

The author observes generally, respecting the Vermes of Linnæus, that the blood is conveyed by veins to the respiratory organs, and from thence by arteries to the heart, in which they differ from fishes; while they differ, on the other hand, from Mollusca in general, by having red blood.

The Sepia has been thought to have a circulation peculiar to itself; but the author remarks, that it bears a close resemblance to that of the Teredo, in having two auricles which transmit the blood received from the bronchiæ to the heart, but differs in this, that there are also two auricles that receive the venous blood, and transmit it to the respiratory organs.

*Observations on the Hirudo vulgaris. By James Rawlins Johnson, M.D. F.L.S. &c. Communicated by the Right Hon. Sir Joseph Banks, Bart. G.C.B. P.R.S. read November 14, 1816. [Phil. Trans. 1817, p. 13.]*

The animal here described under the name of *Hirudo vulgaris*, is the same that has been denominated by Linnæus and others, *Hirudo octoculata*, on account of the number of its eyes; but since the *Hirudo tessulata* has also eight eyes, it has been thought proper to change that name for one not liable to mislead.

This little animal is found very commonly in rivulets, attached to the under surface of stones. Its length varies from one inch to an inch and an half. The back is of a dark brown, marked with numerous transverse lines, and a central line longitudinally of a black colour. On the belly also is a longitudinal black line, but the rest is of a yellowish-green colour.

In structure this animal very much resembles the *Hirudo medicinalis*, having the anus at the extremity of the tail, and four longitudinal vessels destined to convey the circulating blood, one dorsal, one abdominal, and two lateral. In these, eight pulsations are observable in the course of a minute, but not derived from any central organ corresponding to the heart of other animals.

Its food consists of very small worms, which it swallows whole.

The object of the present communication is to record such peculiarities as the author has observed in its mode of propagation, to which he has paid attention during the last two summers.

Having found a pair of them copulating as hermaphrodites, like the common snail, on the 13th of August, he watched the period at which eggs were deposited, and found a capsule of eggs produced on the 17th, and another on the 18th, both of which were subsequently hatched. The same leech also laid as many as seven more capsules, at intervals of two or three days in succession, but all these last seven proved abortive.

Those which were productive showed signs of life in three weeks, and in five more the young made their escape from the capsule.

The capsule in which the eggs are deposited is formed as a membranous ring, surrounding the body of the parent in the region of

the uterus, at the same time that the eggs are forming within the uterus. When the animal is about to produce a capsule, it fixes itself by the tail, and in the course of ten minutes is seen to become much distended in the region of the uterus, but contracted both above and below that part. The swelling at first has the ordinary dark colour of the animal, but in a few minutes a film is seen to separate, and become of a milky white colour, from the contents of the uterus, which are forcibly emitted into it. The animal itself, being thereby diminished, next loosens itself from the enveloping membrane by forcible elongation of the fore part of the body, and then withdraws its head backwards, as from a collar, leaving two openings in the capsule, which, after contraction, remain visible as dark specks, one at each end. These are the points at which the young ultimately make their escape, being apparently aided by the comparative weakness of these parts of the membrane. At the time that they are hatched the young are nearly colourless, and they continue so for several months with very little enlargement. While young they have the property of swimming at the surface of the water with their bellies uppermost, as has been noticed by Müller in the *Hirudo hippoglossi*, and as the author has also noticed in two other species of *Hirudo*.

*On the Effects of Galvanism in restoring the due Action of the Lungs.*

By A. P. Wilson Philip, *Physician in Worcester*. Communicated by Sir Everard Home, Bart. *V.P.R.S.* Read November 21, 1816. [*Phil. Trans.* 1817, p. 22.]

The author ascribes our having derived but little advantage hitherto from the employment of galvanism in the cure of disease, to want of discrimination with regard to the functions of the nervous system, which he considers as twofold, one properly nervous, the other purely sensorial.

Galvanism, he says, never did perform any of the functions of the *sensorial* system; it cannot restore hearing to the deaf, or sight to the blind; and yet these are the cases that have been blindly selected for its employment. On the muscles it acts purely as a stimulus, and is not to be expected to do more than other stimuli. But since it appears to have peculiar power over the nervous system, he was led to inquire what diseases depend on a failure of nervous influence; and from having observed the difficulty of breathing brought on by dividing the eighth pair of nerves, and the relief afforded in that case by sending a stream of galvanism through the lungs, he was induced to try the effects of galvanism in habitual asthma, or asthmatic dyspnoea, which he conceived to depend on some obstruction of nervous energy.

In such instances as have come under his own observation, the employment of galvanism has been almost uniformly attended with relief to the symptoms, and in many instances has proved a perfect cure. When it is applied as strong as the patient can well bear without complaint, the relief is often perceived in five minutes, and