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ROTHAMSTED  
RESEARCH

## Rothamsted Report for 1938

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### The Work of the Station at Home and Overseas

#### Rothamsted Research

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## ROTHAMSTED REPORT FOR 1938

The outstanding event of 1938 was the inauguration of the arrangements for celebrating the centenary in 1943. As Rothamsted is by far the oldest existing agricultural station, the centenary will be an historic event of world-wide interest and the preparations must begin in ample time. The Committee has decided that the celebration shall take the form of putting the laboratories, equipment and farm and other buildings into proper order as far as possible for the thorough carrying out of the work, and of adding to the endowment a sum sufficient to ensure proper maintenance of the fabric and to permit certain essential salary augmentations. An Inaugural Meeting was called on November 1st, 1938, at which H.R.H. the Duke of Kent presided. H.M. the King opened the subscription list, and promises and donations amounting to £31,000 were announced. The fund has since grown and on June 12th 1939 it stood at £37,100 of which £10,000 is earmarked for special purposes. The clouded international situation has hindered operations, but a start has already been made in erecting proper laboratories for the chemical, biochemical and bacteriological workers. Later on it is hoped to provide for more pot culture houses, the extension of the farm buildings and the laying out of the fore-court. The total cost of this part is to be about £47,000 of which some £14,500 is found by the Ministry of Agriculture and some £31,000 from the Centenary Fund.

The need for the extensions is very great: the departments concerned have hitherto been working under serious disadvantages, which have prevented them from accomplishing as much as they would have liked.

### THE WORK OF THE STATION: WORK AT HOME

The purpose of the work is to provide the basis for improving and developing agriculture and for raising the standard of country life. Agriculture, however, is so complex, and its practices are so diverse, varying so much according to local conditions, that it is quite impossible to lay down rules for universal adoption. Throughout Great Britain there are County Organisers and Local Advisory Experts who keep in touch with individual farmers and give them the best advice available in regard to their difficulties. The function of Rothamsted is to provide trustworthy information about soils, crops, fertilizers, diseases and pests of crops, and generally any subject connected with soil management and crop production: and to put this information into forms in which County Organisers, experts and good farmers can use it.

The information is obtained in the laboratories, pot-culture houses and experimental fields. The key experiments are made at Rothamsted on heavy soil and at Woburn on light soil, and in order to find the further effects of soil and weather conditions, selected experiments are repeated on good commercial farms in different

parts of the country. We owe a great deal to those farmers who, at much inconvenience to themselves, allow us to make these experiments in their fields under conditions of good practice.

These outside field experiments are a vitally important part of our work and we are hoping to extend them so as to strengthen still further the links between the research workers and the advisory staffs. The experiments are designed, and the results worked out, by the Chemical and Statistical Departments, and the carrying out of the experiments is in charge of Mr. H. V. Garner, to whom much of the success of the scheme is due.

### EXPERIMENTS AT OUTSIDE CENTRES

During 1938 the following crops came under experiment at the centres indicated and with the valuable field assistance of the experimenters named.

Potatoes. Balance of manures (three levels of nitrogen, phosphate and potash in all their 27 combinations).

Isle of Ely—Mr. W. E. Morton.

Sugar beet. (a) Response to three levels of nitrogen, phosphate and potash in all their 27 combinations.

East Lothian—in conjunction with the staff of the Cupar Sugar Factory.

Essex—Felstead Sugar Factory.

Fife—Cupar Sugar Factory.

Isle of Ely (two centres)—Ely and Peterborough Factories.

Lincolnshire (seven centres)—Bardney, Brigg, Newark, Spalding, Sugar Factories.

Norfolk (seven centres)—Cantley, King's Lynn, and Wisington Sugar Factories.

Nottingham—Colwick Sugar Factory.

Northampton—Peterborough Sugar Factory.

Shropshire (two centres)—Allscott Sugar Factory.

Suffolk (four centres)—Bury St. Edmunds and Ipswich Sugar Factories.

Worcestershire—Kidderminster Sugar Factory.

Yorkshire (three centres)—Poppleton and Selby Sugar Factories.

(b) Time of lifting and effect of fertilisers.

Lincolnshire—Spalding Sugar Factory.

Norfolk (two centres)—Cantley Sugar Factory.

Suffolk—Bury St. Edmunds Sugar Factory.

(c) Ploughing in of fertilisers.

Suffolk—Mr. A. W. Oldershaw.

(d) Residues of Chalk applied in 1932.

Suffolk—Mr. A. W. Oldershaw.

(e) Other experiments were carried out :

Lincolnshire—Lindsey County Council, Brigg and Bardney Sugar Factories.

Norfolk—Wisington Sugar Factory.

Nottingham—Newark Sugar Factory.

Poultry Manure Experiments. Ministry of Agriculture Scheme. The fertilising value of poultry manure and its cumulative and residual effects.

Bedfordshire—Mr. J. W. Dallas. Vegetable Marrows.

Berkshire—Prof. R. H. Stoughton. Chrysanthemums, Strawberries.

Bristol Province—Mr. A. W. Ling. Early Potatoes.

