



Of 146 pregnancy and premarital bloods of groups *O* and *A*, 77.4 per cent (113) were agglutinated by *McGi*. Allen *et al.*<sup>1</sup> reported the antigen  $Jk^a$  to be "present in the red cells of about 77 per cent of Americans".

Our serum reacts both at room temperature and at 37° C., but better at the latter, by both the capillary method and the test-tube method for saline antibodies.

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<sup>1</sup> Allen, F. H., Diamond, I. K., and Niedziela, B., *Nature*, 167, 482 (1951).

### Temperature Characteristics of the Microflora of Central African Soils

THE importance of a knowledge of the effect of temperature on the metabolic activities of the soil microflora can scarcely be questioned, especially in the case of tropical soils. Furthermore, the temperature characteristic of the metabolic activities calculated by the Arrhenius's law:

$$V = \exp(-\mu/RT),$$

where  $V$  is the rate of the process,  $R$  the gas constant and  $T$  the absolute temperature, may be considered as the activation energy of the slowest or 'pacemaking' process in the chain of enzymatic mechanisms<sup>1</sup>. In this case it would be possible to use this method as a kinetic analysis of the slowest enzymatic processes in the metabolism of the soil microflora.

The experimental results presented here report our preliminary findings regarding the order of magnitude of the activation energy calculated from the rate of oxygen uptake at different temperatures. The measurements of oxygen uptake were always made on soils immediately after they had been brought to the laboratory, that is, less than three hours after sampling. Sampling was carried out with a cylindrical soil auger to the depth of 10 cm. About twenty samples were mixed in the field and the composite sample was brought to the laboratory.

The rate of oxygen uptake at temperatures between 28° and 38° was determined on 50-gm. portions of soil (passing a 4-mm. sieve and retained by 1-mm.) with the differential manometer as modified by Lees<sup>2</sup>. Triplicate determinations were made for each temperature. The rate of oxygen uptake of soils recently taken from the field was reasonably constant during the first 30 hr. We have used this value as a measure of the metabolic activity of soil microflora.

TEMPERATURE CHARACTERISTICS AND RATE OF OXYGEN UPTAKE OF CENTRAL AFRICAN SOILS

Soil No.	Oxygen uptake ( $\mu$ l. per hr. per gm. of soil at 28° C.)	Temperature characteristic ( $\mu$ ) cal.
1	5.0	7,500
2	4.0	10,000
3	3.2	7,500
4	2.7	7,000
5	1.1	16,000
6	0.6	16,000

(1) Forest soil under *Cynometra alexandri* Harms; (2) old rubber plantation; (3) forest soil from glade, under second growth; (4) old pasture of *Panicum maximum* and *Digitaria* (soil 1 to 4 on Yangambi reddish-yellow latosol); (5) colluvial sandy soil under young (5-7 years) second-growth forest; (6) the same, four months after felling and burning forest.

The accompanying table presents the observed values for the rate of oxygen uptake at 28° C. and temperature characteristics calculated from the rates at temperatures between 28° and 38° C. The order of magnitude of the values determined for these temperature characteristics agrees well with those given by Crozier for various biological reactions.

It will also be observed that  $\mu$  values for soil microflora are quite close to the corresponding figures in biological reactions, namely, 16,000, 11,000 and 8,000 cal.

It may be of interest to note that the very sandy soils studied here showed constantly a higher value of  $\mu$  than the less sandy soils in the same region. Together with other factors, a more pronounced influence of temperature on the microflora of sandy soils might explain the greater difficulty in maintaining the soil organic matter content in light-textured tropical soils.

Work is now in progress on the analysis of the 'pacemaking' process in the metabolic activities of the soil microflora through selective poisoning of characteristic enzymatic systems.

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<sup>1</sup> Crozier, W. J., *J. Gen. Physiol.*, 123, 136 (1924).

<sup>2</sup> Lees, H., *Plant and Soil*, 2, 123 (1949).

### Acid Tolerance in Plants

THE failure of certain plant species to thrive on acid soils has been ascribed to an intolerance of the acid conditions.

A number of tree species, such as ash and *Pinus halepensis*, which are usually associated in Nature with alkaline soils, have been the subject of experiments designed to throw light on this supposition. In one such experiment, carried out in pot cultures and in the field, seeds of these trees were sown in the acid soil of Wareham Heath and in this same soil to which compost had been added. The Wareham soil had a pH value of 4.4-5; the compost used had an acid reaction, and the pH value of the soil remained virtually unaltered after addition of the compost. The resulting growth in the untreated Wareham soil was extremely poor, whereas in the composted soil it was excellent, notwithstanding that the reaction of the rooting medium was but little more than pH 4.

The behaviour of a number of agricultural crop plants was also studied, for example, red clover,