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Report for 1935

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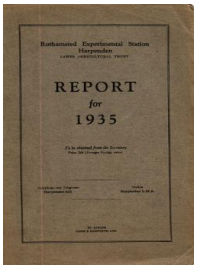

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WOBURN EXPERIMENTAL FARM REPORT FOR 1934-35

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

The season was one of very variable nature, commencing with a severe thunderstorm in September, 1934; rainfall in October and November was rather above the average, and very heavy in December, reaching 4.5 inches in that month, there being 25 rainy days. The winter, however, was mild, and there was but little frost; there was only one fall of snow all the winter. January 1935, was dry, February wet, but March was again dry, so that spring sowing could be done well.

May was marked by cold winds, followed by a "dripping" June, 20 wet days being recorded, though the total rainfall was only 1.95 inches. In July and August hot and very dry weather followed and brought on the ripening of the corn crops so that an early harvest was obtained, and got in in good condition, it being possible to thresh the small experimental corn crops in the field. September, October, and November were all wet—the total rainfall for 1935 being 26.13 inches as against 19.56 for the previous year.

The meteorological records for 1934-5 were as follows:

METEOROLOGICAL RECORDS. 1934-5

Month.	*Rainfall.*		Bright Sun-shine	*Temperature (Mean)*			
	Total Fall.	No. of Rainy Days.		Max.	Min.	1 ft. in Ground.	Grass Min.
1934—	Ins.	No.	Hours.	°F.	°F.	°F.	°F.
Oct. ..	1.67	18	91.1	57.3	45.2	51.6	40.6
Nov. ..	1.94	13	43.0	47.0	37.9	43.1	33.9
Dec. ..	4.56	25	21.0	49.9	42.1	45.1	37.0
1935 —							
Jan. ..	0.77	10	36.1	43.8	35.4	40.7	31.0
Feb. ..	2.75	17	49.1	47.2	36.3	41.2	33.0
Mar. ..	0.41	8	130.4	50.5	35.9	43.1	31.5
April ..	2.98	20	125.9	53.0	38.7	46.6	34.0
May ..	2.41	9	188.2	59.1	40.5	53.7	37.8
June ..	1.95	20	200.0	67.3	50.8	60.7	48.2
July ..	0.52	5	244.9	75.0	52.0	68.8	48.4
Aug. ..	2.09	10	202.4	74.1	51.5	67.5	47.4
Sept. ..	3.98	17	151.7	64.2	48.6	57.1	45.9
Oct. ..	2.84	18	107.5	55.8	42.2	49.4	38.4
Nov. ..	3.48	20	62.0	49.4	39.1	44.6	35.5
Dec. ..	1.95	19	32.4	41.5	32.7	37.9	29.6
Total or mean for 1935 ..	26.13	173	1530.6	56.7	42.0	50.9	38.4

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CONTINUOUS GROWING OF WHEAT AND BARLEY

Stackyard Field, 1935, 59th Year (no manure since 1926.) The fallowing operations on both these plots, begun in 1934, were continued throughout 1935, a vigorous attempt being made to free the land of weeds by cultivation. In this, considerable success was obtained, so much so, indeed, that in the autumn of 1935 these plots were considered fit to put again in corn. In this connection it may be said that continual cultivation and stirring of the fallow land resulted in eliminating the twitch (mainly *Holcus mollis* and *Agrostis stolonifera*) and getting rid of a good deal of *polygonum aviculare* (hogweed) ; fallowing alone was, however, quite ineffective in reducing materially either mayweed or spurry. It was noticeable, nevertheless, that on the acid plots no mayweed would thrive, though spurry was thick.

After the two years' fallowing, wheat (" Red Standard ") was again sown on October 24th, 1935, and barley will follow in spring 1936, on the land formerly occupied by that crop. In neither case has any fresh manuring been done, the last applications having been made in 1926.

ROTATION EXPERIMENTS

THE UNEXHAUSTED MANURIAL VALUE OF CAKE AND CORN (STACKYARD FIELD) 1935.

Series C.

Twelve tons per acre of the swede crop of 1934 were fed off by sheep, these receiving (*a*) on the cake-fed plot ,15 cwt. of mixed linseed and cotton cake giving 78.3 lb. of nitrogen per acre ; (*b*) on the corn-fed plot 15 cwt. of a mixture of oats, barley and wheat, supplying 26.5 lb. of nitrogen per acre. There was, thus, considerable difference in nitrogen between the two sets.

