the results obtained from certain modifications of this dressing. No benefit appears to be derived from the application of the phosphatic and potassic manures in winter instead of in spring.

(3) The best results as regards both yield and sugar content are obtained where the drills were 21 inches or less in width, and where the plants are singled to, approximately, 9 inches apart.

(4) Better results are obtained where the plants are singled at the stage when they have developed four rough leaves than when the singling is performed at either an earlier or a later stage of growth.

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