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Rothamsted Report for 1947

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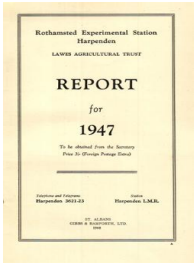

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THE FARMS

By J. R. Moffatt

Rothamsted

The management of the Rothamsted and Woburn Farms was merged in October, 1946, and this necessitated a reorganisation of the administrative staff. Mr. C. R. L. Scowen was appointed in October, 1946, to assist with the management of the Rothamsted Farm, while Mr. G. F. Cole relinquished some of these duties to assist with the general management and supervision of field experimental work at the Woburn Farm. The field staff, led by the farm foreman, numbered about 20, and included 4 German prisoners of war who were billeted on the farm. It was only through the splendid efforts of the staff, working as a team, that the effects of the year's very adverse weather conditions were not more serious. Most of the field operations needing much hand labour were done by German prisoners working under contract, as this proved the only satisfactory method of engaging gangs. Potato planting and picking, and the singling, side-hoeing and harvesting of the mangolds and sugar beet were all carried out in this manner.

In 1947 the area of land farmed at Rothamsted totalled 503¾ acres, of which 345¾ acres were under tillage. The area of permanent grassland was 127½ acres, of which 62 acres were under long-term experiments, 26 acres were rented grazing, and the remainder mostly unploughable ground because of the presence of tree-stumps, etc. Of the arable crops, barley occupied the biggest area (90¾), followed by wheat (60½), and potatoes (30¾). Other crops included oats, linseed, beans, kale, mangolds, sugar beet and rye. The area under temporary leys was 98¼ acres.

Compared with 1946 these figures show a slight increase in the tillage area, with a corresponding decrease in the permanent grass. The area under the various crops remained much the same as in previous years, except that barley increased by 20 acres, and 19 acres were under linseed, which crop was not grown in 1946. In the late spring of the year 19½ acres of old grassland were ploughed up, and as the wireworm infestation, as shown by counts made on soil samples, was heavy, linseed and kale were the first crops taken, these crops being more resistant to damage by this pest than most other crops.

The number of experimental field plots laid out during the year numbered 1,479, rather less than usual. However, the increasing complexity of the experiments and the extremely unfavourable weather conditions in autumn and spring made it impossible to handle successfully any more plots. A detailed description of the field experiments carried out is given in the report prepared by the Field Plots Committee.

The predominant factor governing field work in any year is the weather, and in the season under review conditions were almost as unfavourable as they could be. All extremes of weather were encountered; the winter was the severest in living memory, and this was followed by a very dry, hot spell lasting throughout most of the summer and autumn. Rainfall varied from 5·74 in. in November, 1946, to 0·10 in. in October, 1947. The total rainfall for 1947 was

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only 22·08 in., almost 6½ in. below the average, while even after the long, hot summer the total hours of sunshine were 12 below average. Despite the long, cold winter, however, and a mean temperature in February of 11·4° F. below the average, the mean temperature for the year was 10° F. above the average, each one of the last nine months being warmer than usual.

The late harvest of 1946 and the large acreage of potatoes grown delayed the start of winter corn sowing. The very wet weather in November, 1946, when there were 23 wet days, with a rainfall of well over twice the average, considerably hampered this work. Little more than half the scheduled wheat acreage was sown, and part of the area not sown to wheat was sown to barley in the spring.

Frosts were almost continuous from December, 1946, to mid-March, 1947, and the thermometer did not rise above freezing point at all between the 11th and 25th February. On 24th February the screen temperature fell to 4·4° F., 27·6° of frost. Snow which fell in January was added to in February and March, and did not start to melt until mid-March. With the thaw came floods, and the lowest parts of most of the fields were under water for several days. A gale followed, with gusts up to 60 m.p.h., which stripped the roof from the feeding stuffs loft and blew in a large part of the brick gable end of the building. Trees were brought down, and many stacks were disturbed.

