

paper was ridiculed by several distinguished French naturalists, but he has now proved conclusively "that all the vegetable mould over the whole country has passed many times through the intestinal canals of worms." In this book he first gives an account of the habits of these lowly animals. They require a certain amount of moisture for their existence. They crawl about chiefly at night. They can neither hear nor see, though they are not altogether insensible to light; but they possess the sense of taste and smell to a certain extent, and their sense of touch is strongly developed. Their food consists of leaves and any digestible matter contained in earth, of which they swallow an extraordinary quantity. They have a certain amount of reason as well as instinct, as evidenced by the way in which they draw leaves into their burrows. These leaves they use not only as food, but for the purpose of plugging up the mouths of their burrows; and they almost always draw them in by their narrow ends. These burrows are made partly by pushing the earth aside, but principally by swallowing it, extracting the digestible matter, and then ejecting it from the intestinal canal in the form of so-called "castings;" and it is in this way that they act in modifying the surface of the earth. Mr. Darwin, with the help of his sons, made a series of experiments to determine whether or not these creatures were capable of performing the immense amount of work he was inclined to attribute to them; and he found by weighing the castings thrown up within a certain time in a measured space, and making the necessary calculations, that "in many parts of England a weight of more than ten tons of dry earth annually passes through the bodies of worms, and is brought to the surface on each acre of land; so that the whole

superficial bed of vegetable mould passes through their bodies in the course of every few years." And he calculates that in Great Britain alone no less than 320,000,000 tons of earth is annually brought up to the surface of the ground by worms. We see, then, what an important part they must play in the burial of various objects, such as stones, buildings, monuments, etc., and especially what great assistance they must give to other geological agents in the denudation of land. They also perform a very useful work in preparing the ground for cultivation and rendering it fertile. Mr. Darwin concludes the book with the following striking passage: "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 bodies 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 earthworms. It may be doubted whether there are many other animals which have played so important a part in the history of the world as these lowly organized creatures. Some other animals, however, still more lowly organized—namely corals, have constructed innumerable reefs and islands in the great oceans; but these are almost confined to the tropical zones." So ends this author's last work; and it is no unworthy culmination of the labours of a most remarkable scientific career.

In this sketch I have made numerous quotations from his writings, because I believe that the best con-