ROTHAMSTED RESEARCH

The Use of Electricity in Agriculture

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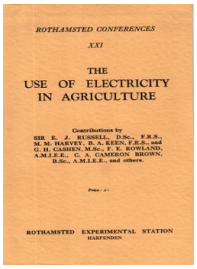

Foreword

Sir E. J. Russell

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FOREWORD

By Sir E. John Russell,
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The interest of Rothamsted in electrification goes back to 1930, when Mr. Borlase Matthews, one of the pioneers of the movement, prepared a scheme for performing all operations about the farm buildings by electrical power. For various reasons, however, it was not then possible to do anything and the matter was in abeyance till early 1932 when Sir Hugo (now Lord) Hirst generously provided the sum of £500 for equipment and arranged for the services of Mr. F. E. Rowland, the agricultural expert of the General Electric Company in making the plans. Another £500 needed for wiring and other works was provided with the consent of Miss Müller out of a legacy left by her mother, widow of the late Dr. Hugo Müller, formerly Treasurer of Rothamsted. Although the farm buildings lay more than a mile away from the nearest source of supply the North Metropolitan Electric Power Supply Co. entered whole-heartedly into the scheme and laid the cables free of cost so that the Institution should not be saddled with a burden of high charges. The equipment charges were of course greatly in excess of what would be needed on an ordinary commercial farm because it was intended from the outset that both the experimental, and the ordinary commercial work about the farm buildings should be done with electricity, and further that comparisons should be made at each stage with the tractor or other oil engine so as to give farmers the data on which they might determine whether it was or was not worth their while to install electricity. When the installation was complete the Royal Agricultural Society made a grant out of its Research Fund to enable records to be taken. This work has continued over a period of three years in consultation with the Oxford Institute of Research in Agricultural Engineering and with Mr. Rowland; the actual recording has been in charge of Mr. G. H. Cashen, assisted by Mr. E. C. Wallis.

Some of the data are presented in the paper by Mr. Cashen and Dr. Keen. They show that with a 20 h.p. motor or a 10-20 h.p. International tractor, each running at approximately half-load, 4 units of electricity or 5½ pints of paraffin were consumed in threshing about one ton of grain: the operation taking half-an-hour, so that the hourly consumption was double these figures. Preliminary experiments on the grinding of barley, using a 5 h.p. electric motor or a 6 h.p. Bamford oil engine, each at an output of 5 h.p., showed, for the same grinding rate and fineness of grinding,

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that 4.6 units of electricty per hour were equivalent to 2.3 pints of diesel oil per hour.

At the price we were paying (1d. per unit + 0.42d. representing the fixed charge spread over all the units consumed during the year) electricity comes out actually a little dearer than paraffin, and dearer still than diesel oil, but when account is taken of the overhead costs the balance is changed : electricity is cheaper than the paraffin tractor but a little dearer than the diesel oil engine.

The convenience of electricity, however, goes far beyond this and we have made no attempt to estimate the value of the better lighting as compared with the old days of lanterns, and of the enormous advantage of being able to start and finish a job simply by pressing a button.

During the past few years great experience of electricity has been accumulated both on the farm and on the engineering side, so that the farmer now has a wide range of motors and other appliances from which to select. In the following pages the various possibilities of the use of electricity and of types of appliance are described, but no particular article is recommended. It is easy for a farmer to get in touch with reliable sources of supply but, as Mr. Cameron Brown shows, good workmanship is essential. A long life can be safely assumed for good modern motors and good wiring installations, and the overheads are proportionately low ; but for inferior appliances and bad wiring the life is shorter and the overheads higher.

Farmers who have never used electricity will find Mr. Harvey's paper both interesting and helpful in showing how to take the first steps to secure the supply and how best to utilise the current when they have got it. The number of uses is considerable and although hitherto more current has in general been used for light than for power, except on dairy farms, the scope is steadily widening and with more experience, fresh applications will steadily be found. Mr. F. E. Rowland describes suitable types of appliances for the different purposes.

Not very long ago it used to be said that a farmer must be a bit of a chemist, a bacteriologist, a veterinarian, a meteorologist, a mechanic and a business man : if in addition he had to become an electrician his life would indeed be hard. But this is quite unnecessary. Modern motors are so good and their vital parts so well enclosed that nothing should go wrong with them. It is, however, well to have the installation periodically tested as leaks may occur and there are certain possibilities of danger in faulty wiring. This testing can be done by the Supply Company.

In the following pages we are concerned only with the immediately practical applications of electricity. Nothing has been said about such matters as electrical ploughing and cultivation, or electrical discharges over crops (shown by Prof. V. H. Blackman and his assistants to have no practical value) or the various horti-

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cultural possibilities such as soil heating and forcing of plants by artificial light. For the present we are concerned with the farm only, yet as the papers and discussions show the possibilities are distinctly impressive.

The Chairman, Sir Bernard Greenwell, said in his opening remarks that the grid system could provide electricity at a more uniform and cheaper rate than the numerous small generating stations that it was now replacing, but with this high tension distribution separate transformers were necessary for each group of small consumers and for isolated farms. Capital expenditure on such construction and for carrying the low tension supply to the consumer had to be met. The simplest and fairest way was for the consumer to bear his share in the form of a standing charge and to pay at a low rate per unit for electricity consumed rather than to merge these two distinct items into one by charging a higher rate per unit. Fortunately the cost of transformers was becoming cheaper. In country districts encouraging results had been obtained with the use of a modified mole-plough for laying underground cables at a cheap cost, and those people who dislike the appearance of pylons with their overhead cables could take hope for the future.

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