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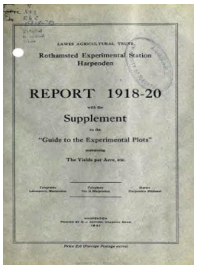
Report 1918-20 With the Supplement to the Guide to the Experimental Plots Containing the Yields per Acre Etc.



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Value of Tractor

Rothamsted Research

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It would be difficult, even if it were possible, to reduce the rate of wages, but there is abundant room for an increase in efficiency. The American estimates* are :—

* K. L. Butterfield, "The Farmer and the New Day." New York, 1919, p. 9.

EFFICIENCY OF AGRICULTURAL WORKERS.

United States	100
United Kingdom ...	43
Germany	41
France	31
Italy	15

The figures may not be absolutely accurate, but it is undeniable that the British worker falls far behind the American in output. No British worker would admit that there need be so great a difference as the figures show, even if any need exist at all. The best hope for the future of the rural community is an increase in efficiency of the worker sufficient to allow for a fall in cost of production without a fall in wages.

The tractor greatly increases the output of the worker. Its effect is shown by the figures for the following times of cultivation of an acre of land measured or estimated on our farm :—

	By Tractor.		By Horses.	No. of Horses.
First Ploughing . .	Titan	4 hours	$1\frac{1}{2}$ days	—
Cross Ploughing . .	Austin	2 ,,	$7\frac{1}{2}$ hours	2
Cultivation . .	Austin	$\frac{3}{4}$,,	$1\frac{1}{3}$,,	3
,, . .	Titan	1 ,,	$1\frac{1}{3}$,,	3
Rolling 10 acres . .	Austin	$3\frac{1}{2}$,,	$8\frac{1}{2}$,,	2
,, ,, . .	Titan	5 ,,	$8\frac{1}{2}$,,	2

THE POSSIBILITY OF EASING THE WORK OF CULTIVATION.

The tractor is purely mechanical in its operation and consumes fuel in exact proportion to the work done by the engine. It is imperative, therefore, that useless work should be avoided as far as possible. Farmers have long known in a general way that certain manures facilitate the working of the land, and we have this year begun measurements which we hope to develop, showing the saving thus effected in energy, *i.e.*, in fuel, oil and wear and tear.

One of the most effective agents in ameliorating heavy soil is chalk. Since 1912 in several fields we have had large plots of chalked and unchalked land, each several acres in extent, and have kept records of the yields obtained. These show improvement in clover and barley, but not in potatoes, wheat, mangolds, etc. Over a six course rotation there is less financial return than might have been expected, though, of course, it is satisfactory so far as it goes.

The ploughman always declared, however, that he could work more easily on the chalked than on the unchalked land. No measure of this difference could be obtained with horse implements,

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but it can be done with a tractor. The Hyatt Roller Bearings Co. kindly lent us a reliable high-class dynamometer with which were taken measurements for cross ploughing land previously ploughed in autumn. These show that the effect of chalking is to increase the speed of ploughing and to reduce the draw bar pull on the three-furrow plough by no less than 200lbs.

	Cockshutt Plough.		Ransome Plough.	
Average.	No Chalk	Chalked.	No Chalk.	Chalked.
Miles per hour	2.18	2.23	1.98	2.21
Draught per plough, lb.	513	453	537	475
Per sq. in. in furrow sect'n, lb.	7.25	6.46	7.67	6.8
Draw bar pull, lb.	1538	1358	1610	1425

We propose to extend these measurements to plots treated with other fertilisers: farmyard manure, green manure, folded land, etc. The "secondary effects" of artificials, studied here by Sir A. D. Hall, may prove to have a measurable economic value when one adds up all the tractor cultivations of the year. This will form an important part of the programme of the soil physics laboratory.

THE POSSIBILITY OF INCREASED OUTPUT FROM THE LAND.

It is often urged as a reproach to agricultural experts that in spite of the multitudinous experiments of the last 20 years the output from the land is no more than it was 50 years ago. The statement is not entirely correct, but there certainly has been no increase in output from the land comparable with that in industry. One important reason is that much less cultivation is done now than was usual 50 years ago, and in consequence the crop is not given a full chance of making good growth. With the advent of the tractor it will, we hope, become possible to remedy this defect and to enable some of the newer aids to crop production to attain their full effect.

The results described in previous reports show that the output from the land is much increased by the proper use of artificial fertilisers on carefully selected suitable varieties of crops. In the case of cereals good results have been obtained by the use of spring dressings of nitrogenous manures, these being required to replace the nitrates washed out during the winter (see p. 35). Experiments, however, show remarkable differences in effectiveness according to the time of application. It is impossible on present data to formulate hard and fast rules, but as shown below it appears that a small dressing (1 cwt. sulphate of ammonia or less) may go on fairly late, while a larger dressing should go on early.

THE AMOUNT OF FERTILISER TO USE.

For many years the Rothamsted data have shown that the yield of crops increases with the amount of manure supplied, but beyond a certain point the increase is no longer proportional to the added manure. In the old experiments the unit dressing was

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