Throughout this period no land work at all was possible; and in the 5 months ending 31st March land work was possible on only 30 days. However, the farm staff were gainfully employed, mostly under cover, during the whole of this period, either sorting potatoes stored in large heaps under the Dutch barns or threshing the 1946 corn crops stored in outside stacks and in the barns. The average yields per acre for 1946 over the whole farm were:—wheat, 28·13 cwt.; barley, 20·9 cwt.; oats, 21·3 cwt.; and beans, 18 cwt.

The damage resulting from this severe winter, though serious, was not as devastating as was at one time feared. Most of the winter wheat survived, although the plant was thinned and patching was needed on some areas. No winter oats or barley had been sown. The winter beans, which were sown very late in the autumn, were severely damaged, and there were not sufficient plants left to warrant leaving the crop. Most of the leaves and stems of clovers were killed, but the crowns survived and the plants were able to re-establish themselves. Part of the kale crop which had not been consumed was destroyed, and the mangolds in an outside clamp were damaged.

Land work in spring could not start until early April, about 5–6 weeks later than usual, and throughout the season each operation was, as never before, a race against time. However, the handicap at the start was so great that none of the spring sowing operations could be done on time. Fortunately a spell of fine weather followed, and by working all the hours of daylight, 7 days a week, the spring cereals, sainfoin, and grass and clover seeds were sown by 20th April. The preparation of the ground for root crops followed, without interruption, as May was drier than usual, but a spell of very hot weather in the middle of the month, and another at the end, caused the surface of the ground to dry out, and considerably delayed the germination of these late-sown crops.

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By early June the field work was up to schedule. The winter wheat then looked rather disappointing, as it appeared to have thinned out considerably, despite top-dressings of nitrogenous fertiliser; the spring corn and linseed looked very satisfactory; the kale had escaped serious damage by fleabeetle and that grown after old grassland heavily infested with wireworm did not appear to suffer damage by this pest; the sugar beet, although rather irregular, was making headway; the mangolds had germinated unevenly and looked very backward; many of the potatoes were not yet through the ground.

The thinness of the wheat crops enabled the weeds to grow rather more freely than usual, and to control them most of the wheat areas, and some of the barley, were sprayed with a salt of D.N.O.C., or dusted with a proprietary weed killing powder, with satisfactory results. One area of old grassland (Great Knott 1), which had not been ploughed since 1928, and which was ploughed up in late March and sown to kale, was heavily infested with Fat Hen (*Chenopodium album*) and yellow charlock. It seems likely that the seeds of these weeds have remained viable for nearly 20 years, merely awaiting suitable conditions for germination. Wild oats (*Avena* spp.), which originated in the continuous corn growing experiments in Broadbalk and Hoosfield, where they have assumed serious proportions, seem to be spreading over most of the farm. It is hoped to keep this weed under control, however, by reducing the number of corn crops grown in succession on any one area.

The growth of the hay crop was slow after a late start, and only a light crop was made in June. However, it was secured in excellent condition. In July the rainfall was almost an inch below average, and this proved to be the start of a very dry spell which lasted until early December. In each of the months July–November, 1947, the rainfall was well below the average, and the total for this period was only 4·46 in. compared with the average of 13·39 in., i.e., only one-third of the average. October, usually the wettest month of the year, yielded only 0·10 in.

The dry weather caused a rapid ripening of the corn crops and enabled the harvest to be gathered in in record time, the operation being completed by the end of August, which month had 271 hours of sunshine, 86 hours above the average, with a mean temperature 9·4° F. above the average. None of the corn was lodged, and most of it was carted without stooking and was stacked in the Dutch barns, while the remainder was threshed in the field. Threshing is not yet completed, so yields are not available; wheat yields will probably be considerably below, and barley and oats a little below normal. The main area of linseed produced a heavy crop, and the estimated yield is at least 12 cwt. per acre. As no seed of the variety "Royal" was available the variety "Bison" was sown, along with a little American seed. The heavy crop was cut with a binder and proved a slow and tedious job. The sheaves were turned after lying for three days, and carting followed two days later. A smaller area of "Redwing" was grown in a field where wheat had failed owing to severe wireworm damage. This crop was sown rather late, and was affected by the drought. The estimated yield from this area is 7 cwt. per acre.

