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ROTHAMSTED  
RESEARCH

## Report for 1934

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## Lucerne

### Rothamsted Research

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### GRASSLAND INVESTIGATIONS

The additional land purchased with the farm includes some 80 acres of grassland not hitherto in our occupation: it is very well suited to experiment, and schemes will be worked out in due course.

*Basic Slag Investigations.* The work on basic slag conducted under the aegis of the Basic Slag Committee of the Ministry of Agriculture was greatly extended in 1934, by the inclusion of experiments to test the new medium soluble slags produced by the steel manufacturers. These slags are not necessarily mixtures of high and low soluble slag: some of them contain new compounds recognisable by their crystals.

During 1934, a series of trials was conducted on swedes in Scotland by local workers in conjunction with Prof. McArthur and Rothamsted. In these experiments low soluble slags gave much better results than had been obtained in the earlier grassland experiments in England, but in all cases the effectiveness of the slag increased regularly with increasing solubility by the citric acid test. Medium soluble slags were intermediate between high and low soluble slags, but the experiments must continue for some years before their value can be properly assessed.

### OTHER FODDER CROPS

The quality of green fodder crops has been for some time under preliminary investigation and now that the barley investigations have been transferred it will be further studied. The chemical work is being done by Dr. Norman and is based on the fact that a green fodder plant passes through two stages in its life history: in the first stage it is assimilating nitrogen and mineral matter from the soil and is consequently rich in protein equivalent and minerals: in the second stage it is elaborating carbohydrates, sugar, starch, cellulose, lignin, etc., and is consequently rich in starch equivalent and fibre. The work promises important practical application in several directions, including animal nutrition. Studies of "crude fibre" have shown its relation to the cell wall constituents. It is recognised, however, that chemical investigations alone will not satisfactorily deal with quality of fodder crops, since biochemistry is not yet sufficiently advanced to give complete indications of the feeding quality of the various crops; methods have therefore been developed for using pigs for this purpose, adopting weight, grade and bacon factory reports as the criteria. The work is now reaching a stage where plant nutrition begins to approach animal nutrition, and it will shortly be necessary to invite the co-operation of investigators in animal nutrition.

### LUCERNE

Prof. Southworth has continued his efforts to isolate strains of lucerne having a higher seed-yielding capacity than the named varieties at present in commercial use.

The season of 1934 being exceptionally sunny and warm the conditions were again favourable for the production of lucerne seed.

The following table shows the average seed yield at Woburn from the six family selections A.B.C.D.E.F. and the numbers of individual plants tested in each family group for the seasons 1933-34.

Family selection group.	Numbers of plants harvested.		Average weight of seed produced from each family.		Average for two years.
	1933.	1934.	1933.	1934.	
A. Provence	9	17	18.09	22.90	20.49
B. 33-185	15	15	18.40	21.71	20.05
C. 32-50	2	5	29.70	27.92	28.81
D. 32-33	16	24	26.86	21.52	24.19
E. 13-1	10	14	26.81	28.50	27.65
F. 24-26	12	13	11.74	10.68	11.21

A. Provence from commercial seed. B, C, D, E, F, progeny of hybrid selections.

*Maize and Soya Beans at Woburn.* Certain Manitoba varieties grew and ripened successfully, producing good well-matured seed. These experiments are to be extended.

#### PLANT PATHOLOGY DEPARTMENT MYCOLOGY

Mr. G. Samuel, the successor to Dr. Stoughton, began his work at Rothamsted by making a survey of the fungus diseases situation. He has shown that a kind of antagonism exists between certain groups of soil fungi so that one cannot develop when the other is present. This suggests possibilities of controlling pathogenic soil fungi that will be further studied. Meanwhile an interesting side line has been opened up: some of the actinomycetes picked out from the soil have the power of making fragrant perfumes. As the subject lies outside our purview it is being studied by a well-known manufacturer of scents and perfumes. This same expert found among the by-products of the milk effluent investigations a substance which we had been seeking to destroy but which he regards as of considerable potential value as a means of enhancing scents. Truly it is impossible for anyone to know where a scientific investigation may lead.

#### VIRUS DISEASES

When the Imperial Agricultural Conference of 1927 recommended that a central station should be set up at Rothamsted for research on virus diseases, it was recognised that their control would best be achieved by a study of the viruses themselves. It was realised that if the pathogenic viruses were living entities their mode of life must be something different from that of a bacterium or fungus, and no satisfactory treatment could be devised without an adequate understanding of their nature and the conditions of their activity. The work at Rothamsted accordingly was designed by Dr. Henderson Smith and the staff of his department for more general study of viruses rather than the specialised investigation of the individual disease and the individual crop, and the research now in progress continues to bear this character. Particular diseases are studied in detail from time to time as occasion demands, *e.g.*, the aucuba disease of the tomato, the virus diseases of *Hyoscyamus*, but always with the object of furthering the more general research.

The precise nature of a virus is still uncertain, and the work continues to probe deeper into this question. It has been shown that the virus is almost certainly particulate, and not diffused throughout the liquids in which it is found, that it is of a definite size which remains the same, independent of the host from which it is taken, and