Barley (" Plumage Archer ") was drilled early in March, and came up well. Towards the end of March Alsike clover was sown among the barley. The barley crop was cut on August 7th, stooked, carted to the farm, and threshed in January, 1936. The yields were as follows :

Plot.	*Head Corn.*		*Tail Corn.*	*Straw Chaff, etc.*		
	Bushels.	Weight per Bushel. lb.	lb.	cwt.	qr.	lb.
1. After Cake-feeding	38.7	55.7	15	24	0	16
2. After Corn-feeding	32.5	55.9	5	20	2	16

The crop was quite a good one, tail corn being but small in amount. The cake plot, as usual, gave the higher return by 6.2 bushels per acre, yet it is remarkable that the corn plot, which received additionally only 26 lb. per acre of nitrogen in the four years' rotation, gave so good a result and one so nearly approaching the yield from the higher application (78.3 lb. acre) of nitrogen by the cake-feeding.

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Series D.

The Alsike clover left after the barley crop of 1934 had been removed, had not been good and, though the parts where it was thin had been resown, the crop was poor and "clover sickness" made its appearance over a considerable part of the area. A good deal of damage was also done by pheasants and other birds. Early in May, 1935, the clover was lightly mown over in order to get rid of seeding weeds, and in the comparatively cold and wet weather of May and June the clover seemed to recover somewhat and began to grow again. It was finally cut on July 5th and made into hay, the weights being :

	Yield of Clover Hay per acre		
Plot.	cwt.	qrs.	lb.
1. After Cake-feeding	12	2	24
2. After Corn-feeding	14	3	16

The difference in weight in favour of the corn plot was really due to the amount of plant left after the attack of "clover sickness," rather than to any difference of manuring.

GREEN MANURING EXPERIMENT

Stackyard Field, 1935 (*Series A*)

(*a*) *Upper Part—Wheat after Green-crops*

The first green crops—Mustard and Tares—of 1934 had been fed off by sheep which received also 1½ cwt. per acre of cotton cake, this giving 7.6 lb. of nitrogen per acre. The mustard crop supplied 20.2 lb. of nitrogen per acre, the tares crop, 44.4 lb. A second green-crop of each kind was sown in August but, owing to drought, came to little and, not being enough to feed off, was ploughed in. The total amounts of nitrogen supplied by the two several green-crops and the cake addition were : Mustard plot, 37.4 lb. per acre ; Tares plot, 58.3 lb. per acre.

The land was prepared for wheat in October and this ("Red Standard") was drilled on November 6th, 1934.

Up to the beginning of May, 1935, the wheat grew quite well, that after tares looking rather the better. After this, however, the change that has so often before been noticed on these plots showed itself, the wheat plant turning yellow and but a poor crop was the result. Rabbits also did a great deal of damage, but by taking, for weighing, the less injured portions, the following will fairly represent the result :—

YIELD OF WHEAT PER ACRE. 1935.

Plot.	*Head Corn.*		*Tail Corn.*	*Straw, Chaff, etc.*
	Bushels.	Weight per Bushel.		
		lb.	lb.	lb.
Tares (unlimed) ..	12.3	63.2	14.0	1066
Mustard (unlimed)	9.9	63.4	9.0	799

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The limed plots were too much damaged for the weights to be satisfactorily recorded.

It may be observed that these plots followed the usual sequence of being quite promising at first and then failing badly in May, and finally yielding only meagre crops of wheat.

(*b*) (*Lower part*). *Green-crops after Wheat.*

After the wheat crop of 1934 green-crops of mustard and tares were sown—the latter in April, 1935, and the former in May. In neither case was anything but a very poor crop obtained, and, these not being enough to be fed off with sheep, were ploughed into the land. It was intended to take a second crop of each, but these could not, owing to the continued drought, be put in in time for getting wheat in afterwards, and the consequence was that the wheat crop for 1936 had to be sown with only the addition of nitrogen from the small first green-crops.

