

such a long time beneath water? We know that aquatic insects carry down a supply of air imprisoned by means of hairs beneath their elytra.

The muscular system is strongly developed. Worms can crawl backwards almost as well as forwards. When extended over the ground they can shoot back again beneath the surface with surprising quickness by the aid of their bristles and their tails which they flatten out to take firm hold of the walls of their burrows. The force required to dislodge them is great, and the only way to manage without breaking them in pieces is to copy the tactics of the blackbirds and thrushes, who take a firm hold and then keep up a steady pull until the worm lets go, which it will soon do, if the strain is kept up. This resistance is also greatly sustained by the setæ or bristles with which the body of the earthworm is provided, they run in four double rows, two lateral and two inferior, for the whole length of the worm's body. These setæ are doubtless of great assistance to worms and act in the same capacity as feet, they are shaped like the italic letter *f*. Dr. A. C. Stokes says at p. 128, "If, with a strong pocket lens, we look directly down upon the sides and ventral surface, there are visible, projecting from almost circular openings in the skin, and pointing backward, eight lines of glistening bristles, beginning at the very first segment, (considering the first segment to be the one immediately behind the two lips) and extending in unbroken order to the very last. These setæ are arranged in pairs forming four continuous rows, of four sets and eight bristles to every segment. In the central and terminal rings they are frequently accompanied by several aciculi, at times short, broad, and sharp, at others long and narrow. The worm has not only the power to project them from their proper openings, but to entirely withdraw them into the cavity of the body.

"Contained, as each seta appears to be, in a sheath, structureless and apparently identical in character with the skin, it is an object of interest, but when isolated it becomes a thing of beauty. The free end is roughened by friction against the earth, it is translucent, and its general outlines are of the most graceful form. I suppose when Hogarth drew his celebrated line of beauty, the thing most remote from his thoughts was an earthworm, but if he had prepared a line with the curves of all earthworm's bristle and named it the line of beauty, the difference between it and his original creation would have been slight. There is nothing new under the sun, the wise man said, the very line of beauty was hidden in an earthworm's skin when the great artist's pencil was making an unsuspected copy. These bristles, at every step, enable the worm to put into practical use one of the first principles of mechanics—that of the lever; for not only do they, by the aid of special muscles, hold the distance gained by muscular contraction, but also help by prying the body forward." There are two pairs beneath each segment and each one has an appropriate system of muscles attached to it. Dr. Williams states they are so sharp that if the polished surface of a deal board be examined with a microscope after a worm has crawled over it, there will be plainly discernable four series of minute perforations. In the act of burrowing, the anterior setæ are firmly placed in the ground, the head is then drawn back, and the strong pharynx, which is placed internally just behind the mouth, is pushed forward with great force; at the same time a new wave of muscular action starts from the tail and gradually travels towards the head, so that the whole muscular system is brought into play in making a burrow.

The body is divided into as many chambers as there are segments, by muscular partitions, which have openings to allow the fluid contents of the general cavity to pass from one chamber to another. By special preparation the body of a worm can be hardened so that a section may be cut from the middle, and if skilfully done, the sides will not collapse, nor will the disposition and shape of the internal organs be disarranged. If this is placed under the microscope, it will be seen first of all that the body is contained by a skin made up of two layers, through which protrude the four pairs of setæ. Outside is a thin and transparent chitinous cuticle, and inside this a much thicker gelatinous layer called the hypodermis. Internal to this lies a thick layer of circular muscles, the rings of which go quite round the body; inside of this layer we find a much thicker coat of muscular fibres of two sorts, but both running longitudinally, one kind composed of thin bands placed vertically to the circular row just mentioned, and the other of fibres running transversely to them. Inside this is the general body cavity, through the centre

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