

Pseudo-helminths : points in the natural history of a nematode worm / by Jabez Hogg.

Contributors

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Royal College of Surgeons of England

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T +44 (0)20 7611 8722
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(18)

*Pseudo Helminths : Points in the
Natural History of a Nematode
Worm.*

By JABEZ HOGG, F.R.M.S., M.R.C.S., &c.

Pseudo-helminths: Points in the Natural History of a Nematode Worm.

BY JABEZ HOGG, F.R.M.S., M.R.C.S., etc.

I N my paper on "The Embryo of a Parasitic Entozoa," in the *Journal of Microscopy and Natural Science*, July, by a slip of the pen, the measurement of the embryo, as given on page 172, is, I find, somewhat over-estimated. I had, in fact, forgotten for the moment that I was viewing it under a somewhat low magnifying power. A few lines further on I would also ask the readers of the *Journal* to substitute the word "epithelial" for "tesselated." I should be glad, at the same time, to avail myself of the opportunity to offer a few remarks on several communications with which I have been favoured on the interesting question of spurious parasites, or, as they are designated by writers on this branch of natural history, "pseudo-helminths," the greater part of which have no relation whatever to the animal kingdom.

First, let me say, once and for all, that with regard to henbane seeds, as a remedy in toothache, I have had no personal experience of its efficacy, and can offer no opinion; but more than one of my correspondents furnish me with confirmatory evidence on this point. Dr. Ringwood, for instance, says:—"I have known cases where, though the teeth were bad, but free from pain, henbane-seed inhalations have been followed by the expulsion of

several parasites." On the other hand, a dentist of considerable experience writes me :—"I have seen parasites drop from the mouths of patients on the bare application of hot water and by steaming the mouth." I need hardly say that such testimony might have proved of more value had these bodies been examined under the microscope and classified.

I am well aware of the fact, however, that the seeds of the henbane plant do furnish us at times with a spurious body which may be mistaken for a "worm" or parasite. Those of my readers curious in these matters may easily satisfy themselves of this fact by taking the seeds and subjecting them to the action of heat and moisture. The testa will be seen to swell out, force open the micropyle, and the radicle, or embryo, with one end charred by the heat, shoots out and completes the illusion. But this spurious worm or maggot is large enough to be seen by the naked eye, and is, I think, hardly likely to deceive a skilled observer. There are, however, a very considerable number of other bodies, which have been described as worms or parasites, as, *e.g.*, shreds of blood and tissue detached from the gums and sides of the mouth by the hot fomentations ; small fragments of vegetable, and even of mineral substances. A typical illustration of the latter is furnished by one of my correspondents. "If," he writes, "a tooth be broken on extraction after acute toothache, the sphacelated pulp will often be seen to occupy the nerve-cavity and root-canals. It forms an ashy grey, tapering, thread-like structure, not unlike a worm in shape, and it is just possible that it may assume the appearance of a worm and have been mistaken for one."

Among vegetable matters, those more frequently mistaken for worms or parasites are shreds of fibro-cellular tissue, awns of grasses, pith, the carpellary segment of the orange, and, as Dr. Fraser reminds me, "a cleverly-cut fragment of a sod of earth, and small pieces of the vascular bundle of a fern." "I have seen," he says, "these and other substances palmed off on my patients by a notorious impostor, a reputed tooth-ache curer, who trades upon the credulity of those who are ready to believe in Faith-healing."

With regard to the specimen which I brought to the notice of

the readers of this Journal in July, I ought to say, perhaps, that my task was a simple one—that of verification, or, more properly speaking, classification. But a professional friend and naturalist tempts me into a byepath of speculation. He insinuatingly writes:—"Would it not find a more fitting place among NEMATODA, ~~and~~ probably ~~be~~ *Filaria bronchialis*?" My reply is that it certainly belongs to the TREMATODA, although it bears a close resemblance to the male *Sclerostoma syngamus*, a nematode entozoon, better known under the name of the Gape-worm, a parasite not only more widely distributed, but ~~is~~ ^{also} invested with a special general interest from the fact that it is the cause of the gape-disease among chickens, pheasants, partridges, magpies, hooded crows, starlings, swifts, and many other birds. There is an undoubted family likeness, however, among the embryos of all the genera of entozoa. The first stage of their existence and development is passed in the water and as free swimmers, quite irrespective of whether their final destination be *Rediæ* or *Cercariæ*.

In the cause of suffering humanity, it is quite worth while to pursue the morphology of these pests somewhat further. There is yet so much to learn regarding them and their several stages of existence, the more intimate relations which obtain between their embryos and their intermediary hosts, and the extent of the pathological conditions to which they sooner or later give rise in the animal body. We are quite unable to guess by what instinctive agency they are enabled to discover and select the most appropriate resting-place in the interior of this or that animal, and whereby they are enabled to attain to a higher state of organisation. Nothing can strike us with more astonishment than that the Gape-worm, *Sclerostoma syngamus*, should select and find its way, not to the œsophagus, but to the windpipe of the chicken or bird, and thus subject its host to a cruel death by suffocation. It seems to be bent upon propagating its species at the cost of life to the higher orders of creation. With reference to internal parasites as a whole, although certain districts are known to have special attractions for many of them, yet none seem to have an abiding resting-place. On the contrary, all have a disposition to roam over a wide area, and it is in this way they so thoroughly

succeed in baffling the scientific acumen of the skilled Helminthologist.

