



*NORFOLK*

# **AGRICULTURAL STATION.**

---

---

## **Guide to Experiments**

CONDUCTED AT THE

**Station Farm, Little Snoring**

**1908-1915.**

---

---

**ANNUAL REPORTS**

**1914 & 1915.**

**LIST OF SUBSCRIBERS.**

---

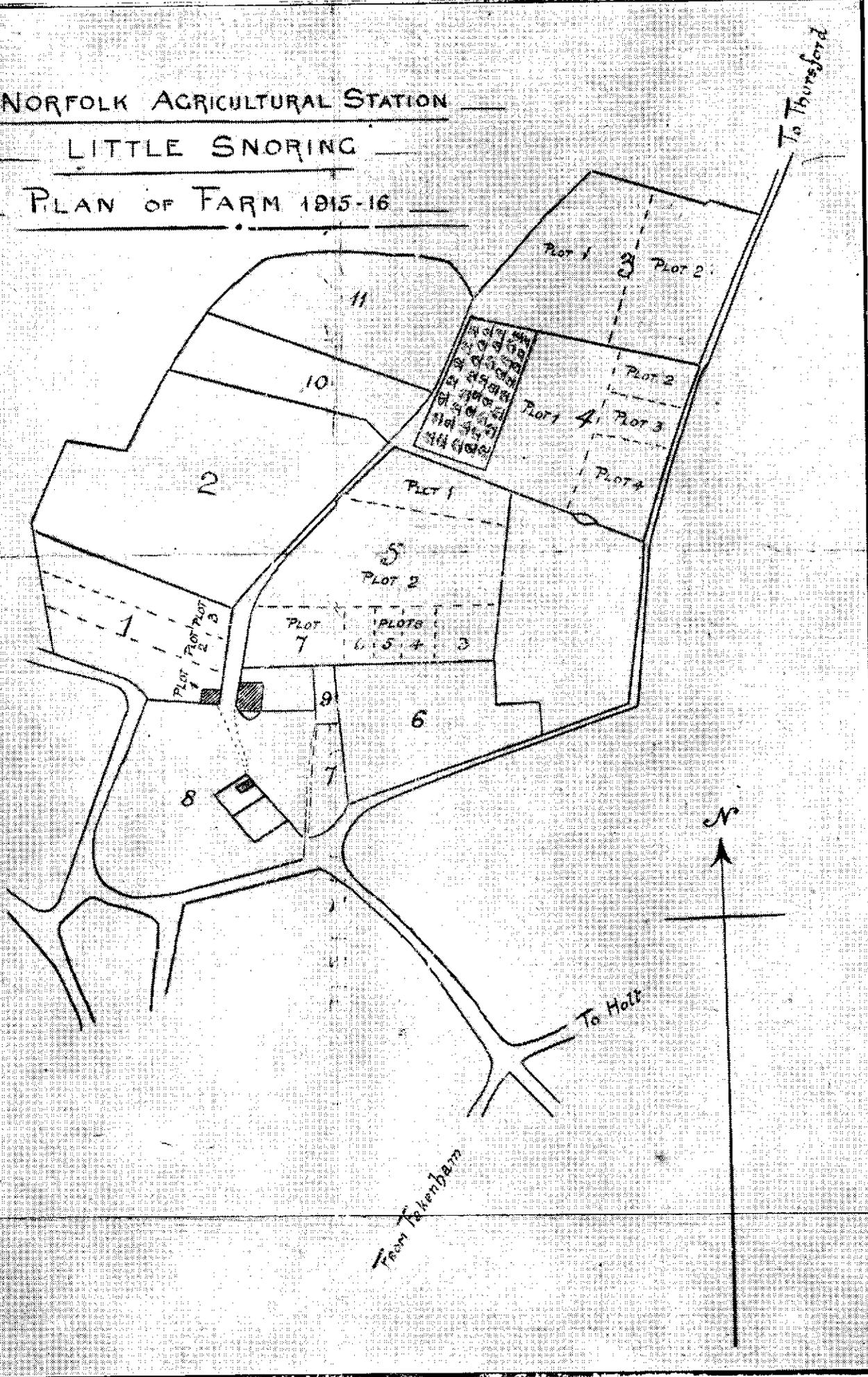
---

*"Norwich Mercury" Co., Ltd.*

NORFOLK AGRICULTURAL STATION

LITTLE SNORING

PLAN OF FARM 1915-16



# NORFOLK AGRICULTURAL STATION,

LITTLE SNORING, NORFOLK.

## SCHEDULE.

No	Quantities.			Cropping and Manuring for the year 1915-1916.	
Field.	A.	R.	P.		
1	13	1	14	BARLEY	
					a. r. p. Plot 1. 4 2 0 Pedigree Archer. ,, 2. 4 0 0 Plumage Archer. ,, 3. 4 0 0 Archerplume.
2	21	3	14	NEW LEY.	
3	18	3	11	OATS AND BARLEY.	
					a. r. p. Plot 1. 9 0 0 Pedigree Archer. ,, 2. 8 0 0 Leader Oats. Manure:—Leader Oats 2½ cwts. per acre of Artificial Manure.
4	17	1	36	SWEDES, OLLAND AND LUCERNE.	
					a. r. p. Plot 1. 7 0 0 Purple King Swedes. Manure:—3 cwts. per acre Superphosphate, with Bone Meal mixed. ,, 2. 2 0 0 Olland, Mixture, Inner Kainrig, consisting of:— 4 lbs. Tall Oat Grass. 9 ,, Cocksfoot. 4 ,, Tall Fescue. 3 ,, Italian Rye Grass. 5 ,, Perennial Rye Grass. 1 ,, Rough Stalk Meadow Grass. 3 ,, Chicory. 6 ,, Burnet. ½ ,, Yarrow. 3 ,, Kidney Vetch. 1 ,, Alsike. 2 ,, Late Flower Red Clover. 1 ,, White or Dutch Clover. ,, 3. 2 0 0 Olland, mixture, Modification of Bankfield 1900, consisting of:— 6 lbs. Tall Oat-like Grass. ½ ,, Golden Oat Grass. 14 ,, Cocksfoot. 6 ,, Tall Fescue. 3 ,, Italian Rye Grass. 1 ,, Rough Stalk Meadow Grass. 3 ,, Chicory. 8 ,, Burnet. ½ ,, Yarrow. 3 ,, Kidney Vetch. 1 ,, Alsike. 2 ,, Late Flower Red Clover. 2 ,, White or Dutch Clover. ,, 4. 4 0 0 Provence Lucerne. Plots 2, 3 and 4 were sown in the Spring, 1913.
5	27	1	32	MANGELS, SWEDES AND ROOTS.	
					a. r. p. Plot 1. 5 0 0 Red Intermediate Mangels. Manure:—10 loads farmyard manure and 1 cwt. Calcium Cyanamide per acre. ,, 2. 12 0 0 Giant Tankard Swedes. Manure:—3 cwts. Superphosphate per acre with Bone Meal mixed. ,, 3. 2 0 0 Standard Red. ,, 4. 1 0 0 The Fenman. ,, 5. 1 0 0 111/30 G g ,, 6. 1 0 0 111/30 D. ,, 7. 3 2 0 Square Head's Master. Manure:—9 loads of farmyard manure per acre.
6	9	1	34	LITTLE JOSS WHEAT.	Manure:—9 loads of farmyard manure per acre.
7	0	3	13	LITTLE JOSS WHEAT.	Manure:—9 loads of farmyard manure per acre.
8	20	0	17	Farm House and Garden Premises, Stackyard and Home Meadow.	
9	0	3	0	Cottages and Gardens.	
		2	0	Roads.	
		132	1	2	
					Additional Land taken as from Michaelmas, 1913.
10	11	1	21	New Ley.	
11	14	1	4	Pedigree Archer.	
	157	3	27		

# Norfolk Agricultural Station.

---

## SIXTH ANNUAL REPORT.

---

The Sixth Annual Report presented at the Annual General Meeting, held in Norwich on February 13th, 1915.

