

other color of the rock beneath.⁶⁶ This contrast, evidently due to oxidation and hydration, especially of the iron, extends downward as far as the subsoil is opened up by

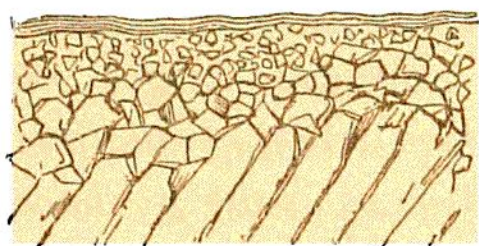


Fig. 100.—Section showing the upward passage of Rock (a) into Subsoil (b), and thence into Vegetable Soil (c).

rootlets and fibres to the ready descent of rain-water. The yellowing of the subsoil may even occasionally be noticed around some stray rootlet which has struck down further than the rest, below the general lower limit of the soil (*postea*, p. 793).

Mr. Darwin observed many years ago that a layer of soil, three inches in depth, had grown above a layer of burnt marl spread over the land fifteen years previously; also that in another example, a similar layer had, as it were, sunk beneath the soil, to a depth of twelve or thirteen inches in eighty years. He connected these facts with the work of the common earth-worm, and concluded that the fine loam which had grown above these original superficial layers had been carried up to the surface, and had been voided there in the familiar form of worm-castings.⁶⁷ This action of the earth-worm is doubtless highly important, but, as Richthofen has pointed out, we have to take also into account the gradual augmentation of level due to the daily deposit of dust (*ante*, p. 564, and *postea*, p. 794).

Soil being composed mainly of inorganic, and to a slight extent of organic materials, the proportion between these two elements is a question of high economic impor-

⁶⁶ Deceptive appearances of a break between the soil or subsoil and what lies beneath are sometimes produced by this means. See W. Whitaker, *Q. J. Geol. Soc.* xxxiii. p. 122. E. Van den Broeck, *Mem. Couronn. Acad. Brussels*, 1881.

⁶⁷ *Geol. Trans.* v. 1840, p. 505; and his more recent researches in his volume on "Vegetable Mould." See also C. Reid, *Geol. Mag.* 1884, p. 165.