CASE
OF
A GIRL WHO VOIDED FROM THE URETHRA
A NUMBER OF
ENTOZOOTIC WORMS,
NOT HITHERTO DESCRIBED,
WITH
AN ACCOUNT OF THE ANIMALS.

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READ JUNE 11TH, 1839.

MAY 31, 1839, I received from Mr. Drake, surgeon, of the Commercial Road, a number of small worms contained in urine, which had been voided a few hours previously by a little girl, his patient, accompanied with a request to know their nature. The following is the account he gave me of the case.

The girl, who is five years of age, had enjoyed good health until June 1837, when she had an attack of inflammation of the lungs in a sub-acute form, attended by a peculiar hollow cough, and a deranged state of the intestinal mucous membrane. She has

been subject to this cough ever since ; a slight cold or derangement of the bowels being sufficient to bring it on. She has likewise been occasionally troubled with the small ascarides. At the beginning of May she had an attack of measles, which left her weak and much emaciated. A troublesome cough remained, attended with fever of a remittent character, and her urine was high-coloured and scanty in quantity. Under mild antiphlogistic treatment the fever diminished, and the urine assumed a natural appearance.

May 26th. Some small worms were first observed in the urine this day, and for several succeeding days, on rising in the morning, she voided, from the urethra, seven or eight.

June 1st. Several ascarides vermiculares were observed in her motions, but no worms were discovered in the urine this day or the following one. They were again observed, however, on June 3rd ; and several have occasionally passed since, in the morning.

11th. The cough has left her, and she is rapidly improving in health and strength. She has never suffered from any affection of the urinary organs.

I found the urine in which the worms were contained high-coloured and slightly acid. It was observed, that when first passed they floated separately in the urine, but in a short time they coalesced and coiled themselves up together in the form of a ball, at the bottom of the vessel, and it was with difficulty that they could be separated.

When they were disturbed their motions were often very lively ; and if allowed to remain in the urine they lived for two or three days. They were very transparent, so that the contents of the alimentary canal could easily be distinguished by the naked eye. On immersing them in spirits of wine they soon became white and opaque. They were of two sizes ; the larger worms being more numerous than the smaller.

A slight examination at once convinced me, that these worms could not belong to any of the species of entozoa at present known to infest man ; and, considering the period of the year, I was at first induced to imagine that they must be the larva or some insect. On placing one in the field of the microscope, I recognized a beautiful organization, and true nematoid structure ; and, on reference to Rudolphi's *Synopsis Entozoorum*, and other works on this subject, I discovered that it was an entozoon which had not hitherto been described. Having received several of these worms from Mr. Drake, at different times, I have had an opportunity of making repeated examinations of them by the aid of the microscope, in which I have had the advantage of the kind assistance of Professor Owen and Mr. John Quekett. The animals being alive and active, formed very interesting objects, as we could readily see and watch the curious actions taking place in their interior.

The worm* is of a light colour, cylindrical in its

* See Plate IV. figs. 1, 2, 3.

form, and annulated, and tapers slightly towards both extremities, but chiefly towards the anterior, which is the smaller. The female measures about $\frac{4}{5}$ ths of an inch in length; the male, as is the case with most of the nematoid worms, is much smaller, being about $\frac{2}{5}$ ths of an inch long. They vary, however, a good deal in size, especially the males. The head of the worm is obtuse and truncated, and has an orbicular mouth. The mouth is generally not very apparent, and several worms were examined before I succeeded in discovering it. The neck is distinctly annulated. The tail is obtuse and also annulated, but not so much so as the neck. The tegument is a delicate transparent structure, containing two layers of fibres, one circular and the other longitudinal, both of which I believe to be muscular. After the rupture of a worm which had been in dilute spirit, these fibres were seen with great distinctness, projecting at the injured part. The tegument is armed with a number of sharp-pointed spines, arranged in clusters of three or four, and sometimes five, in longitudinal equi-distant rows. The intervals between the spines in each row, measured by means of the micrometer, were found to vary from $\frac{1}{50}$ th to $\frac{1}{70}$ th of an inch. With the exception of a small part of the body to be noticed presently, the tegument was completely defended by these spines, which were detected as near the head as the third ring, and also close to the extremity of the tail. It was generally observed that, at the anterior part of the body, the spines were

