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ROTHAMSTED  
RESEARCH

## Report for 1934

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### The Farm

#### Rothamsted Research

Rothamsted Research (1935) *The Farm* ; Report For 1934, pp 69 - 71 - DOI:  
<https://doi.org/10.23637/ERADOC-1-66>

### THE FARM

It is with great regret that we have to report the death of the Farm Director, Mr. H. G. Miller, on April 5th, 1934. He carried out with great success the reorganisation of the farm, necessitated by the decision to convert it from wholly arable to partly grass and he left it in a satisfactory state for the economic performance of the experimental programme.

His successor as Farm Manager, Mr. J. R. Moffatt, had worked under him for some months so that there was no breach of continuity when the change came.

As far as is feasible without detriment to the scientific work, investigations are made at the farm on matters of practical husbandry.

Three of these are already giving results and are set out below.

### COMPARISON OF ELECTRIC MOTOR WITH THE TRACTORS AS SOURCE OF POWER ABOUT THE BUILDINGS

During the last two years there have been facilities on the farm for carrying out routine operations using either a tractor or an electric motor as a source of power. The work is carried out under a grant from the Royal Agricultural Society's Research Fund, and in consultation with the Oxford Institute of Research in Agricultural Engineering. It was made possible in the first instance through the generous donation of electrical equipment by Sir Hugo Hirst, of the General Electric Company, whose agricultural expert, Mr. Rowland, is always ready to help.

In threshing, for example, the electricity consumption is obtained from meter readings immediately before and after an experiment: measurements are taken of the amount of electricity required to bring the thresher up to speed, and also of the electricity used when the thresher is running light, so as to make all necessary corrections.

For the tractors, the quantity of paraffin used during actual threshing is measured, also the petrol required for starting and warming up the engine.

The time required for starting and lining up the tractor is recorded and also that for bringing the motor into position.

In the 1934 threshing experiments the comparison was between a General Electric Company Witton 20 H.P. portable motor and two International Harvester Company 10-20 tractors: one new, and the other having already done 7,000 hours of field work during nearly 7 years of hard service on the farm. The threshing machine, manufactured by Messrs. Marshall & Son (Gainsborough), has a drum width of 48 in., and was run at about 1,100 revolutions per minute.

The work was done under ordinary conditions of farm practice and by the ordinary farm staff: the recording was done by a separate officer. Each test lasted two hours and a considerable number were made. The mean output of grain or total produce in cwt. during that time was on the average:



	Wheat.	Oats.	Barley.
Grain .. ..	50	40	40
Straw, chaff, etc. .. ..	70	55	45
Total produce .. ..	120	95	85

The paraffin and electricity consumption and their corresponding costs per ton of grain and per ton of total produce are shown in the following Table :

Per ton of grain.

	Wheat.	Oats.	Barley.	Cost, pence.		
				Wheat.	Oats.	Barley.
New tractor. Gals. ..	1.03	1.48	1.24	7.65	10.8	9.15
Old tractor. Gals. ..	0.94	—	1.28	7.10	—	9.40
Electric motor. Units ..	6.50	7.60	8.40	9.60	11.1	12.4

Per ton of total produce.

	Wheat.	Oats.	Barley.	Cost, pence.		
				Wheat.	Oats.	Barley.
New tractor. Gals. ..	0.45	0.60	0.60	3.29	4.40	4.43
Old tractor. Gals. ..	0.40	—	0.63	3.07	—	4.60
Electric motor. Units ..	2.65	3.20	4.06	3.90	4.73	5.95

The costs were calculated on the basis of 6d. per gallon for paraffin ; lubricating oil 3.75d. per two hours ; and electricity 1.47d. per kWh. (unit charge + fixed charge). The costs for lining up the source of power with the thresher are not included in the above figure, as under commercial conditions starting costs will not occur every two hours : the labour cost in operating the thresher is also omitted since it was the same for the motor and the tractors. Actually so far as power cost is concerned the advantage is with the tractor : but when overhead charges and depreciation are brought into account, as they must be for a complete statement, the electric motor works out as the cheaper source of power. There is at present some uncertainty about the assumptions necessary to evaluate the overhead charges for electricity, and records of upkeep extending over some years will be needed before we can give a reliable figure.

The efficiency of the old tractor is remarkable ; in a number of the comparisons it consumed less paraffin than the new one, presumably because of a better carburettor setting.

The highest overall output recorded for the 20 H.P. motor was only 10.5 H.P. ; the rated output for the tractor is 20 H.P. ; hence it appears that the motor and tractors were only generally used at about half their rated outputs, and more economical results would have been obtained with units of smaller power.

#### VALUE OF FODDER CROPS

As already stated (p. 30), the value of the fodder crops obtained during the course of the experiments is to be assessed by the pigs since biochemistry is not yet sufficiently advanced to enable us to do this by analysis. It is not proposed, however, to develop investigations into animal nutrition as such.



### SHEEP HUSBANDRY EXPERIMENTS

These experiments deal with the flushing of the ewes and other items of management. The four-teated ewe flock is increasing, and is run with the two-teated flock so that the lambs may be otherwise comparable: detailed records are kept of the rates of growth of the lambs to see if the additional teats tend to increase the milk supply.

The interest of the farm staff in experimental work shows itself in the high standard of their ordinary work. As an encouragement to the staff we began in 1933 to send animals to shows, and this has been continued. No special expenditure is incurred on exhibiting, but gratifying successes have been obtained by both farms as the following list shows:

#### LIST OF SUCCESSES AND SHOW AWARDS, 1933 AND 1934

##### ROTHAMSTED

###### *Great Hertfordshire Show. Hatfield.*

1933. 2nd prize. 5 crossbred fat lambs.  
1934. 1st " 5 " " "

###### *Hitchin Christmas Fat Stock Show.*

1933. 1st prize. 5 crossbred fat tegs.  
1934. 1st " 5 " " "  
1st " Fat sow. " "  
1st " Pen of 2 bacon pigs.

###### *Smithfield Club's Fat Stock Show.*

1934. Reserve and Highly Commended. 3 crossbred fat lambs.

###### *Redbourne and District Agricultural Competitions.*

1933. 2nd prize. Horse ploughing (F. Stokes).  
3rd " " " (A. Lewis).  
1934. 1st prize and silver challenge cup. Horse ploughing (F. Stokes).  
1st " Best turn-out. Landowners' teams (F. Stokes).  
Certificate of National Horse Association of Great Britain (F. Stokes).

##### WOBURN

###### *Bedford Agricultural Society Show*

1933. 1st prize. 5 crossbred lambs.  
2nd " Large black boar.  
3rd " Crossbred gilt.  
Reserve. 5 breeding ewes.  
1934. 1st prize. 5 crossbred lambs.  
1st " 1 gilt pig.  
2nd " 5 breeding ewes.  
2nd " Breeding sow and litter.

###### *Bedford Christmas Fat Stock Show*

1934. 1st prize. 3 fat tegs.

###### *Smithfield Club's Fat Stock Show*

1933. 1st prize. Crossbred lamb carcase.  
Highly commended. Pig carcase (100-160 lb.).

#### VISITORS TO THE FARM AND LABORATORIES

The number of visitors was 2,460, the highest on record, and the arrangements for demonstrations by Messrs. Garner and Gregory worked out very satisfactorily. The new demonstration room at the farm proved very useful.

#### INSECT PESTS AT ROTHAMSTED AND WOBURN, 1933-4

H. C. F. NEWTON

##### GENERAL

There was an increase in wireworm attack this year which was generally severe on cereals. On Pastures field there was an outbreak of *Heterodera schachtii* Schmidt which, together with a frit fly attack,