The Executive Committee have the pleasure to submit their Sixth Annual Report.

The Fifth Annual General Meeting was held in Norwich on February 14th, 1914, at which the Report and Accounts for the year ended October 11th, 1913, were presented and adopted, and the Executive Committee, in which there were no vacancies, were re-elected.

The Committee have met twice during the year, and the Annual Inspection of the Farm took place on July 29th, and was well attended. The President (Mr. J. Sancroft Holmes) once more very kindly provided the company with lunch.

The Committee having been offered by Lord Hastings an additional 25 acres of arable land at a yearly rental of £15, this offer was accepted, and the land was taken over in the early part of last year. The Committee believe that this will materially add to the value of the work of the Station.

The Annual Inspection on July 29th of the various experimental plots was on this occasion under the guidance of Mr. Arthur Amos, of Cambridge University Department of Agriculture, and there was also present Mr. Stewart, one of the Inspecting Staff from the Board of Agriculture. The appearance of the Farm was good, and the Committee desire to thank their two colleagues, Mr. Hy. Overman and Mr. H. V. Sheringham, for their efficient management of it during the year. The Committee also desire to express their appreciation of the services of the Resident Superintendent, Mr. A. C. Dawson.

With regard to finance, the appended accounts show that there is a surplus on the year's working, which, however, is of course due to the fact of only a nominal rent being paid, to the receipt of a Maintenance Grant of £100 from the Government Development Commissioners, and to the generous support of the friends of the Station. The Committee trust that the latter will continue their aid, and thus help on the work which it is sincerely believed is benefiting agriculture in the county.

The Committee desire to thank Professor Wood and his colleagues at Cambridge University for their valuable work for the Station, and there will follow, in due course, as usual, full particulars of the Field and Feeding Experiments carried out under their able initiative and supervision.

## SEVENTH ANNUAL REPORT.

---

The Seventh Annual Report presented at the Annual General Meeting, held in Norwich on January 29th, 1916.

The Executive Committee have the pleasure to submit their Seventh Annual Report.

The Sixth Annual General Meeting was held in Norwich on February 13th, 1915, at which the Report and Accounts for the year ended October 11th, 1914, were presented and adopted, and the Executive Committee, in which there were no vacancies, were re-elected. It is with much regret the Committee record that later in the year a vacancy was caused by the death of their colleague, Mr. B. C. Perowne, who had helped to start the Station, and had always given valuable assistance until ill-health had compelled him to retire. The Committee are happy to say that his place has been taken by Mr. J. Thistleton Smith, of West Barsham, who will join with Mr. Henry Overman and Mr. H. V. Sheringham in the actual management of the farm.

There have been three Committee Meetings during the year, and the Annual Inspection of the farm took place on August 4th, 1915, at which there was a good attendance. On this occasion the company had the advantage of being conducted round the farm by Professor Wood, of Cambridge, who gave short lectures at the various plots. He also spoke on the experiment of bullock feeding with palm nut cake, which had been carried out during the year's grazing season.

Mr. C. de Wolf, the promoter of the Wolfen Electro-Chemical Process for treating seed corn, was also present, and gave an account of the process. He had previously provided a supply of treated seed barley, and had paid a visit to the Station to supervise the sowing of a marked-out plot adjoining the remainder of the barley field. The company were much interested in comparing the two crops, and Mr. de Wolf was

thanked for the time and attention he had so kindly given to the matter. It is maintained that the process materially increases the crop grown from seed treated by it. The continued improvement in the appearance of the farm was generally remarked, and the Committee feel that this is due to the careful and efficient management of their Farming Committee.

Michaelmas, 1915, marked the completion of seven years out of the eight years' lease of the Station, so generously granted to the Committee by Lord Hastings, and it was felt that future arrangements had to be seriously dealt with. Lord Hastings was approached on the subject, and it was finally decided to continue the Station on a yearly tenancy, commencing from Michaelmas, 1916, at an annual rent of 10s. an acre. This rent is considered to be two-thirds of the annual value of the farm, and the Committee recognise that the remaining third is a direct contribution by Lord Hastings to the support of the Station, for which they most heartily thank him.

Turning to Finance, the Committee are happy to report that, after a quite conservative estimate of the value of the stock and crop on the farm at Michaelmas, 1915, the Balance Sheet shows a small surplus on the SEVEN years' working of the farm, there being a considerable surplus on the year 1914-15, due to war time prices, which has more than wiped out previous deficiencies. The Committee desire, however, to point out that this result has been attained by assistance from outside sources, notably from Lord Hastings, from generous help by donors and subscribers, and from the Government Development Fund. They also wish to impress upon all those interested in the Station the impossibility of such an undertaking being self-supporting, and they feel that if the good work is to be carried on it must be with help from outside.

There follows a Report from Professor Wood of the seven years' work of the Station, for which the Committee sincerely thank him, and they look to him for such assistance in the future as will make the Station of continued benefit to Norfolk agriculturists.

The Station Farm, Little Snoring, was taken in hand on October 11, 1908, under a lease from Lord Hastings of 8 years at a pepper corn rent. At the present time, October, 1915, the last year of this period is just beginning, and it is necessary that the Executive Committee should make up their minds on the future of the station. To assist them in this responsible task the Committee have requested me to prepare for them a report setting forth the work which has been done in the seven years of the tenancy, and reviewing the lessons which have been learnt. I have prepared the following report with the greatest pleasure, for I esteem it a privilege to be connected with the Norfolk Agricultural Station, which is the only case of an Experiment Station founded by the spontaneous effort of the landowners and farmers of a county, who have provided from their own pockets practically the whole of the capital and annual expenses.

### THE SOILS OF THE STATION FARM.

Samples of the soils of several of the fields were taken during the first year of the tenancy, and analysed in the Chemical Laboratory of the School of Agriculture by Mr. H. K. Clayden, B.A., of Jesus College. The results of the analyses are given below :—

	FIELD 1.		FIELD 3.		FIELD 4.		FIELD 6.	FIELD 7.
	N. side of drain.	S. side of drain.	N.W. wood side of drain.	Side of drain next road.	Top soil near pan.	Where pan is absent.	Road side of drain.	
Water ... ..	1.94	2.10	1.80	2.13	1.58	2.01	1.84	2.04
Loss on Ignition ... ..	4.53	5.05	5.25	5.95	5.28	6.21	5.80	5.57
Calcium Carbonate ... ..	1.97	2.12	2.28	2.01	1.52	2.24	1.49	1.16
Fine Gravel ... ..	3.25	4.15	3.10	2.35	4.65	2.80	4.80	4.85
Coarse Sand ... ..	44.55	46.85	44.05	44.60	54.35	41.80	39.80	42.70
Fine Sand ... ..	26.40	23.05	26.45	26.05	18.30	25.10	27.65	24.85
Silt ... ..	5.65	5.65	5.95	7.70	7.75	11.05	7.20	9.75
Fine Silt ... ..	5.65	6.20	3.65	4.92	4.57	3.45	5.75	2.42
Clay ... ..	5.00	4.25	2.70	5.00	2.65	3.60	3.60	4.80
Insoluble Matter ... ..	84.25	83.11	85.32	83.06	86.77	85.29	85.32	83.82
Nitrogen ... ..	0.19	0.20	0.17	0.20	0.20	0.20	0.23	0.20
Phosphoric Acid ... ..	0.13	0.11	0.07	0.07	0.08	0.08	0.08	0.12
Potash ... ..	0.27	0.28	0.22	0.22	0.22	0.20	0.20	0.20

