Earth-Worms.

"Vegetable Mold and Earth-Worms," by Charles Darwin, is not, as the title would imply, a book for specialists alone. It is written in the great naturalist's clear style, and is extraordinary as an evidence of his patience in research and experiment. His studies on this subject were begun as early as 1837, when he read a paper on the formation of mold be ore the Geological Society in London, and in this book he mentions incidentally that in one o. his experiments he spread a layer of chalk over a patch in a field in 1842, and waited until 1871 to learn the result. The early chapters are given up to a description of the habits of earth-worms and contain many curious facts. Worms kept in the dark, from habit still come out in the night and withdraw into their burrows during the day. Though they are entirely deaf, they are extremely sensitive to vibrations of the earth in which their burrows are made. This was proved by putting two pots of earth with worm-burrows in them on a piano. Single notes struck in either base or treble sent the animals into their holes forthwith. The worms kept in confinement found out little bits of food buried near the mouths of their burrows apparently by means of a sense of smell. They like raw fat better than anything else to eat, and next to that onion. They swallow earth in enormous quantities in digging their holes, coming to the surface tail first to eject it in the well-known heaps called castings. They also swallow it as food and extract the digestible matter from it. They seize objects either by taking hold of them between their upper and under lips or at their edges, or by using their mouths as suckers. One o the most curious of their habits is that of protecting the entries of their burrows. They often pile little heaps of stones over these. Their strength is extraordinary, for one stone dragged over a gravel walk to the mouth of a burrow weighed two ounces.

The concluding chapters are devoted to the influence of worms in changing the earth's surface, and will be found very interesting. Thus, what Mr. Darwin says of the gradual alteration of fields by the action of worms is novel to any one but a specialist or a farmer, and especially of the disappearance of stones and other objects from pasture land. He describes how a field of his, after being plowed in 1841, showed very scanty vegetation, and was thickly covered with small and large flints, some of them half the size of a child's head. The smaller stones disappeared soon, and after a time all the larger ones, till, when thirty years had elapsed, a horse could gallop over the compact turf "from one end of the field to another without striking a single stone with his shoes." This burying work, though contributed to slightly by ants and moles, is almost entirely performed by the worms: they swallow the earth below the stones and eject it again as castings above them. In the same way they have assisted largely in the preservation of the monuments of antiquity dug up by the modern archeologist. Worms are known to have the power to penetrate even tesselated pavements laid on concrete, and to bleep mold upon them, gradually and almost imperceptibly burying them from sight. They undermine old walls, and in a great variety of ways succeed in totally altering the face of a country. In fine, as the author concludes, "it may be doubted whether there are many other ani-

mals which have played so important a part in the history of the world as have these lowly organized creatures." (New York: D. Appleton & Co. For sale by James T. White & Co.)