ROTHAMSTED RESEARCH

Report for 1930

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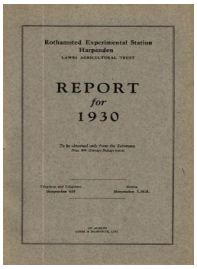

Utilisation of Results of Agricultural Experiments

Rothamsted Research

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THE UTILISATION OF RESULTS OF AGRICULTURAL EXPERIMENTS

Agricultural problems rarely present clear cut simple issues; they are usually complicated by a number of factors, some of which are themselves highly complex; in experimental work there is always, therefore, an element of doubt whether the result is obtained because of the treatment or in spite of it. Experimenters in the past have got round the difficulty by repeating the experiment a number of times, and if they frequently obtain the same result they have felt justified in attributing it to the treatment and not to some other and unknown cause. In the original Rothamsted experiments Lawes and Gilbert repeated their field trials for twenty years before publishing much about them; they then could speak with considerable certainty.

It is not practicable in modern conditions to use this long time method, and another was introduced at Rothamsted in 1919. Mathematicians have developed methods for studying figures and tracing any relationships that may exist between one set of observations and another; the result can be expressed as the odds in favour of one result being related to another. Dr. R. A. Fisher was appointed to apply these methods at Rothamsted, and he has designed arrangements for field experiments which allow of the valid calculation of the odds in favour of the result being due to the treatment and not to chance. These field methods have been in use for several years, and have proved easily workable and a great advance on the old ones.

Dr. Fisher has also improved the methods for studying masses of data such as agricultural experimental farms and stations have accumulated. It is now possible, for example, to trace the effect of rain week by week, on crops grown under different manurial or cultural conditions, and so to learn definitely how crops and manures behave in different seasons. Great masses of data that have accumulated at the various experimental farms in the country, and have not hitherto been used, can now be examined with a high degree of assurance that any information concealed therein will soon be discovered. In recent years Dr. Fisher has developed a new method, the Analysis of Variance, which is of special value in agricultural and biological research. It is used at Rothamsted for the most diverse purposes; in the bacteriological work for the study of the hourly fluctuations of the numbers of bacteria in the soil, in the entomological department for studying bees and other insects, in the field work for assessing the trustworthiness of the results, and in the chemical department for extracting information from the masses of figures accumulated by a succession of industrious analysts.

THE COMPOSITION OF THE SOIL: SOIL ANALYSIS

For many years past, chemists have been analysing soils, and the work has now been systematised by the setting up of soil surveys in different parts of the country. Great quantities of analytical data have accumulated which, however, are difficult to interpret by the older methods. Statistical methods have been used by Dr. Crowther, and he has extracted from the figures some highly interesting and valuable results. He has begun on the many analyses of clay fraction of the soil that have been made. The molecular ratio of silica to alumina (SiO_2/Al_2O_3) has been recognised as an important soil character, but it varies a good

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