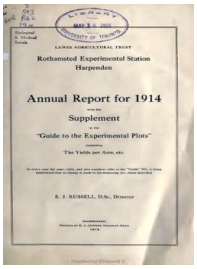
Annual Report for 1914 With the Supplements to the Guide to the Experimental Plots Containing the Yields per Acre, Etc.



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The Experimental Plots and Fields

Rothamsted Research

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THE EXPERIMENTAL PLOTS AND FIELDS.

1914 like 1913 was characterised by a long dry summer, but it was much more sunny, indeed over the whole season, April to September inclusive, there were 1,211 hours of sunshine against only 899 in 1913. The last four months of 1913 had been drier than usual so that the work was well forward: January also was relatively dry and favourable for work in the fields, while the frosts and the dry weather of December helped materially in getting the soil into good condition. The winter wheat started well, the general mildness of the winter being favourable to growth. February and March were very wet, 7·55 inches of rain falling against an average of 3·73 so that the work on the land was brought to a standstill. Then followed a spell of dry sunny days with a cold N.E. wind, which greatly checked winter corn and grass and was not very favourable for the getting of a tilth, in consequence the barley came up somewhat unevenly. May was a bad month for growth: it was dry, cold with N.E. and N.W. winds and there were several frosts. Warmer weather set in in June and a good shower of rain helped both mangolds and potatoes considerably, but it came too late to save the hay, which was very short. The drought continued so long that Brussels sprouts had to be watered in.

Harvest weather was good, and ploughing for winter crops was kept going notwithstanding the persistence of the drought. The winter corn had ripened well but the barley was late and its uneven ripening caused the harvest to be prolonged.

Mangolds were seriously affected by the dry summer, the yield on Barnfield being brought down to almost exactly one half the average. Hay also was badly affected and the only plots in the Park approaching normal yields were those receiving nitrate of soda or sulphate of ammonia. Clover hay grown in the Rotation experiment on Agdell Field also gave low yields. The Broadbalk wheat was again poor, the yields being almost identical with those obtained in 1913, but for this the season is only partly responsible. Continuous wheat growing allows very few opportunities of cleaning the land, and weeds have obtained so strong a hold on this field that hoeing and hand-weeding are insufficient to keep them down, and indeed the processes finally injure the crops more than the weeds. The committee therefore decided to fallow the west or top half of the field in 1914, and the east or bottom half in 1915. Only once before since the experiment began in 1843 has there been a fallow, and that was in 1903-4 and 1904-5, when however, the operation was carried out by dividing each plot into a north and south half and fallowing one in 1903-4 and the other in 1904-5. The method did not prove very successful by reason of the narrowness of the strips.

On the ordinary farm land Long Hoos Field yielded 39 bushels of wheat per acre, but Great Knott Field, which had been badly attacked by birds, only yielded 24 bushels per acre.

The Hoos Field barley, grown continuously on the same land, was somewhat below the average and very considerably below the extraordinarily high yields of 1913 which followed on the fallow of 1912. Higher yields were obtained in the adjoining Little Hoos Field where barley is grown in rotation; perhaps the most interesting

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feature here was that ordinary dung gave almost the same results as cake fed dung, no advantage accruing from the cake.

THE NEW FARM.

Up till recently the Rothamsted Experimental Station had only five fields, and as these were fully occupied with the classical experiments no land was available for new work. In 1911, however, an additional 230 acres were taken on a long lease and were gradually got into order; they are farmed largely without stock, manures being purchased and everything sold off, this method having certain advantages when experiments are to be undertaken. There being no buildings available, some were erected—stables, stalls for six bullocks, a covered manure yard, and the usual chaffing room, granary, store for artificial fertilisers, etc. In addition, a large Dutch barn has been built, with stout wooden posts set in concrete and affording 8,550 cubic yards capacity, the cost of which was only £127.

Much of this land is farmed in the ordinary way, but from time to time additional areas are brought into experiment; this is done in a definite systematic manner to test some method or principle devised in the laboratory. The usual course is that the laboratory investigations clear up some point in soil fertility or in plant nutrition, and suggest some way in which the growth of the plant might be increased. The method is carefully tested by pot experiments carried out under carefully controlled conditions in the pot culture house, and the laboratory experiments are revised in the light of the results obtained. Thus the *principle* of the method is established. It does not follow, however, that the method will work in the field: the weather, the subsoil, the difficulties of manipulation and other causes may all operate against it and reduce or nullify its effects. Field experiments are therefore made, first on a small scale, and then if need be on a larger one.

Broadly speaking, there are two ways in which soil fertility investigations may be applied to agriculture: they may lead to increases in crop or they may enable the farmer to obtain the same crop at lower cost. There are limits set by the climate to the possibilities of increasing the crop: but there is no limit to the farmer's desire to lower the cost of production.

Another guiding principle is that so far as possible old methods are utilised and developed instead of seeking to bring out quite new ones. The old methods have many advantages: they are effective or they would not have survived, they can be worked on the farm, and they are capable of improvement.

In laying out new experiments at Rothamsted it is unnecessary to conduct simple manurial trials except with new fertilisers. The old plot experiments admirably demonstrate the properties of the artificial manures and their effects on the crop and the soil: our newer experiments, therefore, start out from the basis thus acquired.

One of them is directed to the study of problems revealed by the periodical surveys of the plots, one of which is now in progress. The manures applied in certain cases contain 80 to 200 lb. of nitrogen, but we only recover some 50 or 60 lb. in the crop and the

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