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ROTHAMSTED  
RESEARCH

## Rothamsted Report for 1932

[Full Table of Content](#)



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### Improvements at the Farm

#### Rothamsted Research

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## REPORT FOR 1932

The reader may be tempted to ask: why, when farmers are suffering from such a glut of overproduction is it necessary to make further experiments in agriculture? Why cannot we call a holiday from scientific investigation till there is again the possibility of a shortage of food such as always existed till the present time?

The answer is that scientific investigations in agriculture are primarily for the purpose of obtaining information, and this will always be needed so long as farming continues. It is in times of difficulty that exact information about soil, crops and animals is most valuable to farmers, for it enables them rapidly to alter their methods in accordance with the rapidly changing economic conditions. At the present time the need is greater than ever, for the community has now given to farmers a measure of assistance which they have never had before, and it is rightly expected that a high standard of efficiency should be maintained in return.

The Rothamsted experiments have always had as their main purpose this search for information about soils and crops: the work, however, is carried a stage further, and efforts are made to put the information in a form in which it can be used by good farmers, experts, teachers and others interested in the improvement of country life.

The work is done in the laboratories, in the pot culture and glass houses, and on the two farms, the heavy-land farm at Rothamsted and the light-land farm at Woburn. In spite of some curtailment of the Government grant and a fall in subscriptions and donations, it has been possible to continue the work without loss of efficiency, though some important investigations have had to be deferred till the necessary financial provision can be assured. The congestion in the laboratories still remains a serious problem, and the erection of an additional storey for which the architect provided is badly needed.

### THE FARM

The arrangements for experimental work at the farm have been greatly improved by the facilities afforded by the new buildings and the new demonstration room has been much appreciated.

The electrical installation at the farm is, for the present, complete. It was formally inaugurated by Sir John Gilmour, Minister of Agriculture, on June 21st, 1932. The scope of the work now in hand is described in the 1930 Report, p. 21.

A sub-station has been erected in the farm buildings, and the high tension supply of electricity led into a 30 K.V.A. transformer. The supply in the buildings is 400-440 volts, three-phase, 50 cycles, used

for large-power applications ; and 230 volts, single-phase, used for lighting, heating and small-power applications up to 1 h.p.

The actual equipment, in addition to the complete lighting installation supplemented by two portable electrical lanterns, is as follows :

- 20 h.p. G.E.C. Witton Portable motor.
- 5 " " " Drumotor.
- 2 " " " Fixed motor for sack hoist and cake-breaker.
- $\frac{1}{2}$  " " " Portable motor.

Direct-driven grinding mill by Harrison McGregor, direct-coupled to a 10 h.p. G.E.C. Witton motor.

Liquid manure pump driven by  $\frac{1}{2}$  h.p. G.E.C. Witton motor.  
4 h.p. G.E.C. Witton motor, fixed for pumping water ; by means of a float, pumping automatically stops when the tank is full.

Portable groomer and cleaner.

Sterilizing outfit.

Alfa-Laval milking machine, with  $\frac{1}{2}$  h.p. motor.

Water-heaters for piggery and sterilising room.

Several special meter-boards for taking consumption readings.

Measurements are now being taken of the number of units of electricity required to do particular operations as compared with the amounts of fuel consumed by internal combustion engines doing the same work. The electrical equipment for this purpose was generously provided by the General Electric Company, while the Royal Agricultural Society made a grant towards the cost of recording.

Observations have been begun on the possible uses of rubber on the farm. Rubber tyres have been fitted to one of the carts ; they so facilitate working that some 50 per cent. additional load is easily carried ; further, they do not cut up the farm roads as the old iron tyres did. Rubber tyres are now being fitted to the tractor. A rubber road has been made in front of the farm buildings ; it has the advantage that it can readily be made clean, and it would set off a model dairy very well. Rubber flooring is being installed in some of the pig sties, cattle stalls and stable.

The head of stock during the past four years has been approximately :

	1929		1930		1931		1932	
	Sep. 30	Sold in last 12 months	Sep. 30	Sold in last 12 months	Sep. 30	Sold in last 12 months	Sep. 30	Sold in last 12 months
Sheep ..	303	85	499	177	447	296	433	336
Pigs ..	99	133	215	78	192	237	286	201
Cattle ..	33	13	27	20	63	24	100	16

For the better provision of food an additional 42 acres of grassland has been rented from the estate.

The farm now consists of 322 acres, used as follows :

<i>Arable.</i>	
Classical experiments. . . . .	29½
Other permanent experiments. . . . .	15½
Temporary experiments. . . . .	11
Non-experimental. . . . .	68
<i>Permanent Grass.</i>	
Classical experiments . . . . .	7
Other Grass. . . . .	165
Used for buildings, roads and other purposes . . . . .	26
Total	322

During the past five years under H. G. Miller's management there has been a marked improvement in the general appearance of the farm, and in the condition both of the arable and the grass land. Although they are only four or five years old, the new grass fields have already attained a high degree of productiveness, largely as the result of proper grazing and feeding of meal or cake.

The great expansion in the field experimental work is shown by the growth in the number of plots ; they were as follows :

1911-12.	1921-22.	1931-32.
250	638	1,408

In addition there are considerable numbers at Woburn and at the outside centres.

#### STATISTICAL CONTROL OF THE EXPERIMENTS

During its fourteen years of existence the Statistical Department under Dr. R. A. Fisher has had as its chief function the giving of assistance to other departments in the design of experiments and the interpretation of results. Its influence has not only permeated the whole Institution, but has spread far beyond, so that a constant stream of workers from other institutions come here to study the methods and to seek advice about applying them to their problems.

It is perhaps in the field work that the influence of the Department has been most profoundly felt. Three difficulties had always been serious and apparently insuperable : the irregularities of the land on which the experimental plots were set out ; the large experimental error attaching to the results ; and the fact that the magnitude of the error was unknown. Dr. Fisher has been able to devise experimental methods which are free from these difficulties and yet are practicable ; and these methods are now used not only in all the new work at Rothamsted and at Woburn, but in a large number of other field investigations at home and overseas. Several important agricultural colleges and departments now include courses on statistical methods.

Contrary to the earlier belief, it is found that a complex experiment involving a number of questions, gives better results than a single experiment involving one question only : a modern field experiment may include 80, 100 or even more plots. Much theoretical work has had to be done on the principles of experimental design and on the significance of results, as well as on such details as the proper procedure to be adopted when, as occasionally happens, one or more plots in a large set is for some reason spoiled.