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# Report 1921-22 With the Supplement to the Guide to the Experimental Plots Containing the Yields per Acre Etc.



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## Introduction - General Account of Rothamsted

### Rothamsted Research

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## INTRODUCTION

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The Rothamsted Experimental Station was founded in 1843 by the late Sir J. B. Lawes, with whom was associated Sir J. H. Gilbert for a period of nearly 60 years. Lawes died in 1900 and Gilbert in 1901; they were succeeded by Sir A. D. Hall from 1902 to 1912, when the present Director, Dr. E. J. Russell, was appointed.

For many years the work was maintained entirely at the expense of Sir J. B. Lawes, at first by direct payment, and from 1889 onwards out of an income of £2,400, arising from the endowment fund of £100,000 given by him to the Lawes Agricultural Trust. In 1904 the Society for extending the Rothamsted Experiments was instituted for the purpose of providing funds for expansion. In 1906 Mr. J. F. Mason built the Bacteriological Laboratory; in 1907 the Goldsmiths' Company generously provided a further endowment of £10,000, the income of which is to be devoted to the investigation of the soil, thus raising the total income of the Station to £2,800. In 1911 the Development Commissioners made their first grant to the Station. Since then Government grants have been made annually, and for the year 1922-23 the Ministry of Agriculture have made a grant of £22,030 for the work of the Station. Viscount Elveden, M.P., has generously borne the cost of a chemist for studying farmyard manure since 1913, and until his death the late Mr. W. B. Randall defrayed the salary of a biologist. The Sulphate of Ammonia Federation and the Fertiliser Manufacturers' Association jointly defray the cost of a Guide Demonstrator for the field plots.

The laboratories have been entirely rebuilt. The main block was opened in 1919, and is devoted to the study of soil and plant nutrition problems; a new block is being erected for plant pathology. The library has been much expanded and now contains some 20,000 volumes dealing with agriculture and cognate subjects. The equipment of the farm has also been expanded.

The most important development of recent years has been the reorganisation of the work of the Station so as to bring it into touch with modern conditions of agriculture on the one side and of science on the other. The general organisation of the laboratory is now completed; it is hoped to reorganise in the near future the farm and field work and to improve the field technique.

The general method of investigation at Rothamsted is to start from the farm and work to the laboratory, or *vice versa*.

There are four great divisions in the laboratory—biological, chemical, physical and statistical—which may be regarded as the pillars on which the whole structure rests. But the method of investigation differs from that of an ordinary scientific laboratory where the problem is usually narrowed down so closely that only one factor is concerned. On the farm such narrowing is impossible; many factors may operate and elimination results in conditions so artificial as to render the enquiry meaningless. In place, therefore, of the ordinary single factor method of the

scientific laboratory, liberal use is made of statistical methods which allow the investigation of cases where several factors vary simultaneously. Thus in the crop investigations a large number of field observations are made; these are then treated statistically to ascertain the varying degrees to which they are related to other factors—such as rainfall, temperature, etc.—and to indicate the probable nature of the relationships. Thus the complex problem becomes reduced to a number of simpler ones susceptible of laboratory investigation.

It has been found desirable to widen the scope of the work by repeating some of the more important experiments elsewhere, and some twenty centres in different parts of the country have been selected for this purpose.

In October, 1921, the Station undertook, so long as its funds should allow, to carry on the continuous wheat and barley experiments at the Woburn Experimental Farm, till then conducted by the Royal Agricultural Society, and Dr. Voelcker gives his services as Honorary Local Director. In December, 1922, E. D. Simon, Esq., generously placed his Leadon Court farm at the disposal of the Station for experimental purposes. This is being used as a large scale test of the soiling system for keeping dairy cows (see p. 26).

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## REPORT FOR THE YEARS 1921-22

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In order to appreciate properly the Rothamsted experiments, it is necessary to understand the purpose for which they are carried out. This purpose is to discover the principles underlying the great facts of agriculture and to put the knowledge thus gained into a form in which it can be used by teachers, experts and farmers for the upraising of country life and the improvement of the standard of farming.

The most fundamental part of agriculture is the production of crops, and to this most of the Rothamsted work is devoted. On the technical side the problems fall into three groups, concerned respectively with the cultivation of the soil, the feeding of the crops, and the maintenance of healthy conditions of plant growth. The subjects will be taken in this order.

### THE CULTIVATION OF THE SOIL.

Cultivation has been reduced to a fine art, and a good farmer independent of financial considerations could obtain very satisfactory results without consulting the scientific worker. In practice, however, costs dominate the situation, and efforts are continuously being made to cut them down. Scientific investigation of all cultivation processes therefore becomes necessary. This is done in the Physical Department under Dr. Keen; the effects produced