

Reprinted from "Current Science," Vol. II, No. 8, February 1934, page 296.

**Organic Manures and Soil Structure.**

By A. Sreenivasan and V. Subrahmanyam.

### Organic Manures and Soil Structure.

THE beneficial effect of organic manures in improving the tilth and increasing the absorptive and water-holding capacities of soils has long been known. Their utility as sources of plant and microbial food has been recognised and, more recently, evidence has also been adduced to show that they supply a part of the carbon-dioxide assimilated by the plant.<sup>1</sup> No information is available, however, regarding the effect of their decomposition on the ultimate mechanical composition of soils: indeed, they are not supposed to have any effect at all.

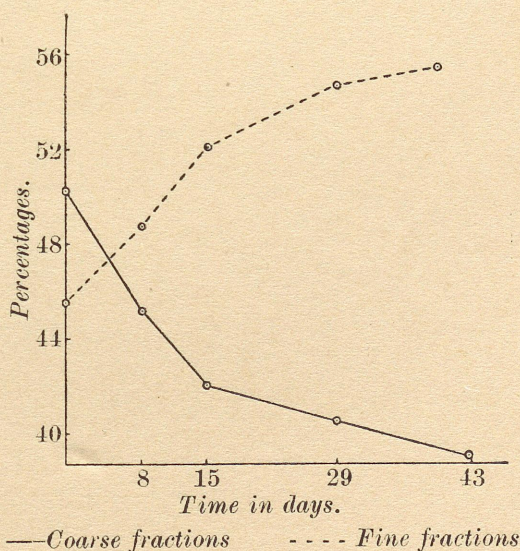
In the course of an investigation on nitrogen transformations in swamp soils, it was observed that soils treated with organic manures tended to become increasingly heavy with the progress of the decomposition. This observation, combined with a few others, such as increased difficulty in 'dry' digesting such specimens for estimation of nitrogen, suggested that the treatments had brought about some permanent change in the physical texture of such soils.

With a view to obtaining some quantitative evidence regarding the nature and extent of such transformations, specimens (40 lbs.) of a local soil (red loam) were made up, in the usual way, in glazed earthenware pots and treated as follows:—(a) unmanured and maintained at 60 per cent. saturation with regard to water; (b) green manured with the leaves of *Pongamia glabra* at 100 g. per pot and maintained at 60 per cent. saturation; (c) unmanured and swamped to a depth of 3 inches; and (d) green manured as in (b) and swamped as in (c). At convenient intervals the contents of the pots were removed in three-inch layers and their mechanical composition determined according to the International Method after destroying organic matter by treatment with hydrogen peroxide.

The results showed that in none of the cases was there any perceptible effect on the composition of the soil below the first three

inches. The surface layers of the unmanured specimens were not also appreciably altered. On the other hand, the green manured soils showed a significant change with the decomposition of the organic matter. This was particularly so in the case of the water-logged specimens in the first three inches of which the coarse fractions (coarse and fine sand) showed a distinct fall while the fine ones (silt and clay) showed a corresponding rise.

The mechanism of the above change is still not fully understood. There is evidence, however, to suggest that the formation of organic acids and the attendant solubilisation of minerals, particularly silica, is, in some way, connected with the increase observed in the case of the finer fraction.



Further work is in progress to throw more light on the above and related phenomena.

A. SREENIVASAN.

V. SUBRAHMANYAN.

Department of Biochemistry,  
Indian Institute of Science,  
Bangalore,

February 6, 1934.

<sup>1</sup> *Nature*, 132, 1001, 1933.