The most striking thing about the analyses is their great uniformity. The composition of the soil of all the fields which were sampled is almost identical. All the soil of the farm is very light sandy loam, well supplied with calcium carbonate, but deficient in both potash and phosphoric acid. It is the kind of soil which can be profitably farmed on sheep and barley lines. That it suits barley well is shown by the fact that the average yield of all varieties of barley on fields 1, 2 and 5 for the seven years is just over 11 coombs per acre, whilst the yield of the best variety, Beaven's Pedigree Archer, is only a fraction short of 12 coombs per acre. The soil is too light for good wheat land. The average yield of wheat on fields 1, 2 and 5 for the seven years is exactly nine coombs for the average of all varieties. The best variety, Biffen's Little Joss, has yielded on the average just over 10 coombs per acre.

Although analyses of the surface soils of different fields show such striking uniformity the productivity of the different fields is by no means the same. Whilst fields 1, 2 and 5 have yielded averages of 9 coombs of wheat and 11 coombs of barley per acre for the seven years, the yields of corn on fields 3 and 4 have not reached as much as half these figures. No kind of manuring or cultivation which we have been able to try has made these fields yield more than four or five coombs of barley, or about nine or 10 coombs of oats per acre.

At first sight, it may appear extraordinary that soils with the same composition, and so near together as to have identical climates, should show such widely different productivities, but reflection at once provides the reason. The composition of the surface soil and the climate are only two out of the many factors which govern productivity. Another very obvious factor is the subsoil, and still another the slope of the land. Fields 1, 2, 5, 6 and 7 slope in such fashion as to admit of effective drainage. Fields 3 and 4 are flat and difficult to drain. Further than this, the subsoil of these fields is impervious chalky boulder clay, which is so disposed as to form a basin or basins under the surface soil, which is thus kept water-logged. Under these conditions a more or less hard pan has been formed a foot or so beneath the surface of a large portion of the area of these two fields. We are indebted for this explanation of the condition of fields 3 and 4 to Mr. R. H. Rastall, M.A., of Christ's College, who visited the Farm and made a thorough geological examination of the whole area.

## SYSTEM OF FARMING.

The farm has been run on the usual four-course shift. The barley and wheat shifts have been for the most part devoted to trials of different varieties of these cereals. No trials have been made on the roots or seeds, which have simply been regarded as food for the stock on which feeding trials have been carried out each winter. The feeding trials have been confined to bullocks. A number of ewes have generally been bought in the autumn, and sold with their lambs in the spring. It has not been possible to keep fields 3 and 4 under the strict four-course shift. Several methods of increasing their productivity have been tried, including laying parts of them down to grass. The history of these attempts will be discussed in a separate section.

## THE GENERAL POLICY.

The County of Norfolk has long been to the fore in the matter of agricultural experiments. Beginning as early as 1886, the Norfolk Chamber of Agriculture carried out year by year a very complete series of manurial experiments at a number of farms scattered through the county. The results of these are recorded in the annual reports of the Chamber, a study of which is capable of answering almost any question as to the manuring of any kind of crop on any kind of soil. The Chamber also carried out several series of comparative trials of different varieties of cereals. The barley series may claim the credit of first bringing into prominent notice the remarkable cropping capacity of Archer barley.

Now there is a striking difference between manurial trials and variety trials: little change takes place in the number and kind of manures at the disposal of the farmer, but new varieties of cereals are continually being put on the market. With the exception of the recent introduction of artificial nitrogenous manures made from the air, such as nitrate of lime and calcium cyanamide, or nitrolim, the standard manures, such as superphosphate, basic slag, nitrate of soda, sulphate of ammonia, potash salts, guano, bone manures, and so on, were the staple artificials at the disposal of the farmer when the Station started work, just as they were in the days of the Chamber's experimental activities. All these things had been tried by the Chamber on all sorts of crops and soils, and the Executive Committee of the Station saw no reason for repeating such manurial trials.

Since the days of the Chamber's variety trials, however, many new varieties have come into existence, and several investigators have shown the importance of growing pure strains of some of the old varieties. As late as the year 1907 the writer bought for seed the best sample he could find on the market of Archer barley. The sample was submitted to a very careful examination when it was found to contain only 75 per cent. of true Archer grains, the rest being a mixture of Chevalier, Goldthorpe, and other varieties. The Executive Committee therefore decided to make variety testing an important part of their work. They have grown side by side many of the new varieties of wheat and barley for comparison with well-known standard varieties. Accurate records of yields have been kept, and every summer just before harvest the crops have been inspected by large parties of farmers who have thus been given the opportunity of seeing for themselves independent tests of all the new varieties as they come on to the market. Through the generosity of the Norfolk Local Committee of the Royal Show at Norwich, and by means of a grant from the Development Fund voted to the Station by the Board of Agriculture, the Station is well equipped for work of this kind. It possesses a small threshing machine, which can be taken to pieces for cleaning, so that the seed of the best varieties can be kept pure. To assist in rapidly storing the numerous lots of produce, a large Dutch barn has also been provided. The extent to which this kind of work has met with the approval of farmers is shown by the following figures:—Between the years 1908 and 1914 the amounts of seed wheat sold to 84 purchasers was 467 coombs, an average of about  $5\frac{1}{2}$  coombs to each purchaser. During the same period 864 coombs of barley were sold for seed to 125 purchasers, or about 7 coombs to each purchaser. Over 200 small lots of good seed have thus been distributed in seven seasons. Only those varieties which have approved themselves have been sold for seed. The inferior varieties, amounting to more than half the wheat, and nearly half the barley, have been sold to merchants for milling or malting. In this way pure stocks of approved varieties have been widely distributed through the county. Where the supply of any variety has been small subscribers have had the first call on the stock.

The importance of work of this kind cannot be over-estimated. The value of good strains of live stock has long been recognised in this country, and as a result of the efforts of our breeders of stock, Great Britain supplies pedigree stock

of all kinds to all quarters of the globe. But until recently the importance of pure seed of good strain has been overlooked by the majority of farmers. The efforts of the Station have materially assisted to show the farmers of the county that pedigree in seed is as important as pedigree in stock. The average yield for six seasons of the best variety of wheat and barley above the average yield of all the other varieties is, in the case of wheat just over one coomb per acre, and in the case of barley just under one coomb per acre. This means on the average an increased return of about 15s. per acre on the corn land. Since a good variety costs no more to cultivate than a poor one, this is practically clear profit to the grower. But it can be looked at in a wider manner. Taking the total acreage of wheat and barley in the country as 3,000,000 acres, general use of the best cropping varieties means an increased return to the farmers of the country of £2,250,000, or, to put it another way, which has a very special appeal at the present time, an increased home production of 300,000 tons of food.

Variety trials of cereals, although perhaps the chief work of the Station, have not comprised the whole of its activities. The Executive Committee have utilised the resources of the Station to obtain information on what may be called topical questions. When the Station began work everyone wanted to know about French wheats, which were therefore included in the variety trials. We were next asked what was the cost of growing sugar beet, and what was the feeding value of dried sugar beet slices. The Station attacked both these problems, showing that the cost per acre of growing sugar beet is about £12 to £14, and that one stone of sugar beet slices is worth one cwt. of average swedes.

