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Report for 1935

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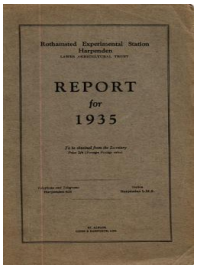

Soil Cultivation

Rothamsted Research

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cal spraying methods are also being tried, and a series of experiments has been started, with quite interesting results so far, on the possibility of removing weeds from grassland by spraying.

SOIL CULTIVATION

The cultivation experiments have continued, and an extensive series of observations on rotary cultivation is being worked up.

Soil tilth has been studied from the field side in Dr. Keen's cultivation experiments and from the laboratory side by him and his assistants, Mr. Scott Blair, Mr. Cashen and Dr. E. W. Russell. The essential point is to bring the soil into an aggregation of crumbs and to prevent it falling into a state of dust. The actual changes depend on the drying and re-wetting of the soil and are brought about largely by the weather, but the implements play a vital part in putting the soil into such form that the weather can act. The field experiments have shown some of the differences between rotary cultivation and the older methods. They are now being extended to show how the soil moisture is affected by the various cultivation processes : this work is difficult because the Rothamsted soil, by its stony nature, is not readily sampled, and no method of estimating the moisture content *in situ* is yet free from objection.

The laboratory work has now reached a stage where the numerous facts are falling into order. An important test of value of any new development is the extent to which it can be used. These physical investigations have already proved of value to experts concerned with such diverse industries as flour milling and oil boring apart from their use in agriculture.

MINOR ELEMENTS IN PLANT NUTRITION

In 1923 Miss Warington proved definitely for the first time that a minute quantity of boron is essential for plant growth, and this result has already found applications in practice. Various crop diseases previously incurable have now been traced to a lack of available boron ; notably a heart rot in sugar beet and " Internal cork " in apples in New Zealand, " Top rot " of tobacco, and diseases of potatoes, turnips, tomatoes and other crops. These diseases may occur even when compounds of boron occur in the soil, but presumably the boron is unavailable, because they are cured by addition of a small quantity of borax. The subject is being further developed and several field experiments on sugar beet have been started in affected areas in consultation with us.

It is known that oats suffer from shortage of manganese on certain soil types, and the factors controlling the availability of the manganese in soils are being studied.

Small amounts of molybdenum salts are also shown to affect plant growth considerably, causing, in some cases, simulation of