

EARTH WORMS AS PULVERISERS OF THE SOIL.

Mr Darwin, the great philosopher, in his last contribution to natural science, devotes himself to an inquiry into the habits and uses of earth worms, and supplies us with a wonderful fund of interesting information respecting these hitherto despised creatures. To the ordinary farmer their presence in the soil was simply looked upon as an evidence of fertility. To the gardener they are sometimes an annoyance, disfiguring his gravelled walks, or depositing their casts among the velvet grass of his lawn, making holes in the borders, or, worse than all, establishing themselves in his flowerpots. None of us have looked upon worms as of any great consequence, much less have they been regarded by the farmer and gardener as essential to their daily work, and capable of not only modifying the condition of the soil, but even an agent in bringing a large share of the earth's surface to its present configuration. It will naturally be asked "Why have we not sooner discovered that earthworms played so important a part in the economy of Nature?" The answer is, that no Darwin has before shown us how to use our eyes in this direction. This wonderful naturalist took up the commonest things, and when we look at them by the aid of his eyes, we wonder why no one else ever saw them before. He shows us the end of a bean vine, or the tendril of a grape vine, and we see the most remarkable movements, which those plants have been making, unobserved, for centuries. So when he calls our attention to the worms, which bring up their pellets of earth from below, we at once see that this work cannot have gone on for centuries upon centuries without producing results, and this creature from being "nothing but a worm" becomes at once an important farm and garden laborer.

Not the least interesting chapters are those devoted to the structure and habits of worms. These give experiments which show that worms are sparingly supplied with senses. They have no eyes or ears and cannot smell, but their sense of feeling is wonderfully acute. Being without legs, they

move by means of small bristles upon a portion of the many rings of the body. Though of such simple organisation, worms

have a share of intelligence, as shown by their seizing a leaf by that portion which will best allow it to be dragged into the hole. The mouth is a mere slit, with a projecting lip, by which it takes hold of objects. Worms live upon a great variety of food, vegetable and animal, including dead worms; they swallow earth for the sake of the nutriment it contains. They burrow from three to eight feet, though the worms remain near the surface, except in very dry or very cold weather. The amount of earth brought up from a single burrow after drying weighs from less than an ounce to over four ounces. A square yard of earth was measured, the castings from this, when collected and dried, weighed three and a-half pounds—equal to seven and a-half tons per acre per annum! In other cases, fifteen to eighteen tons of earth per acre have been estimated, and this, if scattered equally over an acre—as it may be by rains and wind—would form a uniform coating of a little over two inches in the course of ten years. The examples cited of this increase of soil are numerous and full of interest, showing how the depth of vegetable mould is increased; fields where the stones almost touched one another, became so covered with soil in thirty years by the agency of worms that no stones were visible. As to the service to the farmer and gardener, Darwin says:—"Worms prepare the ground in an excellent manner for the growth of fibrous-rooted plants and for seedlings of all kinds. They periodically expose the mould to the air, and sift it so that no stones larger than the particles which they can swallow are left in it. They mingle the whole intimately 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 nitrification. The bones of dead animals, the harder parts of insects, and the shells of land molluscs, leaves, twigs, &c., are, before long, all buried beneath the numerous 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 burrows, partly for the sake of plugging them up, and partly as food." We might give many other extracts, did our space permit, from this highly interesting and instructive work, which concludes as follows:—"When we behold a wide, turf covered expanse, we should remember that its smoothness, on which so much of its beauty depends, 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 expanse has passed, and will again pass, every few years, through the body of worms. The plough is one of the most ancient and most valuable of 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 so important a part in the history of the world as have these lowly organised creatures."

This work, "The Formation of Vegetable Mould Through the Action of Worms, with Observations on their Habits," by Charles Darwin, F.L.S., will well repay the time spent in its perusal, especially by those who live in the country, as showing them how every-day facts, apparently of little importance in themselves, if carefully noted and recorded, may lead, as in this case, to most interesting results.