During the last 10 years several new feeding stuffs have come on to the market, notably Soya bean cake, and more recently a number of Colonial products which used to go to Germany, but cannot get there now because of the war. Among these are palm nut kernel, coconut cake, and ground nut cake. Soya bean cake has been tested at the Station, and found to be too laxative for bullocks on roots unless used only in small quantities and mixed with cotton cake. Palm nut kernel has also been tried and found a safe and economical feeding stuff for bullocks on roots possessing about the same feeding value as linseed cake. The Committee have during last winter tested ground nut cake, which at the present time is the cheapest concentrated feeding stuff on the market. In addition, the

Station has also obtained some little information on the debatable question of the relative economy of high and low feeding.

Finally, Fields 3 and 4 have received the continual attention of the Committee; indeed, Lord Hastings especially drew attention to the problem they presented when he offered the farm for an experiment station. When the farm was taken over these two fields were under rough grass of the most worthless description. This was ploughed up, and several ordinary crops were grown with various manures, attempts being made to break up the pan in places. However, no kind of treatment appeared to give the least indication of a profitable result. In the spring of 1914 the Committee decided to sow portions of Field 4 with lucerne and with various grass mixtures. At last there is some promise of success. The ordinary grass mixtures have again failed to produce anything like a crop, but two mixtures, including deep rooting plants, as suggested by Messrs. James Hunter after the prescription of the late R. H. Elliot, give some promise. The lucerne patch is, however, the most successful. Two good crops of hay were cut from it in the summer of 1915, and the plant looks like holding. If lucerne will stand several years on this land its deep roots may so improve the conditions of soil and subsoil that ordinary crops may be grown with profit.

### **VARIETY TESTS WITH WHEAT.**

During the last seven years about 20 varieties of wheat have been tested at the Station. The experimental resources of the Station do not admit of a great re-duplication of plots so as to ensure very great accuracy. Each variety has, as a rule, been grown on two plots of one acre each, which were harvested separately. The figures given in the tables are the average of these two separate results. The average of two separate acre plots cannot lay claim to any very great accuracy, but the accuracy is increased year by year as the tests are repeated. It has been impossible, however, to repeat the tests with all the varieties. The Committee have been compelled to discard year by year certain varieties which have failed to give good results. The value of a variety has been judged largely by the yield as ascertained by the average figures given in the tables. Other points, however, have been taken into account: freedom from rust and other diseases, strength of straw, date of ripening, and, finally, the results of other experiments carried out elsewhere.



TABLE II.  
RE-CALCULATED YIELDS.

Yields of wheat re-calculated so that the average crop each year is 40 bushels per acre. This neutralises the effect of varying seasons and makes the average of all varieties comparable. Yields in bushels of 63lb. per acre.

VARIETY.	BUSHELS PER ACRE.								
	AVERAGE OF EACH YEAR TAKEN AS 40.								
	1909	1910	1911	1912		1913	1914	1915	Average.
After Clover.				After Roots.					
Biffen's Little Joss ... ..	—	50	46	60	38	48	44	50	48
Dreadnought ... ..	—	—	—	38	50	40½	—	—	43
Sensation ... ..	46	—	42	39	—	35½	40	36	39
Browick ... ..	—	45	48	38	38	42½	41	40	42
Square Head's Master ... ..	—	39	46	40	38	41½	42	37	41
Standard Red ... ..	—	—	—	45	—	41½	41	38	41
Wilhelmina ... ..	—	—	—	32	33	—	—	—	32½
Coronation ... ..	—	—	—	29	35	39	—	—	34
Treasure ... ..	41	—	29	—	—	—	—	—	35
Red Marvel ... ..	44	30	31	—	—	—	—	—	35
White Marvel ... ..	40	—	—	—	—	—	—	—	40
Biffen's No. 1 ... ..	41	40	41	—	—	—	—	—	41
Biffen's Burgoyne's Fife ... ..	33	—	—	—	—	—	—	—	33
Carter's Stand-up ... ..	37	—	—	—	—	—	—	—	37
Champion ... ..	—	—	—	—	—	40½	34	38	37½
Rivett ... ..	—	—	—	—	—	35½	—	—	33½
Essex Conqueror ... ..	—	—	—	—	—	—	42	47	44½
Victor ... ..	—	—	—	—	—	—	39	50	44½
Supreme ... ..	—	—	—	—	—	—	—	23	23
Biffen's Fenman ... ..	—	—	—	—	—	—	—	42	42

The following list gives in order of yield per acre all the wheats which have been tried at the Station, with the number of times they have been grown, the average yield per acre re-calculated so that the average of all varieties each year comes out at 40 bushels per acre, and notes on the characteristics of each variety kindly written by Professor Biffen. In the case of those varieties which have only been grown once or twice it is impossible to place much reliance on the figure given for the yield per acre, but the figures for those varieties which have

been grown 6 or 7 times is probably accurate to somewhere between one and two bushels per acre.

**LITTLE JOSS**, grown 7 times; average yield per acre, 48 bushels. A hybrid, produced at Cambridge from Square Head's Master and Ghirka. A heavy yielding rust-resisting variety, with an unusual capacity for tillering.

**VICTOR**, grown twice; average yield per acre, 44½ bushels. Very like Wilhelmina. A stiff level straw, carrying a good crop of poor quality grain.

**ESSEX CONQUEROR**, grown twice; yield per acre, 44½ bushels. Somewhat loose ears; straw long and liable to lodge if the soil is at all rich.

**DREADNOUGHT**, grown 3 times; yield per acre, 43 bushels. A French wheat, called in France Hatif Inversable. A square-eared variety, with moderately good straw. Very uncertain cropper.

**BROWICK**, grown 7 times; yield per acre, 42 bushels. A good all round variety, which is little affected by soil or climatic conditions. It usually crops satisfactorily and stands well.

**FENMAN**, grown once; yield per acre, 42 bushels. A hybrid, produced at Cambridge. Short stiff straw, carrying dense square ears. Somewhat like Wilhelmina in habit of growth, but under parallel conditions a little shorter in the straw.

**SQUARE HEAD'S MASTER**, grown 6 times; yield per acre, 41 bushels. A good all round reliable variety.

**STANDARD RED**, grown 5 times, yield per acre, 41 bushels. Very like Square Head's Master in general appearance, but the grain appears to be of better quality.

**BIFFEN'S No. 1**, grown 3 times; yield per acre, 41 bushels. A hybrid, produced at Cambridge. Markedly susceptible to yellow rust, particularly on rich soils. Should not be grown.

**WHITE MARVEL**, grown once; yield per acre, 40 bushels. A French wheat, known in France at Bordier.

**SENSATION**, grown 6 times; yield per acre, 37 bushels. One of the best of the French wheats, with an abundance of straw, which stands moderately well, and is usually singularly clean. Known in France as Bon Fermier.

**CHAMPION**, grown 3 times; yield per acre, 37½ bushels.

**STAND UP**, grown once; yield per acre, 37 bushels. A dense-eared, somewhat short-strawed wheat, often of special value for rich, moist soils.

**RED MARVEL**, grown 3 times; yield per acre, 35 bushels. A French wheat, known in France as Japhet. Often useful for early spring planting owing to its rapidly maturing habit. Poor straw, liable to rust badly, and indifferent quality of grain.

**TREASURE**, grown twice; yield per acre, 35 bushels. A French wheat called Tresor.

**CORONATION**, grown 3 times; yield per acre, 34 bushels. Very susceptible to yellow rust, and of no particular merit.

**RIVET**, grown once; yield per acre, 33½ bushels. A very heavy cropper on suitable soils. Late ripening; bearded. Poor quality grain.

