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THE ORGANIC MATTER OF THE SOIL.

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THE various classes of material which go to make up a fertile soil may be broadly classified into five groups, according to the origin of each.

First there is the rock-derived mineral matter, wholly lifeless, but capable of change in composition, character, and appearance — compound reacting with compound, or with the soil-water, or with the substances dissolved in it. Second are the important salts of calcium, mostly derived from pre-existing life—the carbonates and phosphates of lime, as they are commonly called. Third is the soil-water or soil-solution, containing, in addition to a certain amount of carbonic-acid gas, small amounts of other soil-constituents. Fourth is the soil-air, about which so much remains to be learnt. Fifth, and most important, is that portion of the soil which will burn away when ignited, known as "organic matter," derived from the remains of plants and animals dying in or on the soil, forming ultimately a black spongy mass, the culture medium for nourishing that portion of the soil-life which lives wholly below the surface.

This organic matter, or, as it is often broadly termed, humus, is the portion which gives character to the soil, and when present in sufficient quantity obliterates all other distinctions. For instance, both sandy and clay soils when altered by the growth of organic matter lose their characteristic features, both loose porous and very dense impermeable soils, when mixed with organic matter, becoming altogether changed in texture. Thus on the Manawatu dune-sands, where the topography will not permit the escape of the copious surface water, aquatic and semi-aquatic vegetable growth develops, organic matter accumulates, and finally, in an area surrounded by sandhills and resting upon sand, occurs an area which when drained and "brought in" presents none of the difficulties of treatment which the sand (with which it may be still largely admixed) originally exhibited.

A good supply of organic matter darkens the colour of the soil, thereby causing the absorption of more sun's rays than is possible in a lighter-coloured soil. This effect in rise of temperature is appreciable, and may be measured by means of a thermometer. Organic matter can withdraw from the soil-solution various plant-foods. It causes the soil to swell up, thereby increasing its pore-space and