to the period from April 25, 1952 (when differential watering commenced), to October 4, 1952.

Since the level of watering was the main variable environmental factor under the conditions of this experiment, the results suggest that there was a strong correlation between the type of water-regime under which the plants were grown and the yield of ripe fruit produced, the wetter treatments tending to produce the higher yields. Other observations point to a similar positive correlation between the vigour of vegetative growth and the level of water applied. The distribution of roots in the soil was also affected by the water-regimes, the zone of greatest root development becoming progressively deeper in the drier treatments.

The results are of great interest when compared with those of other workers in this field. Martin[1] (working with *Helianthus annuus*), Heck[2] (working in Hawaii on sugar cane) and others have found that vegetative growth is retarded as moisture tensions rise, which is in accord with our own results on tomatoes. On the other hand, Singh and Joon, in India[3], and Molenaar and Vincent, in Washington[4], have shown that excessive application of water to tomatoes (growing out-of-doors) may reduce the yield of fruit. There may thus be an optimum moisture regime, in the region of field capacity, for the growth of tomatoes under glass.

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Use of the Warburg Respirometer to study Microbial Activity in Soils

THE respiratory activity of the micro-organisms in samples of soil, determined by estimating the evolution of carbon dioxide, has long been considered by soil microbiologists to be related to soil fertility[1,2]. Lees has recently described a modified Haldane respirometer for measuring oxygen uptake as the criterion for that activity[3]. Along somewhat similar lines, our own studies suggest that the Warburg constant-volume respirometer may prove a valuable tool with which to examine the activities of soil organisms in the breakdown of soil organic matter, or to determine the effect of various treatments in modifying the behaviour of soil organisms.

We have noted that, when air-dried soil is placed in Warburg vessels and moistened to 30–90 per cent of saturation, the daily rates of oxygen uptake may be related to time by the equation :

$$Y = F'/t^{m'},$$

where Y represents oxygen uptake expressed in μl. per gm. of soil per hr., F' and m' are constants, and t is time in days. This equation is derived from earlier forms reported by other workers[4,5]. F' and m' are derived by converting the equation to its logarithmic form :

$$\log Y = \log F' - m' \log t.$$

When $\log Y$ is plotted against $\log t$, a close fit to a straight line has, as a rule, been obtained for periods of two to three weeks ; and it appears that observations taken for five or six days (the result for the first day usually being omitted) establish the line reasonably well. We are of the opinion that the Warburg method, combined either with graphs or regression-line values, makes possible a considerable reduction in the time required for determining respiratory activity in a soil.

By these procedures it was found that two soils, differing widely in their organic content (one being a 'muck' and the other a loam), gave m' values which did not differ significantly, though their F' values were quite distinct. Lees's results from an experiment with a tropical soil[3] yielded a regression line having a value of m' similar to those obtained from our own soils, but a value of F' much higher than any we have found.

Results of experiments using agents (disinfectants and heat) detrimental to the soil organisms suggest that our method may prove useful in determining the degree and duration of the interference of such agents with the biological equilibrium, since such treatments cause a marked deviation from the normal straight line ; the latter reappears if and when adaptation to the treatment occurs.

A hypothesis seeking to explain the peculiar log rate – log time linear function is proposed. It is based upon the premise that the energy-yielding components of soil organic matter may be composed of two fractions, one being readily decomposable and the other less readily decomposable, and that the breakdown of each portion proceeds simultaneously according to first-order reaction rates. It is suggested that the apparent log rate – log time function arises because two superimposed first-order reaction rates tend to dominate the processes of decomposition. A more detailed account of our results is planned for a later paper.

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Influence of the Blood Glucose-Level on the Secretion of Adrenalin and Noradrenalin from the Suprarenal Medulla

CONSIDERABLE evidence has accumulated to show that hypoglycæmia, for example after insulin, leads to an increased liberation of adrenalin from the suprarenal medulla[1]. This effect may be regarded as a regulating mechanism for the blood sugar homœostasis.

In order to study this possible mechanism, the secretion of adrenalin and noradrenalin has been