**BURGOYNE'S FIFE**, grown once; yield per acre, 33 bushels. A hybrid, produced at Cambridge. A useful variety for spring sowing. Uncertain as an autumn wheat. Straw somewhat slender. Excellent quality grain.

**WILHELMINA**, grown twice; yield per acre, 32½ bushels. Dense ears on a stiff straw, giving the crop an attractive appearance on account of the uniformity of level. Often yields very well. Poor quality.

**SUPREME**, grown once; yield per acre, 23 bushels.

## VARIETY TESTS WITH BARLEY.

Since the Station started work 12 strains of barley have been tested, in most cases on duplicate plots of one acre each. Attempts have been made the last two seasons to use the strip test devised by Mr. E. S. Beaven, of Warminster. This consists in blocking the middle coulter of the drill, and dividing the seed box in the middle by a piece of board if it is not divided already. Seed of the two varieties to be tested is then put in separately in the two halves of the seed box. Half the coulters sow one variety, half the other variety. The drill is then drawn up and down the field. In this way strips of the two varieties are sown side by side with a space between them left by the blocked coulter. At harvest the ends of the strips are cut off square, and the areas of the strips measured. The binder is then made to cut and tie up one strip at a time, which it cuts at one cut. It is best to thrash and weigh the corn from each strip separately, but if this cannot be done all the sheaves from all the strips of one variety are stacked together. We have adopted this latter method, and made so many strips of each variety as would add up to half an acre.

Table III. gives the actual average yields of the varieties of barley grown each year. It is not very satisfactory to average all these results because the varieties grown in good barley years get an advantage. For this reason the figures have been calculated in Table IV. on the basis of the average crop each year being 40 bushels per acre.

TABLE III.

## ACTUAL AVERAGE YIELD OF BARLEY.

The tests were carried out in most cases on duplicate plots of one acre. The yields are given in bushels per acre of 56lb.

VARIETY.	ACTUAL AVERAGE YIELDS OF ALL THE BARLEY TESTS.							
	1909	1910	1911	1912	1913	1914	1915	Average.
Local Archer ...	53	—	—	—	—	—	—	—
Pedigree Archer B. ...	48	34	48	45	48	38	—	—
"  "  G.W.C. ...	—	—	42	37	38	—	—	—
"  "  F.J.C. ...	—	—	39	44	38	—	—	—
Plumage ...	50	—	—	—	—	—	—	—
Medium Wide ...	—	32	32	—	—	—	—	—
Hybrid 14/107 ...	—	—	48	48	42	—	—	—
"  14/183 ...	—	—	48	48	44	—	—	—
"  Plumage Archer ...	—	—	47	45	46	34	—	—
"  59/7 ...	—	—	—	—	—	—	32	—
Pedigree Sprat ...	—	—	39	—	—	—	—	—
Murton's Marvel ...	—	30	—	—	—	—	—	—

TABLE IV.

## RE-CALCULATED YIELDS.

Yields of barley re-calculated so that the average crop each year is 40 bushels per acre. This neutralises the effect of varying seasons, and makes the average of all varieties comparable. Yields in bushels of 56lb. per acre.

VARIETY.	YIELDS IN BUSHELS OF 56 LBS. PER ACRE							
	1909	1910	1911	1912	1913	1914	Average.	
Local Archer ...	42½	—	—	—	—	—	42½	
Pedigree Archer B. ...	38½	42½	44½	40½	46	43	42½	
"  "  G.W.C. ...	—	—	39	33	36	—	36	
"  "  F.J.C. ...	—	—	36	39½	36	—	37	
Plumage ...	40	—	—	—	—	—	40	
Medium Wide ...	—	40	30	—	—	—	35	
Hybrid 14/107 ...	—	—	44½	43	40	—	42½	
"  14/183 ...	—	—	44½	43	42	—	43	
"  Plumage Archer ...	—	—	44	40½	44	—	43	
"  Archplume ...	—	—	—	—	—	36½	36½	
Pedigree Sprat ...	—	—	36	—	—	—	36	
Murton's Marvel ...	—	37½	—	—	—	—	37½	

The following list gives particulars of all the varieties and strains which have been tested:—

**LOCAL ARCHER.**—A plot of this strain was grown the first year the Station started, and gave a good yield. Examination of the standing crop just before harvest showed it to be far from pure. About a quarter of the ears were not Archer at all. One of the objects of the Station being to turn out pure seed, this strain was not grown again.

**PEDIGREE ARCHER B.**—This strain was produced by Mr. E. S. Beaven from a single ear. A large number of ears were rubbed out and the grain from each sown separately on a separate plot. The produce of each ear was weighed separately. The produce of a number of the more productive ears was grown again, this time on several small plots, which were weighed separately and the results averaged. After repeating this process for several years it was possible to decide quite definitely that one ear had produced a strain which was more productive than the rest. This strain was then grown on until a quantity large enough for distribution was obtained. This strain is known as Beaven's Pedigree Archer. It is a very good cropper, and is rather more plump and rather a better colour than most strains of Archer.

**PEDIGREE ARCHER, G.W.C. and F.J.C.**—These two strains of Archer were picked out from single ears by a local firm of seedsmen. They are both sturdy barleys with the typical Archer characteristics, but they do not yield as well as Beaven's strain, probably because the ears from which they originated were picked out by appearance and not by careful measurement of their cropping power.

**PLUMAGE.**—A wide-eared strain of the well-known Goldthorpe type. This was selected by Mr. Beaven from a selected strain of Goldthorpe obtained from Denmark. It is one of the best Goldthorpe strains, and is not so liable to break at the neck as the typical Goldthorpe, but is more suitable for heavy land than for the usual light Norfolk barley soils.

**MEDIUM WIDE.**—Another of Mr. Beaven's strains, with ears intermediate between Archer and Goldthorpe. It was tried twice, but seemed to have no special character to recommend it, so it was discarded.

**HYBRIDS 14/107 and 14/183** were produced by Mr. Beaven from a cross between Pedigree Archer and Plumage, but were discarded because they were inferior to Plumage-Archer, which has the same parentage.

**PLUMAGE-ARCHER** resulted from a cross between Archer and Plumage made by Mr. Beaven. It closely resembles Goldthorpe in appearance, but, being shorter in the neck, is not so liable to break off and lose ears. It has long straw, which stands well. It cannot compete with Archer on typical light barley land, but on heavy land and land in extra good condition it stands better. It is now largely grown in the western and northern barley growing counties.

**ARCHPLUME** is a hybrid produced at Cambridge by Professor Biffen, from a cross between Plumage and Archer. It is similar to Plumage-Archer, and in some districts has given greater yields.

**PEDIGREE SPRAT.**—Sprat is a very old variety of barley, with a short wide ear with a peculiar and characteristic twist. Its grain is

very poor quality, but it will stand on the very richest soil, and is still grown sometimes in the Fens, where other varieties always get laid. The strain tested was grown from a single ear by Mr. Beaven.

MURTON'S MARVEL is a strain grown in some districts of East Anglia. It was grown one year, but did not seem to have any special advantage.

The tests leave little doubt that Pedigree Archer is the most productive barley to grow on the ordinary light barley soils of the county. On heavy land or on land in extra good condition or on fenland, Plumage-Archer or Archplume would be likely to stand where Archer would be almost certain to go down.