Kent—Dr. K. Barratt. Onions.

Small scale trials testing the cumulative effect of poultry manure were made at eighteen schools in various parts of the British Isles.

Basic Slag Committee Experiments.

Residual effects of phosphates measured in Oats and Hay.

West of Scotland—Prof. D. N. McArthur.

Experiments on Organic Manures.

Kent—Mr. G. Ossenton. Mangolds.

Suffolk—Mr. A. W. Oldershaw. Potatoes.

Sussex—Land Settlement Association. Potatoes.

The dissemination of the information gained by these various experiments is effected by writings, lectures or addresses, broadcast talks and visits of various kinds. Much of the lecturing is done by Mr. Garner, but other members of the staff share it with him, and so far as is practicable a lecture visit is combined with visits to farms in the district.

The justification for these extensions is that agricultural research work cannot be regarded as complete until it has found a way into current teaching or practice, and the first steps must be taken by the Research Institute itself. The work gains considerably thereby, for it often happens that considerable extensions are opened up through the observation and criticism of the advisors and farmers. A good example is afforded by the discovery in the Botanical Department at Rothamsted in 1923 that small quantities of boron are essential to the growth of certain plants. This was at first regarded rather as a scientific curiosity till agricultural experts in various parts of the world learned the symptoms of boron deficiency and found that it was widely spread, and was the cause of certain plant diseases that had caused a good deal of trouble. Once the cause was discovered the remedy was easily applied, and now these diseases are well under control. But the diseases and the associated problems of the practical growers have opened up a new lot of scientific problems and shown that the subject is much wider than was first suspected. Many of these diseases occur overseas, e.g. in New Zealand, Australia, the United States, and the investigations made in these countries have proved very helpful to agricultural experts in Great Britain in showing them what to look for.

#### OVERSEAS WORK, AND LINKS WITH OTHER AGRICULTURAL RESEARCH STATIONS

The overseas activities of Rothamsted began in 1923 when the Director was invited jointly by the Sudan Government and the Empire Cotton Growing Corporation to visit the Sudan and advise in regard to agricultural developments and scientific services. Subsequent visits of a similar nature have been made to other parts of Africa, Palestine, Australia, New Zealand, Canada, India, and outside the Empire, the United States and European countries including Russia. In addition a good deal of experimental work in parts of the tropical Empire is organised or directed from Rothamsted, and this has in several cases led to the transfer of Rothamsted workers to large planting organisations overseas. The old methods of plot experiments had in many cases proved unhelpful, but the new methods worked out at Rothamsted from 1926 onwards have proved of great value and are now widely adopted in Africa, India,

Malaya, Ceylon and elsewhere. They have the great merit of giving results of known validity, so that the magnitude of the experimental error can be estimated, and in consequence the experimenter knows how much importance attaches to each figure in his results. Dr. W. B. Haines in 1927 gave up his post at Rothamsted to carry out experiments on the growth of rubber in Malaya, remaining in close association, however, with the chemical and statistical departments. His work has already had a marked effect in showing how the rubber trees should be manured. Dr. H. J. Page, formerly head of our Chemical Department, has accepted the Directorship of the Rubber Research Institute in Malaya, thus ensuring close touch between their workers and ours. A visit by Dr. Crowther in 1938 still further strengthened the connections. Dr. T. Eden left Rothamsted in 1927 for the Tea Research Institute in Ceylon and by suitably applying the new field plot technique has succeeded in obtaining valuable information about the manuring of tea which the older methods never could have given, in view of the difficulties such as steeply sloping ground, etc. All the important sugar cane experiments in India are laid out on the modern lines discussed in our laboratories with Dr. Vaidyanathan and others responsible for their performance. This use of Rothamsted methods and of Rothamsted results has led to invitations to members of the staff to visit overseas countries for purposes of discussion with the experts there: during 1938 the Director was invited to Australia and Ceylon; Dr. Crowther was invited to plan experiments on the manuring of oil palm and to visit West Africa as expert attached to the Leverhulme Commission; Mr. Cochran was invited to the United States to lecture on the recent application of statistical methods to agricultural problems: in addition Dr. Mann went to New Zealand. Quite apart from the many advantages of rendering service to the large planting organisations operating overseas, but centred in England, and of returning courtesies to the United States and European Universities and experiment stations which are invariably willing to help us—apart from all this the Rothamsted work gains enormously by these visits: the methods and results are criticised by really competent experts and new ideas emerge. In all scientific work, and especially in agricultural science, it is the new idea that counts: and whether it was acquired in Africa, America, or at home is of secondary importance.

#### THE LESSON FOR THE BRITISH FARMER

One impression comes out very definitely from these overseas visits. Farmers in every exporting country are casting longing eyes on the English market, and their expert advisors are doing their best to help them secure a place. English farmers can keep their position only by maintaining a high standard of efficiency, for it is certain that no protection would long be given to an inefficient industry.

#### GRASSLAND

Numerous experiments are made on grassland. For some years these were chiefly concerned with basic slag and were carried out under the aegis of the Basic Slag Committee of the Ministry of