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Report for 1934

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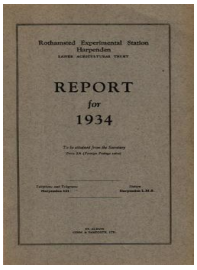

Statistical Department

Rothamsted Research

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sky: of all these factors temperature appears to be the most important. Dr. Barnes continued his work on gall midges and Mr. H. C. F. Newton carried a stage further his observations on the ovipositional and feeding reactions of the sawfly *Pteronidea melanaspis*.

The investigations on bees made during the last eleven years by Mr. D. T. M. Morland have attracted more and more attention from practical beekeepers and last year the British Bee Keepers Association guaranteed the sum of £250 annually for a period of three years, to which the Agricultural Research Council adds another £250, to permit of the investigation of Brood diseases. Dr. H. L. Tarr was appointed to the work and began on May 1st, 1934. The Lister Institute of Preventive Medicine is kindly allowing Dr. Tarr the use of their laboratories for the serological and other investigations thereby saving considerable reduplication of costly equipment and ensuring adequate control on the bacteriological side. A very successful conference with practical beekeepers was held in May, 1934, in which their experience was freely set out for the benefit of the investigators. This led to a request for further conferences and a further one was held in May, 1935, on swarming, a subject on which Mr. Morland has been working for the past few years and has now accumulated a mass of valuable information. Some 350 persons attended this Meeting and as no hall could be had to hold them, a marquee had to be erected.

INSECTICIDES

Drs. Tattersfield and Martin are studying further improvements in the method of the chemical evaluation of samples of pyrethrum, and they have begun a parallel investigation on derris. The results so far obtained have attracted wide interest and Dr. Tattersfield has been invited to the United States to confer with American experts on the subject.

Owing to shortage of staff the work on soil insecticides and fumigants has been in abeyance for a few years but this is now resumed, thanks to a grant from Imperial Chemical Industries, and Mr. W. R. S. Ladell has been appointed in charge.

STATISTICAL DEPARTMENT

Much of the time of this department is occupied with the design and analysis of replicated experiments at Rothamsted, Woburn and elsewhere and this work continues to expand as shown by the following table:

	Number of Experiments			*Plot Yields Analysed*		
Year.	Rothamsted and Woburn.	Outside Centres.	Total.	Rothamsted and Woburn.	Outside Centres.	Total.
1925	8	—	8	328	—	328
1926	13	4	17	740	73	813
1927	12	5	17	802	150	952
1928	11	12	23	1,267	392	1,659
1929	12	12	24	1,565	352	1,917
1930	14	24	36	1,341	918	2,259
1931	13	41	52	2,044	1,968	4,012
1932	17	49	64	2,153	3,792	5,945
1933	15	78	93	2,539	4,870	7,409
1934	17	98	115	2,060	7,082	9,142

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In addition a considerable amount of assistance is given to agricultural experimenters from overseas. Some send or bring their proposals for field experiments so as to ensure good design, others bring their accumulated data for help in extracting all the valid information they can be made to yield. There is a growing demand for this kind of help and it is hoped that permanent provision may be made for it.

As special pieces of work during the year Mr. Yates has studied the applicability of the χ^2 test to contingency tables, especially 2 x 2 tables, involving small numbers, while he and Mr. Cochran both devoted considerable time to the study of the Woburn data. This Report is now complete and is being prepared for the press.

THE CONTRIBUTION OF ROTHAMSTED TO SOIL PHYSICS

B. A. Keen

Until 1913 no systematic work on the physical properties of soil had been done at Rothamsted or indeed in Great Britain. The investigations were suspended during the War and resumed in 1919. Most of the publications of the Physical Department fall conveniently into a few groups, and these have been utilised, rather than a chronological order of papers, in the short account that follows. A full discussion will be found in the Rothamsted Monograph entitled " The Physical Properties of the Soil."

Mechanical Analysis

The methods of mechanical analysis have been developed in two main directions : existing methods based on the separation into a few groups or fractions have been improved both in simplicity and accuracy ; and much attention has been paid to the elegant procedure, first evolved by Odén in Sweden, by which a particle size distribution curve is obtained.

In Great Britain a co-operative investigation was organised from Rothamsted to test the suitability of two important improvements devised by Robinson of Bangor, Wales : pre-treatment of the sample with hydrogen peroxide to remove organic matter, and the substitution of pipette sampling for separation by sedimentation. Two reports(1) were issued, recommending for official adoption in Great Britain the use of hydrogen peroxide in the pre-treatment of the sample, and the employment of the pipette for determining the percentage of the silt and clay fractions. The new method was subsequently adopted, with a minor modification, as the Official Method A, of the International Society of Soil Science. Thus, the International and British methods of mechanical analysis are identical, except for one minor difference. In changing their method, British workers were faced with many difficulties in preserving continuity with the extensive results accumulated by the older methods ; but the international character of soil science, and the ultimate advantages of a generally accepted universal method, were

(1) A Sub-Committee of the Agricultural Education Association—" The Mechanical Analysis of Soils : a Report on the Present Position, and Recommendations for a New Official Method." J. Agric. Sci., 1926, Vol. XVI, pp. 123-144 ; " The Revised Official British Method for Mechanical Analysis." J. Agric. Sci., 1928, Vol. XVIII, pp. 734-739. See also " The Official Method for the Mechanical Analysis of Soils Adopted by the Agricultural Education Association in 1925." Agric. Progress, 1926, Vol. III, pp. 106-110 ; and " Revised Official Method for the Mechanical Analysis of Soils Adopted by the Agricultural Education Association in 1927." Agric. Progress, 1928, Vol. V. pp. 137-144.