Lansome Field. Green-manuring Experiment, 1935. *Wheat after Green-crops.*

After the green-crops of 1934 had been turned in, wheat ("Red Standard") was drilled on November 2nd—the mustard crops had supplied 40.6 lb. of nitrogen per acre, the tares 97.2 lb. Already in March the wheat had begun to turn yellow and by May this was much worse, so that—as on Stackyard Field—only small yields of wheat were obtained, as shown in the following Table :—

YIELD OF WHEAT PER ACRE. 1935.

Plots.	*Head Corn.*		*Tail Corn.*	*Straw, Chaff, etc.*
	Bushels.	Weight per Bushel.		
		lb.	lb.	lb.
1. Mustard, old series..	10.9	59.5	10½	1560
2. Tares, old series	16.9	61.1	12½	2737
3. Mustard, new series	11.2	62.2	10½	1870
4. Tares, new series	11.7	62.7	8	2079
5. Control, new series..	9.6	61.5	16½	1696½

As in Stackyard Field, the wheat crop after tares was rather the better, but the crop, considering the amount of nitrogen supplied to it in the green-crops, was miserably poor.

Lucerne. Inoculation Experiment—Lansome Field, 1935.

This experiment, on the advantage or otherwise of inoculating the seed before sowing it, had been started in the year 1932, and so was now in its fourth year. The plots had yielded two cuttings in 1932 and in 1933, but three were obtained in 1934. Now, again, in 1935, three crops were reaped. After the 1934 crop the plots were harrowed and 10 tons per acre of farmyard manure were applied, this being the first manurial treatment since the first sowing of lucerne. The lucerne, though in its fourth year, continued to thrive and gave a wonderfully good and clean crop at each time of

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cutting. There were 12 plots, one half of these having been originally sown with inoculated seed and the other half with seed not so inoculated. The averages of the two sets, each composed of 6 plots, when reckoned as green lucerne or as lucerne hay were as follows:—

	Green Produce per acre.	Lucerne Hay per acre.
	tons.	tons.
Uninoculated area	25.6	6.55
Inoculated area	25.2	6.48

There was thus—as in former years—nothing to favour the inoculation of the seed, but it was remarkable, indeed, that such a yield as shown above should have been reached in the fourth year of the growing of lucerne, and that without the use of any manure, until 1934—5, when they received 10 tons of farmyard manure per acre. Up to the present, and including the 1935 crops, the total yields have been :—

	Lucerne Hay per acre.
	tons.
Uninoculated area	14.60
Inoculated area	14.24

The hay of the inoculated plots was, throughout, rather the higher in nitrogen.

Taking the total crops of the four years, the following amounts of nitrogen were obtained in the crops and removed from the land :—

	Nitrogen per acre
	lb.
Uninoculated area (4 years) ..	791.14
Inoculated area (4 years) ..	826.68

Grass Experiments. Broad Mead, 1935.

These experiments on the manuring of grass land were commenced in Broad Mead in 1901. They comprised six different plots, one with lime, one with farmyard manure, and the others with different artificial manures. In 1935 the plots were grazed by sheep and were much improved by the close feeding they received.

Pot-Culture Experiments.

The remainder of the earlier work undertaken at Woburn is comprised in the investigations carried out at the Pot-culture

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Station. These have direct reference to problems which have arisen out of the field experiments; among the principal are (*a*) green-manuring, (*b*) acid soils, (*c*) clover-sickness.

Rotation Experiments. Series B. Stackyard Field, 1935.

This was a series commenced in 1932 under the new Rothamsted plan. The rotation is a six-course one, the respective crops being, in 1935, red clover; wheat; barley; rye; sugar beet; potatoes. Of these all came well with the exception of red clover, which was unaccountably poor, for there was no "clover-sickness" here.

Miscellaneous Experiments.

In Lansome Field different strains of lucerne are being grown, also carrots (manurial experiment), Green-manuring experiment using lupins and then turning these into the land before planting kale. The growing of Soya-bean is also tried and has been fairly successful.

In Butt Close a very extended manurial experiment on sugar beet was carried out, this involving investigations as to time of planting and distance of drills apart. Other work covered the growing of different varieties of wheat, the time of application of sulphate of ammonia, etc.

In Great Hill Pyrethrum continued to be successfully grown, and in Warren Field plots laid down in different grass mixtures in 1931 were kept under observation. In 1935 they were grazed by cattle and sheep.

All the above, including Series B (rotation), form part of the new Rothamsted work and will be separately reported on from there.