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Report for 1929

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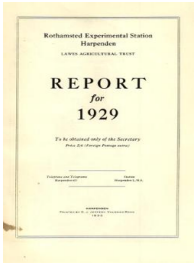
Rothamsted Experimental Station
Harpenden

REPORT
for
1929

Soil Cultivation

Rothamsted Research

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There is now no justification for pollution of rivers by sugar beet factories: they can either set up a purification plant or they can obviate the difficulty by using their water over and over again, as is already done by some processes.

Two detailed reports on this work have been presented to the Water Pollution Research Board of the D.S.I.R., and these have been circulated, for official use only, as Papers No. 36 and 41, under dates 22.11.28 and 21.3.29, respectively. A brief account of the investigation, supplied by the Department, was published in "The Times" of the 28th October, 1929.

SOIL CULTIVATION.

The investigations on soil cultivation are carried out by the staff of the Soil Physics Department. Their underlying purpose is to reduce the art of cultivation to a science, just as the chemists and plant physiologists of the period 1800 to 1840 reduced the old art of manuring to a science and so paved the way for the introduction of artificial fertilisers as the result of the early Rothamsted experiments.

The work is developing in three directions: the effect of cultivation on the soil, the physical properties of the soil, and new methods of cultivation, are all under investigation.

Methods have been devised for estimating the degree of breaking up of the soil, *i.e.*, its comminution, also for estimating the surface. The effect of ploughing in breaking up the soil and increasing its surface is shown by the following results:—

	RELATIVE SURFACE OF SOIL.		
	Before Cultivation	After Ordinary Ploughing	After Rotary Cultivation
(*a*) Soil compact	320	475	530
(*b*) Soil looser ...	440	420	—
Relative sizes of soil particles in (*a*): Percentage distribution.			
Large	60	45	30
Medium ...	33	40	55
Small	7	13	13

Dynamometer measurements are taken of the amount of work done in cultivating the soil, and the records are studied in relation to the physical properties involved. The figures are closely related to the "static rigidity" of the soil, *i.e.*, the energy needed to set flowing a paste made up from the soil. This has led to some interesting developments in the study of the plasticity of the soil, and in order to forward the work the Rockefeller Foundation gave Mr. Scott Blair a Fellowship, enabling him to spend a year in the United States working with Prof. Bancroft, who is studying cognate problems in the Cornell Laboratories.

The experiments on rotary cultivation were continued to see whether it gave as good a seed-bed as the ordinary processes for barley after roots. It proved to be equally effective; indeed, for germination and initial growth it was better, and, of course, it was quicker and cheaper, as it made the seed-bed complete in one operation. This result we have had in the preceding trials, excepting where rotary cultivation caused a "cap" to form on the soil, and then its effect was not so good. It seems probable, however, that this tendency can be overcome.