

In this book Mr. Darwin gives another proof of his wonderful faculty of observation, and of his marvellous power of bringing together facts which most persons would fail to see had any connection with one another, and arranging them before his readers in a manner that must convince them of the correctness of his conclusions. Hitherto very few persons have had even the slightest idea of the very important part which earth-worms play in the economy of nature; they have generally been looked upon as creatures the object of whose existence, beyond affording food for blackbirds and thrushes, is very doubtful, and whose presence otherwise in gardens is decidedly objectionable. Anyone who may read this account of Mr. Darwin's most instructive observations on these animals (and every agriculturist and horticulturist should do so) will be surprised to learn the prominent part which these despised creatures take in the formation of so-called vegetable mould, in the preservation of antiquities, and positively in altering the form of the surface of the earth; these facts are all the more surprising when we consider how comparatively low in the scale of animal life the earth-worms are, and how destitute they are of the organs and sense with which the higher animals are furnished.

Worms, as is well known, have no limbs, and eyes and ears are also wanting; it appears, however, that they are not insensible to light, and are probably able to distinguish night from day; they have no organs of hearing, and are perfectly deaf; their sense of smell seems very limited, and as an acute sense of smell would be of no use to them, it seems confined to the odours of substances which may be of service to them as food. They have the sense of touch, however, strongly developed, and are keenly alive to a current of air and to any vibrations in the soil. Mr. Darwin placed pots of earth containing worms on a piano, and at night when the worms were on the surface of the earth if even such a high note as G above the line in the treble clef was struck, the vibrations caused the worms to disappear instantly, though they had taken no notice of the sound of the piano when not in contact with it. They are probably not insensible to variations in temperature. The mouth of a worm is a small aperture

devoid of jaws or teeth, but is provided with a small, projecting lip, with which it can lay hold of its food, &c. Their food consists of leaves, which they drag into their holes, and any nutritious matter which may be contained in the earth they swallow; they make their burrows, which are sometimes between 5ft. and 6ft. deep, partly by pushing away the earth on all sides and partly by swallowing it, passing it through their bodies and depositing it on the surface; the worm-casts found on lawns, &c., are the result of this action. Von Hensen estimates that 53,767 worms exist in an acre of garden ground, and Mr. Darwin assumes that half that number (26,883) per acre may be found in ordinary grass and arable land, and by his figures shows that each worm annually ejects 20oz. or 1½lb. weight of earth.

The quantity of earth annually brought to the surface in this manner by worms is truly marvellous. Mr. Darwin estimates that on land which is suitable for worms to inhabit, "a weight of ten tons of dry earth annually passes through their bodies, and is deposited on the surface of each acre of land, so that the whole superficial bed of vegetable mould passes through their bodies in the course of a very few years." The observations on which this estimate is based are fully detailed, and will be read with great interest. It appears that worms often leave their burrows and form fresh ones; the old holes collapse, and the surface of the ground gradually sinks, but is also being constantly raised by fresh castings, consequently any substance lying on the surface gradually sinks and is covered by the soil thrown up by the worms. In this way chalk and cinders which were known to have been spread over the surface of pasture land at a certain time have been found many years afterwards some inches below the surface. A field near Mr. Darwin's house at Down, in Kent, was "left to become pasture land; it was so thickly covered with large and small flints, that it was always called by my sons the stony field, and when they ran down the slope the stones clattered together. After thirty years a horse could gallop over the compact turf and not strike a single stone with his shoes." In the same way the remains of ancient buildings no doubt sink and become covered with soil.