

DARWIN ON EARTHWORMS.*

WE have already given an outline of the contents of the new book by Mr. Darwin. The fact that earthworms have much to do with the condition of the soil has been commented upon by numerous observers during the last fifty years. As early as 1837 Mr. Darwin read a paper on the "Formation of Mould" before the Geographical Society, and Mr. C. F. Morren published in 1829 his valuable observations and experiments on "Worms." Since then other writers have taken up the subject, notably Von Heusen, who published the result of his researches in 1877. It has been reserved to Mr. Darwin, however, to sum up the knowledge acquired in a singularly succinct form, and to add the account of his own painstaking researches for many years. Mr. Darwin's facilities are almost unique. In his efforts to discover the secrets of nature he has the pertinacity of a ferret. He has, in addition to ample means, four sons inheriting his tastes, and when at a loss for the verification of some statement, or for a fresh examination of evidence, "My son William" or "My son Horace" supplement very ably the labours of their sire. Ramblers on the South-downs must often have noticed the ledges turning along the slopes, and wondered how they originated. Mr. Darwin, coming to the conclusion that the ledges on hillsides are produced by the castings of earthworms arrested in their downward tendency by blades of grass or other growth, sends "My son Francis" to a chalk escarpment near Lewes, and from the careful report establishes the correctness of his theory. A long life of scientific observation, amounting to nearly or quite half a century, has enabled the veteran philosopher to watch the gradual formation of mould from the castings of earthworms, until it entirely covered a stone path in his garden, thus proving under his own eyes what worms can do. He has corresponded for a lifetime with observers of nature in all parts of the world. No wonder, then, that Mr. Darwin is enabled to unlock a treasure-house of knowledge on the action of earthworms which partakes of the character of a new revelation.

Earthworms are very considerable factors in the apparent "denudation" of the earth's continents. Before the earth is ultimately consumed by fire, if such is to be the final result, the sea will gradually encroach upon and engulf the vast alluvial plains now existing. Worms on slopes and hillsides are ceaselessly loosening the soil, causing it to slide into the valleys to be carried by rivers into the sea, until it is estimated that the peat valley of the Mississippi, for instance, will be level with the sea in the comparatively short time, geologically speaking, of 4,500,000 years. That is if (there is much virtue in an if) no elevation of the land takes place. But there are counteracting forces in nature. We owe to Mr. Darwin himself the discovery of the marvellous insects whose wonderful accretions are forming the coral islands of the Pacific. As far as recent discoveries carry us, and we are indebted to Mr. Darwin as the foremost leader in careful research, we are still very far from definite conclusions on the value of even the most likely theories of the world's history and future.

Whether intentionally or not, Mr. Darwin supplies new evidence of design in nature. For a million of years, to use his own suggestive calculation, that which we call vegetable mould has been passing through the bodies of earthworms. Not only has the earth been entirely ploughed up every few years, but concurrent with the ploughing has been the fertilising. The soil has been triturated in the gizzards of the tiny agriculturist and mixed with vegetable manure. If we could imagine a plough which turned up the soil and manured it in one operation, it would give a good idea of the action of earthworms. Worms serve the purpose of fertilising ploughs. They have pursued their avocations for ages without change of structure and without variation. They have not evolved into something else, and for aught we know have not been evolved out of a "fortuitous concourse of atoms." If there is any law gradually originating or changing species by "natural selection," or the "survival of the fittest," a million of years has seen no application of it in history of earthworms. The evident design of their structure and work is to make the surface of the earth fit for the growth of all things necessary to man and beast. Are we not driven to the conclusion that there must be an Intelligent Power behind all this?

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