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Normally, potato lifting closely follows harvest, but this year there was a considerable interval as corn harvest finished early, while owing to the late planting and dry season the tops of the potatoes remained very green until mid-October. There was no late blight this year, and as the weather conditions were unfavourable to the disease no preventative routine spraying was done. The start of lifting was delayed to give the crop a chance to put on more weight. The experimental plots were lifted at the end of September, but the main area of non-experimental potatoes was not lifted until the latter half of October. Even then the tops were green and vigorous, and had to be burnt off with acid before lifting could commence. Yields were lower than usual, and the tubers smaller, but considering the lateness of planting and very dry season the estimated yield of 7–8 tons per acre must be considered satisfactory. The ground was very hard and dry, and resisted the penetration of the lifter blade, which resulted in more damage than usual to tubers. Most of them were stored in large heaps within straw bale walls to a depth of 12 ft. under the Dutch barns. In order to get the sacks in which the potatoes were carted from the field up to this height a sack-elevator was used very successfully, resulting in a big reduction in strenuous manual labour.

The lifting of the mangolds followed, but this crop was very disappointing, having suffered severely from the effects of late sowing and drought. The roots were generally very small and yields low. The crop was lifted by the end of October and was carted and clamped under good conditions.

The lifting of the sugar beet crop presented great difficulty, as the ground was so hard that it was extremely difficult to keep the beet lifting plough in the ground. This resulted in the ends of a large number of roots being broken off. The roots were easier to clean than ever before, however, and the whole operation was completed by mid-November, about three weeks earlier than usual. Yields were well below average, but this was mitigated to a certain extent by the very high sugar content. The main beet experiment gave an average yield of 8·75 tons per acre of clean beet, with an average sugar content of 20·53 per cent., a sugar yield of 36·3 cwt. per acre.

Autumn ploughing was seriously impeded by the hard state of the ground and the shortage of plough-shares. Some of the fields were in fact too hard to plough at all, and those which were ploughed turned up very hard and dry, and needed a lot of working to get a suitable seed bed. Because of these hard, dry conditions the drilling of winter corn and beans was delayed, but as the drought remained unbroken by the end of the third week in October seed beds were forced by the use of cultivators and rollers. By the end of the month, with the drought still unbroken, most of the winter corn and beans were sown. Certain areas were still too hard to plough, and the cropping schedule had to be revised accordingly. Approximately 90 acres of winter wheat were drilled, the main varieties being Bersee and Squareheads Master 13/4. The winter bean area was destroyed by birds where the seed was drilled, but where the seed was dropped into the furrow bottom during ploughing little damage has been done. In future, beans will be either placed

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in the furrow bottom or will be broadcast on the surface of the ground before ploughing and then ploughed in. In the past, both these methods have given satisfactory results.

Only a few small areas were undersown with grass and clover seeds during the year, and most of these survived the drought. The area undersown with sainfoin had to be ploughed up as the plant was too thin to warrant leaving it.

Rainfall during December was heavier than usual, but it was not until the middle of the month that the rain reached ploughing depth. Conditions for ploughing were then excellent, and most of the winter ploughing was finished by the end of the year.