---

## HIGH AND LOW CAKE FEEDING.

During the winter of 1909-10, 21 bullocks were fed at the Station. Ten of them were used for testing Soya bean cake against linseed cake, 11 were kept in an open yard on roots cake, practically a store diet. The bullocks used for the test of Soya bean cake got a high ration, averaging about 8lb. of mixed cake per head per day. It should also be noted that they were fed in boxes under cover.

In this way two lots of dung were made, one with a rich cake ration under cover, the other with a ration low in cake

and in an open yard. These two lots of dung were sampled and analysed, with the following results :—

TABLE.

Analyses of dung made with high and with low cake feeding.

Kind of Feeding.	No. of Bullocks.	Wt. dung tons.	NITROGEN.					
			% total in dung.	Total in dung lb.	Total in food lb.	Loss %	% ammonia in dung.	ammonia lb. in dung.
High Cake ...	12	84	.496	931	1292	27	.158	288
Low Cake ...	10	78	.245	429	620	31	.025	43

The analyses show quite conclusively that the use of a ration high in cake makes dung which is rich in nitrogen. The high cake dung in this case contained almost exactly twice as much nitrogen as that made from the low cake ration. Moreover, the high cake dung is specially rich in nitrogen in the form of ammonia, which is more important than the total nitrogen because it acts more quickly.

The analyses also show that in making dung there is a considerable loss of nitrogen. Nothing like all the nitrogen contained in the food and litter is recovered in the dung. The loss in each case amounted to about 30 per cent. It is a coincidence that the loss in the two cases should have been so nearly equal, since the causes of the losses must have been different. The loss from the high cake dung was no doubt due to the very fermentable nature of rich dung; from the low cake dung to its being washed away by rain in the open yard. In both cases the loss is far more than the small proportion retained in the bullocks in the form of increased live weight. For further information on this subject see "Compensation for unexhausted residues of manures," by Hall and Voelcker, *Journal of the Royal Agricultural Society*, 1902.

To test further the relative value of the rich and poor dung two plots of land intended for mangolds were manured with

each kind of the dung at the rate of 10 tons per acre. The results were as follows:—Average yield per acre of poor cake plots, 15 tons 11 cwt.; average yield per acre of rich cake, 17 tons 15 cwt.; increase due to extra cake in the dung, 2 tons 11 cwt.

In 1910 these plots were sown with barley, when the residue of the rich dung gave only one tenth of a bushel per acre more barley than the residue of the poor dung. No further increase was noted either in the clover of 1911 or the wheat of 1912.

Re-calculating the results so as to get the total extra return for the whole of the dung made by the two lots of bullocks, the financial result of the experiment comes out as follows:—

	£ s. d.		£ s. d.	£ s. d.
Extra cost of Cake, &c., for 11 Cake-fed Cattle	47 17 0	Gross return on 11 Cake-fed Cattle at £8 4s. each ...	90 4 0	
		Gross return on 10 Store-fed Cattle at £5 10s. each ...	55 0 0	
				35 4 0
		Value of 17 ton 1 cwt. increased Mangel crop from 78-ton rich dung, above 78 ton poor dung, Mangels, at 7s. per ton ...		6 2 0
		Value of $\frac{3}{4}$ coomb in- creased Barley crop from re- sidue of rich dung, over residue of poor dung, Barley, at 20s. per coomb ...		0 15 0
		Balance against high feeding		5 16 0
	<u>£47 17 0</u>			<u>£47 17 0</u>

### SOYA BEAN CAKE, FEEDING TEST.

This test was carried out in the winter of 1909-10. Each lot consisted of six animals. The trial lasted for 20 weeks. The animals were sold by auction at Fakenham Market.

The linseed cake lot made an average increase of 13.1 lb. per head per week, and a gross money return of 8s. 10d. per head per week.

The Soya bean cake lot increased only 10.6 lb. per head per week, and their gross money return was only 7s. 7d. per head per week.

The Soya bean cake ration cost 3½d. per head per week less than the linseed cake ration.

Soya bean cake should only be used in small quantities along with cotton cake, to neutralise its very laxative properties.

### DRIED SUGAR BEET SLICES, FEEDING TEST.

This test was carried out in the winter of 1911-12 with two lots of 10 bullocks. Each lot had 4lb. mixed linseed and cotton cakes, and as much chaff as they would eat. One lot had in addition 1 cwt. of roots, for the first half time swedes, afterwards mangolds. The other lot had one stone of dried slices, which were moistened some hours before feeding with about two gallons of water. This lot also had as much water as they would drink. The trial lasted for 10 weeks.

The slices used were obtained from the Continent. They were analysed, with the following result:—

Water	...	...	...	9.5	per cent.
* Protein	...	...	...	10.6	" "
** Carbohydrates	...	...	...	61.8	" "
Fibre	...	...	...	15.3	" "
Ash	...	...	...	2.8	" "
* Including nitrogen	...	...	...	1.7	" "
** Including sugar	...	...	...	7.0	" "

The swedes contained 9 per cent. dry matter, the mangolds 12 per cent. The slices lot gained 13.6 lb., the roots lot 13.1 lb. per head per week. These gains being so nearly equal, it appears that one stone of slices has about the same feeding

value as 1 cwt. of roots. The price of slices should therefore be about eight times the price of roots. It should be remembered that slices are to be used as a substitute for roots. They are not suitable to replace cake or meal.

This trial was repeated in the winter of 1912-13 with slices from the Cantley Sugar Factory of the following composition :—

Water ... ..	10.48	per cent.
Protein ... ..	8.12	" "
Carbohydrates ... ..	67.44	" "
Fibre ... ..	10.40	" "
Ash ... ..	3.56	" "

The details of the test were much the same as the year before, except that the allowance of cake was rather larger, and the root and slice rations were increased during the test from 1 cwt. and 1 stone to 1½ cwt. and 1½ stones. The live weight increases per head per week were :—On roots, 13.6 lb.; on slices, 11.3 lb.

From these figures it appears that one stone of slices has not quite as great a feeding value as 1 cwt. of roots.

Combining the two results, it seems to be proved that one stone of dried sugar beet slices has about the same feeding value as 1 cwt. of average roots, and that the price per ton of slices should not be more than about eight times the price per ton of roots.

## SUGAR BEET.

Five acres of sugar beet were grown both in 1912 and in 1913, very careful accounts being kept of the cost of production. The figures for the two years are given below :—

	1912	1913
Gross yield per acre delivered on rail ... ..	19 tons	14 tons
Nett yield paid for by Factory ... ..	13 tons	10½ tons
Payment received from Factory ... ..	£11 11s.	£9 9s.
Total Cost of Labour and Manure ... ..	£12 0s.	£10 10s.

If a small allowance is made for the feeding value of the tops, the roots seem to have repaid the cost of manure and

labour, but to have left nothing for rent, rates and taxes. It is by no means certain that an ordinary root crop pays better than this. In this connection it must not be forgotten that a root crop cannot be expected to pay directly, for the greater part of the cleaning and manuring of the whole rotation is charged to the root crop, and this is the case with all kinds of root crops, whether swedes, mangolds or sugar beet. The advantage of growing sugar beet is that the grower gets cash before Christmas when he delivers his roots to the factory. With swedes or mangolds he gets no cash return until he sells his bullocks or sheep, which may be late in the spring. The disadvantages of growing sugar beet are that if the roots are sold fewer stock can be kept and less dung made. Also the labour of lifting and delivering so heavy and bulky a crop is apt to interfere with the autumn cultivations.