For the reasons stated, even small and apparently isolated facts are often of some importance. Now, I have lately had the advantage of making myself fully acquainted with the "Gape-worm" by a careful examination, and after removal by my own hand of innumerable specimens from the windpipe of the young pheasant, and I trust the observations I am about to offer may prove acceptable to the student of natural history. I may point out, first, the great disparity observed in the size of the sexes. The female of the genus *Sclerostoma syngamus* measures full six-eighths of an inch in length, while the male scarcely exceeds the one-eighth of an inch. On detaching the female from the trachea of the bird, and of which she had still a very firm hold, she was of a deep-red colour, at first sight very like the smaller blood-worm of the Thames, *Gordius aquaticus*, and for which, when taken out of the windpipe, she might easily have been mistaken. The male worm, from its minuteness and want of colour, was at first quite overlooked by me, but on a more careful search, and by the aid of a pocket-lens, was at length discovered attached to the upper fourth of the body of the female. The remarkable tenacity of life displayed by these parasites I must not pass over without notice, as on the third day after the death of the bird I found, on cutting open the windpipe, the whole of the females alive and vigorous, and so they remained for twenty-four hours, although immersed in water and exposed to the light.

With reference to their morphology, the integumentary covering of the body is uniformly smooth throughout, and about the upper portion of the epidermis an irregular epithelial pigmentary layer can be made out. Beneath this is the denser cutis, and then a broad band of longitudinal and transverse muscular fibres, which under a high power bear a striking resemblance to the striped muscle of the Vertebrata. The most internal basement membrane consists of a delicate mucous coat and a layer of ~~tessellated~~ ^{faded} epithelium. The digestive and coecal canal of the female is seen to terminate in a sharply-pointed anal opening, which also serves as an ovipositor. The terminal portion of the male differs very considerably. It is truncated and

rounded off, turns sharply on itself to form a clift and an opening, in which are placed the organs of generation.

The nervous system is ~~quite~~ of an elementary nature. So far as I can discover, it consists of a single cephalic ganglion, which sends off one or more minute branches to the proboscis or oral opening. *Organs of special sense are entirely wanting.* There is nothing remarkable about the mouth. It is formed for suctorial purposes only. In form and structure it is perfectly circular, and is divided into two or three rings, which are acted upon by separate sets of circular and radial muscular fibres. The inner or middle ring, when opened out, divides into six equal parts, which turn outwards upon the inner lip, somewhat like the petals of certain flowers. The muscular layer is capable, when set in action, of producing a considerable vacuum, while the radial set will convert the innermost disc into a sphincter, closing up the œsophageal opening. The oral arrangement of the male appears to me to differ slightly. I make out a third inner divided disc, with a series of equally disposed chitinous teeth.

Dr. Cobbold, in his valuable work on "Entozoa," in a wood-cut drawing of the female, represents the disc I allude to, but this is an error on his part, for this is only seen in the male. The vulva and uterus of the female is located unusually high up in the body, and here the male is securely attached. In this case it is the female who shows herself an imperious monogamist, for having selected a mate she compels him to cling to her body, and thus carries him about with her for the rest of her natural life. It has long been in dispute whether or not actual incorporation of substances takes place between the sexes. Von Seibold taught that there is actual incorporation, but I believe this is quite a mistaken view, founded, of course, on the very intimate nature of the connection, although the same kind of joining of the sexes is seen to take place in certain of the Lepidoptera—the silkworm moth, for instance.

The male organ of generation is of a very distinctive character. It consists of a ~~double~~ set, of trifurcate, finger-like series of processes, and an intermediate ~~in~~ ^{un}partite penis. These several parts, on passing through the vulva, have an antagonistic action to the other. I have been unable to satisfy myself of the existence

of any cup-shaped appendage formed out of a folded extension of the dermal covering, described by Dr. Cobbold, and which, he says, consists of "a membranous bursa, strengthened internally by a series of projecting rays, intended for the purpose of fixing and supporting it in the same manner as we find the whalebone rods employed to distend the hood of the umbrella."

The ova sac is tortuous and convoluted, and extends throughout the length of the body. It is literally loaded with eggs in all stages of development, and numbering from one to two or three thousand. The egg, as first seen, is a mere globular speck of protoplasm, but after fertilisation takes place the mass breaks up, the nuclei enlarge, and segmentation of the whole quickly follows. At the same time the egg becomes ovoid in shape, with a lid or micropyle at one end, and through which the young worm emerges at maturity. When first hatched, the embryo is without structure. It is little more than a contractile integument, enclosing innumerable granular bodies, no distinctive or formed organs being visible. Notwithstanding, it is quite equal to an active migration, and probably will next be met with in the body of one of the smaller *Pulmonata*, or attached to a portion of decaying vegetable substance, and ultimately finding its way to a pond or stream of water. Evidence is certainly wanting in confirmation of the statement made that it enters the body of the common earthworm. In what way it really gains access to its intermediary host remains a mystery. There is, however, no doubt whatever of its extraordinary breeding powers and great tenacity of life.

Should a single worm enter the windpipe of one of the feathered tribe, it quickly proves itself a bloodthirsty foe. I have seen the trachea of a young chicken swarming with Gape-worms, and I have been led to wonder how breathing was sustained and life prolonged.

I conclude with a word of warning, because I have been given to understand that in some agricultural districts it is no uncommon thing for the poor people to cook and eat poultry and game dying or killed ~~from~~ ^{from} gape-disease. The head and neck is perhaps severed from the body and carelessly thrown out into the dust-heap, to be pecked at and eaten, and so to infect other birds and animals, a prolific source of spreading a loathsome and noxious

disease. It is, therefore, of the utmost importance that the bodies of birds dying from "Gapes" should be burnt—*cremated*—as soon as possible after death. By taking a precaution of this kind, and by paying greater attention to the hygiene of the poultry-yard, this terrible *Strongylus* may be prevented from slaying annually its thousands of victims.

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