

SATURDAY, DECEMBER 3, 1881.

REVIEW OF CURRENT ENGLISH LITERATURE.

I.

The formation of Fossils Borel through the action of Worms, with observations on their habits. By CHARLES DARWIN. (London: John Murray.)

Since the "Descent of Man," Mr. Darwin has hardly written a book of wider and more enduring interest than this. The subject, at the first blush, may appear uninteresting, but the feelings of the reader who entertains the idea will undergo a remarkable change before he has perused many pages of this interesting book. In felicity of diction and purity of style, Mr. Darwin has few rivals, and these purely literary qualities have been of the utmost service to him in making clear in two or three sentences abstract points of physiology and chemistry which the clearest-headed scientist would generally require pages to

elucidate. There is, however, nothing which can fairly be called abstract about the book, taken as a whole. Everything is made eminently clear, and the author goes to the point at once. No one who has read what Mr. Darwin has to say about worms can any longer entertain the prejudices which so many of us have felt with regard to these little creatures, for the worm has, from the commencement of the world, been the benefactor of human kind. He has been the ploughman who has turned over the soil, whose burrows have ariated the land, and whose castings have fertilized the vegetable world which forms the crust of our earth in all moderately humid countries. The story of his habits and of his life, as told in Mr. Darwin's pages, is instructive with interest, and proves the worms to be—if not fairly constructed—much more highly organized than has generally been supposed, even by men of science. Worms possess a certain amount of intelligence, and are endowed with the capacity of profiting by experience. We cannot follow Mr. Darwin into the account which he gives of the more than forty pairs of experiments which he has made into the habits and structure of earth worms, but the following may be quoted as a very admirable summary of the benefits for which we are indebted to them:—

"Worms prepare the ground in an excellent manner for growth of fibrous-rooted plants and for seedlings of all kinds. They periodically expose the mould to the air, and stir it so that no stones larger than the particles which they can swallow are left in it. They mingle fine whole fragments together, like a gardener who prepares fine soil for his choicest plants. In this state it is well fitted to retain moisture and to absorb all soluble substances, as well as for the process of fertilization. The bones of dead animals, the harder parts of insects, the shells of hard molluscs, horns, hoofs, &c., are broken up all buried beneath the accumulated castings of worms, and are thus brought in a more or less decayed state within reach of the roots of plants. Worms likewise drag an infinite number of dead leaves and other parts of plants into their bur-

rows, partly for the sake of plugging them up and partly to feed. The leaves which are dragged into the burrows at first, after being torn into fine fibres, slowly decay, and combined with the intestinal and urinary excretions, are commingled with much earth. This earth forms the dark coloured, rich loam which almost everywhere covers the surface of the land with a fairly well-defined layer or stratum. Von Sieben placed one worm in a vessel 18 inches in diameter, which was filled with sand, on which fallen leaves were strewn; and these were soon dragged into their burrows to a depth of 2 in. After about six weeks an almost uniform layer of sand, a centimetre (1 in.) in thickness, was converted into loam by having passed through the alimentary canal of these two worms. It is believed by some persons that worm-burrows, which often penetrate the ground almost perpendicularly to a depth of five or six feet, constantly act as drains; notwithstanding that the inside castings piled over the mouths of the burrows prevent or check the rainwater directly entering them. They allow the air to penetrate deeply into the ground. They also greatly facilitate the downward passage of roots of most plants; and thus a 21 be ascribed to the loam with which the burrows are lined. Many seeds owe their germination to having been covered by castings; and often, buried to a considerable depth beneath accumulated castings, in dormant, cold, or some future time, they are suddenly uncovered and germinate.

Here, too, are the reflections which naturally arise when we consider the part which worms have played in the fertilization of vegetable mould:

When we behold a wide, flat-covered region, we should remember that its smoothness, on which so much of its heavy deposits, is mainly due to all the inequalities having been slowly levelled by worms. It is a marvellous reflection that the whole of the superficial mould over any such region has passed and will again pass, every five years, through the bodies of worms. The plough is one of the most ancient and most valuable man's inventions; but long before he existed, the land was, in fact, regularly ploughed, and still continues to be thus ploughed by earth-worms. It may be doubted whether there are many other animals which have played an important part in the history of the world, or have done more highly organized work.

We hope these brief extracts from a very charming and very readable book will have the effect of sending out readers to Mr. Darwin's pages for themselves. Certainly they could not have a better contribution to the literature of popular science.