### **PALM NUT KERNEL CAKE.**

Palm nut kernel cake was tested in the winter of 1914—15 on two lots of 10 bullocks. Each lot had swedes, hay, and straw, and 3 rising to 3½ lb. per head of cotton cake. One lot had in addition, 3 rising to 3½ lb. per head of linseed cake, the other the same quantity of palm nut kernel cake. The live weight increases were exactly the same in both cases, and the bullocks fed on the palm nut kernel cake fetched a trifle more per cwt. live weight when sold at Fakenham Market. From this we may conclude that the feeding value of palm nut kernel cake is about the same as that of linseed cake. The animals ate the cake readily, and no trouble was found in keeping it.

### **GROUND NUT CAKE.**

A test of this cake was carried out last winter on 21 bullocks, weighing when the test began, on November 11th, 209 cwt. 7 st., or almost exactly 10 cwt. per head.

Throughout the test the animals had all the roots they would eat, a little cut straw, and ground nut cake at the rate of 3 lb. per head for the first month, rising to 4 lb. per head for the rest of the time. They ate the cake well, and made steady progress on it, as shown by the weighings. The ration of cake may seem very small, but ground nut cake is the most concentrated cake on the market, containing 45 per cent. of digestible protein. If used alone it must therefore be balanced by a very large ration of roots, as was the case in these tests,

If roots are short, it must be mixed with an equal weight of some starchy food, such as maize, wheat offals, &c. When all starchy foods are as dear as they were last winter, 3-4lb. of ground nut cake, balanced by a large root ration, is far the cheapest way of fattening bullocks.

The bullocks were sold as they were ready, between February 17th and April 13th. The average length of time for which they were fed was 17 weeks. Their weight, when sold, was 262 cwt., or  $12\frac{1}{2}$  cwt. per head, so that their total live weight increase was 52 cwt. 1 st., which works out at almost exactly 20 stone per head, or  $16\frac{1}{2}$  lb. per head per week, a more than average rate of increase, which speaks well for ground nut cake and a big root ration.

They realised at Fakenham Market £734 10s., or 56s. per cwt. live weight, which was the top market price at the date when they were sold.



# NORFOLK AGRICULTURAL STATION.

STATEMENT OF RECEIPTS AND PAYMENTS FOR THE YEAR ENDING OCTOBER 11TH, 1914.

## SIXTH YEAR.

RECEIPTS	£ s. d.	PAYMENTS.	£ s. d.
Donations	120 0 0	Live Stock	550 0 0
Subscriptions	94 2 4	Implements	5 7 6
Live Stock	747 5 6	Seeds	72 5 10
Corn	435 16 0	Feeding Stuffs	153 2 0
Sugar Beet	47 5 3	Labour	496 8 2
Wool	31 3 6	Manures	53 17 3
Sundries	1 6 8	Tradesmen's Bills	82 14 0
	<u>1476 19 3</u>	Rent, Rates, Taxes, etc.	58 5 1
Balance due and carried to next year's Account	62 9 4		<u>1470 19 10</u>
Total	<u>£1539 8 7</u>	Balance due and brought from last year's Accounts	68 8 9
		Total	<u>£1539 8 7</u>

## BALANCE SHEET, 1913-14.

Dr.	£ s. d.	Cr.	£ s. d.
Donations as per last year's Balance Sheet	1548 13 7	Stock and Crop on the Farm at Michaelmas, 1914	1518 9 6
Added this year	0 0 0	Loss on the four years' occupation to Michaelmas, 1913	195 14 10
Advance by the Bank	1548 13 7	Deduct: Surplus for the year ended Michaelmas, 1914	103 1 5
	<u>1548 13 7</u>		<u>92 13 5</u>
Total	<u>£1611 2 11</u>	Total	<u>£1611 2 11</u>

# NORFOLK AGRICULTURAL STATION.

STATEMENT OF RECEIPTS AND PAYMENTS FOR THE YEAR ENDING OCTOBER 11th, 1915.

## SEVENTH YEAR.

RECEIPTS.		PAYMENTS.	
	£ s. d.		£ s. d.
Donations	100 0 0	Live Stock	731 17 6
Subscriptions	89 6 0	Implements	0 0 0
Live Stock	1181 13 0	Seeds	93 19 5
Corn	422 12 4	Feeding Stuffs	220 6 8
Wool	33 5 0	Labour	543 13 0
Outstanding from last year	1 10 0	Manures	34 6 1
		Tradesmen's Bills	95 4 11
		Rent, Rates, Taxes, etc.	57 19 10
			1777 7 5
		Balance due and brought from last year's Accounts	62 9 4
			1839 16 9
		Balance in hand and carried to next year's Account	38 9 7
			1878 6 4
		Total	£1878 6 4

## BALANCE SHEET, 1914-15.

Dr.	£ s. d.	£ s. d.	Cr.	£ s. d.
Donations as per last year's Balance Sheet	1548 13 7		Stock and Crop on the Farm at Michaelmas, 1915	1624 4 0
Added this year	0 0 0		Cash in hand in the Bank	38 9 7
		1548 13 7		
Loss on previous six years	114 0 0			
Surplus for the year 1915	92 13 5			
Loss on the previous six years	21 6 7			
		£1662 13 7		
Total		£1662 13 7	Total	£1662 13 7

# NORFOLK AGRICULTURAL STATION.



## LIST OF DONATIONS.

	£	s.	d.		£	s.	d.
His Majesty King				Carr, W. ... ..			
Edward VII. ... ..	52	10	0	Champion, W. N. L. ...	10	10	0
Leicester, Earl of, K.G.				Gonville and Caius			
(the late) ... ..	100	0	0	College, Cambridge ...	10	10	0
Harker, W. (in 4 years)	100	0	0	Green, Sir Edward,			
Barclay & Co. ... ..	52	10	0	Bart. ... ..	10	10	0
Norfolk Chamber of				Gurney, John H. ... ..	10	10	0
Agriculture ... ..	50	0	0	Hall, Mrs. T. S. ... ..	10	10	0
Ditto (2nd donation) ...	10	10	0	Norfolk News Co., Ltd.	10	10	0
Ditto (3rd donation) ...	10	10	0	Soames, A. W., M.P. ...	10	10	0
Norfolk Agricultural				Strachan, C. E. ... ..	10	10	0
Experiments Fund,				Bacon, N. H. ... ..	10	0	0
Balance ... ..	16	16	1	Barclay, Hugh G. ... ..	10	0	0
Cator, John, M.P. (in				Barry, W. J. ... ..	10	0	0
5 years) ... ..	50	0	0	Beauchamp, Sir R.,			
Anglo-Netherland Sugar				Bart. (the late) ... ..	10	0	0
Corporation ... ..	27	10	0	Birkbeck, Henry ... ..	10	0	0
Albemarle, Earl of ... ..	25	0	0	Forrester, James B. ...	10	0	0
Calthorpe, Lord (the				Hoare, Sir Samuel, Bart.			
late) ... ..	25	0	0	(the late) ... ..	10	0	0
Lindley, Lord ... ..	25	0	0	Horsfall, R. E. ... ..	10	0	0
Spencer, Earl (the late)	25	0	0	Le Strange, Hamon ...	10	0	0
Stafford, Lord (the late)	25	0	0	Lombe, E. H. Evans,			
Holkes, Sir W. H. B.,				Major ... ..	10	0	0
Bart. (the late) ... ..	25	0	0	Meade, Captain ... ..	10	0	0
Mann, Sir Edward Bart.	25	0	0	Noble, Sir Andrew ... ..	10	0	0
Colman, Messrs. J. J.,				Pratt, E. R. ... ..	10	0	0
Ltd. ... ..	25	0	0	Price, Sir E. J., M.P. ...	10	0	0
Colman, Russell ... ..	25	0	0	Rider-Haggard, Sir H. ...	10	0	0
Gurney, Sir Eustace ...	25	0	0	Rippingall, F. T. S. (the			
Holmes, J. Sancerf ...	25	0	0	late) ... ..	10	0	0
De Ramsey, Lord ... ..	20	0	0	Salter & Simpson,			
Fellowes, the Right Hon.				Messrs. ... ..	10	0	0
Sir Ailwyn E., K.C.V.O.	15	0	0	Sparke, E. Bowyer (the			
Overman, H. & Brother	15	0	0	late) ... ..	10	0	0
National Sugar Beet				Upcher, H. M. ... ..	10	0	0
Association ... ..	15	0	0	Unthank, Col. C. W. J.	10	0	0
Bright, Rev. J. T., D.D.	10	10	0	Wood, John M. ... ..	10	0	0