The season was an extremely unfavourable one for livestock. Fortunately the cattle survived the hard winter without losses or serious setbacks, although they made heavy inroads into the stocks of hay. A bunch of Irish bullocks was purchased in the autumn of 1946, and most of these were out-wintered with the intention of selling them fat off the grass during the summer of 1947. However, as a result of the hard winter they were in rather poor condition by the spring, and just as they were beginning to thrive really well the drought caused a severe shortage of grass. This resulted in only a few of the cattle being fattened from the grass, and to get these away they had to be fed liberally with kale and concentrated feeding stuffs. Several of the more forward beasts were brought into the covered yards in the autumn of 1947 to fatten by Christmas. The less forward beasts lived during September, October and November mainly on barley straw, helping themselves from stacks built in the grass field from the 1946 and 1947 crops. They maintained their condition on this diet but will have to be over-wintered again before being fattened off during the summer of 1948. The position was aggravated during the summer as owing to the very severe effects of the drought on grass on the light Woburn soil some of their cattle had to be transferred to Rothamsted. During the summer the Blue-grey and Kerry cows, which had been kept to rear stock of known history for grazing experiments, were sold. Most of them were about twelve years old and fetched more than their original price. No new breeding policy has yet been formulated as this will depend to some extent upon the programme of field experiments now under consideration. Most of the calves reared by these cows during 1945 and 1946 are still on the farm, and will be used for the last season of the grazing experiment comparing the residual value of feeding stuffs with the conventional estimates of their manurial value applied as fertilisers.

Sheep, too, survived the hard winter without loss and appeared to maintain their condition. Fortunately, lambing did not commence until the weather improved, and the 100 Halfbred ewes reared 163 lambs. The shortage of grass considerably reduced the milk yield of the ewes and consequently the lambs did not do as well as was expected. Weaning was delayed for this reason, and owing to the absence of fresh grass for the lambs they were almost immediately folded on to the kale. Most of them were sold fat by the end of the year. About 30 of the most forward ewe lambs of the 1947 crop were tupped in the autumn of 1947 by a Suffolk ram, and about 30 of the cross-bred ewe tegs of the 1946 crop were

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retained for the breeding flock. Several of the old ewes which would normally have been culled were also retained in the flock for another year, and a few of the best ewes from Woburn were transferred to Rothamsted. The rams used for the production of fat lambs were Oxfords and Suffolks.

The use of purchased feeding stuffs for livestock was almost eliminated, the only exceptions being the sugar beet pulp allotted to us as growers and certain feeding stuffs required for the animals on experiments. The protein-rich food in the home-produced rations consisted almost entirely of beans.

During the period between the end of harvest and potato lifting general estate maintenance work, including hedge trimming and the removal of barbed wire from around the Manor House, was undertaken. This work was continued after beet-lifting had finished, and all hedges were finished, but a lot of work remains to be done before the grounds of Rothamsted House attain their pre-war condition.

Work was commenced on the much needed new road between the farm and laboratories, and six new cottages for farm workers are in course of erection. No additions to the farm buildings were made, although new office accommodation was provided by the conversion of buildings previously used for other purposes.

The farm was worked, as in the past few years, by 4 wheeled tractors and 2 teams of horses, the latter used mainly on the experimental plots and for carting. Little new equipment was purchased, other than the sack elevator and a small rotary hoe for keeping clean the paths in the experiments.

The year under review was an extremely difficult one from the farming point of view. A wet autumn followed by the severest winter in memory caused all operations to be rushed in a vain attempt to make up for the late start. It was disappointing that the results of the tremendous efforts made in the spring were not fully realised because of the severe drought which lasted throughout the summer and autumn. This greatly restricted the growth of all crops and resulted in yields which were generally well below our average. The dry conditions also hampered the preparation of the ground for the 1948 crops, but it is hoped that more normal weather will prevail in 1948 so that crop yields will be a truer reflection of the work involved.

Woburn

On 1st October, 1946, the management of the Woburn Experimental Farm was merged with that of the Rothamsted Farm, and this report covers the first year's work.

Prior to 1947 considerable emphasis had been laid on market garden crops which, with sugar beet and some potatoes and barley, formed the main arable crops. There was also a considerable area of poor quality grassland but the only stock kept was a very small pig herd and a small sheep flock kept primarily for experimental work on Swayback disease in lambs. The market garden crops demanded more labour than seemed justified on an experimental farm, and the time taken in the marketing of the small amount of produce seemed out of proportion to the returns. It was therefore decided to abandon the growing of non-experimental market garden crops.