	£	s.	d.		£	s.	d.
Ireland, Messrs. ....	5	5	0	Sheringham, H. V. ....	5	0	0
Spurrell, J. T. ....	5	5	0	Smith, Henry (the late) ...	5	0	0
Amherst of Hackney, The Baroness ....	5	0	0	Sutton, Francis ....	5	0	0
Astley, Major Delavel G. ...	5	0	0	Taylor, Garrett (the late) ...	5	0	0
Barratt-Lennard, T. ....	5	0	0	White, Sir Geo., M.P. (the late) ...	5	0	0
Berney, Mrs. Catherine (the late) ...	5	0	0	White, Woolmer, W. ....	5	0	0
Birkbeck, W. J. (the late) ...	5	0	0	Mott, John S. ....	3	3	0
Boileau, Sir Maurice, Bart. ....	5	0	0	Collison, A. ....	2	2	0
Buxton, Mrs. (Bolwick) ...	5	0	0	Day, H. A. ....	2	2	0
Buxton, Sir T. Fowell (the late) ...	5	0	0	Hall, W. ....	2	2	0
Buxton, Geoffrey F. ....	5	0	0	de Pass, J. ....	2	2	0
Bygrave, John ....	5	0	0	Jex-Blake, very Rev. T. W., D.D. (the late) ...	2	2	0
Coaks, I. B. (the late) ...	5	0	0	Johnson, W. (the late) ...	2	2	0
Christie, Jas. A. (the late) ...	5	0	0	Kenyon, J. G. ....	2	2	0
Crisp, J. E. ....	5	0	0	Sheringham, H. ....	2	2	0
Cubitt, E. G. ....	5	0	0	Sutton, W. Lincoln ...	2	2	0
Custance, Col. C. E. ....	5	0	0	Underdown, H. ....	2	2	0
Digby, Algernon ....	5	0	0	Fletcher, B. E. (the late) ...	2	0	0
Dunell, Owen R. ....	5	0	0	Sewell, P. E. ....	2	0	0
Edwards, H. W. B. (the late) ...	5	0	0	Bird, Rev. M. C. H. ...	1	1	0
Falcon, M. ....	5	0	0	Blofeld, J. C. ....	1	1	0
Foster, Sir W., Bart. (the late) ...	5	0	0	Cannell, G. W. ....	1	1	0
Frank, F. Bacon (the late) ...	5	0	0	King, Robert ....	1	1	0
Gurdon, the Right Hon. Sir Brampton (the late) ...	5	0	0	Lee Warner, H. ....	1	1	0
Gurney, Robert ....	5	0	0	Littlewood, Colonel ...	1	1	0
Hare, Sir T. L., Bart. ...	5	0	0	Robinson, Lionel ...	1	1	0
Hollway, Calthrop H. C. ...	5	0	0	Stimpson, A. ....	1	1	0
Jodrell, Neville Paul ...	5	0	0	Underdown, H. C. B. ...	1	1	0
Jones, Sir Lawrence, Bart. ....	5	0	0	Cobon, Geo. ....	1	0	0
Lancaster, Sir W. J. ....	5	0	0	Digby, Captain H. A., R.N. (the late) ...	1	0	0
Masters, C. W. ....	5	0	0	Eagling, W. J. ....	1	0	0
Newcome, F. d'A. ....	5	0	0	Gaymer, E. T. ....	1	0	0
Paul, J. J. Dawson ...	5	0	0	Gaymer, John ....	1	0	0
Perowne, B. C. (the late) ...	5	0	0	Harvey, W. ....	1	0	0
Petre, Major ....	5	0	0	Hamond, C. ....	1	0	0
Sapwell, B. B. ....	5	0	0	Heywood, E. ....	1	0	0
Scott-Chad, Charles ...	5	0	0	Key, E. S. ....	1	0	0
Sewell, J. W. ....	5	0	0	Kemp, Sir K., Bart. ...	1	0	0
Seymour, C. D. ....	5	0	0	Lane, W. A. ....	1	0	0
Kerrison, Colonel ...	3	0	0	Norris, W. E. ....	1	0	0
				Poll, C. H. ....	1	0	0
				Shipley, W., F.R.C.V.S. ...	1	0	0
				Ditto (additional) ...	1	1	0
				Ward, E. F. ....	1	0	0
				Cobon, H. (the late) ...	0	10	6
				Littlewood, C. J. ...	0	10	6
				Bartram, W. ....	0	10	6

—(C)—

**Hastings, Lord, the Station Farm at Little Snoring,  
132a. Ir. 2p. Rent Free for 8 years.**

## ANNUAL SUBSCRIBERS.

	£	s.	d.		£	s.	d.
Leicester, The Earl of ...	10	0	0	Brereton, Miss K. D. ...	1	1	0
Holmes, J. Sancroft ...	10	0	0	Dewar, Charles ...	1	1	0
Deterding, H. W., and his tenants ...	10	10	0	Dimmock, J. B. ...	1	1	0
Norfolk Chamber of Agriculture ...	10	10	0	Matthews, T. S. ...	1	1	0
Fellowes, Right Hon. Sir A. E., K.C.V.O. ...	5	5	0	Waters, H. J. ...	1	1	0
Bacon, N. H. ...	2	2	0	Fisher, Right Rev. Bishop	1	0	0
Colman, Messrs. J. & J.	5	5	0	Hollway-Calthrop, H. C.	1	0	0
Gurney, John Hy. ...	2	0	0	Buxton, H. G. ...	1	0	0
*Gurney, Sir Eustace, Life Membership Sub- scription ...	25	0	0	Le Strange, Hamon ...	1	0	0
Cannell, G. W., & Sons	5	18	6	Digby, Algernon ...	1	0	0
Bright, Rev. J. T., D.D.	2	2	0	Mann, Sir Edward, Bart.	1	0	0
Forrester, J. B. ...	2	2	0	Stubbs, Ismay ...	1	0	0
Horsfall, R. E. ...	2	2	0	Kidner, T. ...	1	1	0
Sewell, P. E. ...	1	0	0	Littlewood, Colonel ...	1	1	0
Soumes, A. W., M.P. ...	2	2	0	Buxton, Noel, M.P. ...	1	0	0
Overman, H. and Brother	2	0	0	Hare, Sir T. L., Bart. ...	1	0	0
Champion, W. N. L. ...	2	0	0	Gurney, Robert ...	1	0	0
Lombe, E. H. Evans, Major ...	2	0	0	Sapwell, B. B. ...	1	0	0
				Sheringham, H. V. ...	1	0	0
				Bartram, W. ...	0	10	6
				Littlewood, C. J. ...	0	10	6
				Underdown, W. M. ...	0	10	6
				Eglington, S. S. ...	0	10	0
				Lee, R. G. ...	0	5	0