directed posteriorly, whilst about the centre they projected outwards, and near the tail pointed towards the head. On examining the worm slightly compressed between two pieces of glass in the field of the microscope, I often obtained a lateral view of the spines attached to the sides of the animal, and I could then very distinctly discern their motions, the animal having apparently the power of protruding and retracting them at pleasure. The spines are attached to the external tegument, into which, when retracted, they are received; and they appear to be moved by a number of fibres radiating outwards, in the substance of the tegument. The alimentary canal appeared, on some occasions, of a light yellow colour; on others, it presented a brownish hue. Upon examining a large female worm, the alimentary canal appeared to commence at the mouth, by three small convoluted tubes, which were shortly afterwards united into a single one. The single tube, after proceeding for some distance in a tortuous course, became sacculated, and, enlarging as it descended, it terminated at the extremity of the tail in a trilobular aperture, the anus. On one occasion, I saw very clearly the opening and closure of this orifice. The commencement of the alimentary canal by three tubes was not always apparent, and for some time I imagined that it began by a single tube. The motions of this canal were extremely beautiful. It moved freely in the interior of the animal, at one

time becoming straight and at another time convoluted, as the body of the worm was extended or diminished. It also moved backwards and forwards in an extraordinary manner, and the sacculi were seen to close and dilate by a sort of peristaltic action. On each side of the alimentary canal, at its commencement, there is a series of lobulated bodies, the structure and office of which I could not make out. They were of a light colour, and accompanied the cesophagus in its lively movements in the longitudinal direction. In several male worms a band was seen running along the centre of the intestinal canal, being lost near the anus.

By the side of the alimentary canal, and sometimes crossing it obliquely, I observed in many instances, especially in the female worms, a distinct tube of a faint light colour, marked by transverse bands, which seemed to have independent motions, somewhat of a pulsating character. It was generally seen near the anterior part of the body, but it could be traced for some distance towards the posterior. The pulsating character of this tube was first determined by my friend Mr. Owen; the pulsations occurred at intervals of from eight to twelve seconds. This tube forms, in his opinion, the analogue of the dorsal artery of the annelida. In several worms I could distinctly perceive two light-coloured vessels twining round the alimentary canal near the head, which gave off lateral branches, and afterwards, joining, formed a single trunk, which also sent off

branches from its sides. Between the intestinal canal and external tegument I could distinguish, on numerous occasions, an extremely rapid circulation of minute globules which passed in two contrary directions, side by side, in a continuous stream. This was observed at intervals nearly the whole length of the animals, being frequently obscured by the movements of the digestive tube. I could also discern, near the tail, a number of globules passing slowly in longitudinal and transverse currents, and crossing the alimentary canal.*

The structure of the female worm is much more complicated than that of the male. The vulva is situated near the anterior extremity, about one-fifth of an inch from the head. It appears like a mamillated process, is somewhat opaque, and can be discerned by the unassisted eye. The animal swells at this part, the tegument is thicker, there are no spines, and, for a short distance above and below the vulva, the body is encircled by a series of regular dark-coloured fibres. About mid-distance between the head and vulva, and on opposite sides of the digestive tube, I invariably found, in the numerous microscopic examinations which I made of the female worms, two oval granular bodies or glands. Imme-

* The worm became so opaque after immersion in spirit, and decomposed so rapidly, that much of the beautiful organization that I have described became lost to the observer shortly after death. I attempted to preserve some in salt and water, and in dilute vinegar, but without any better result.

diately below these oval bodies, there are two slightly convoluted tubular processes. It was a long time before I could make out the structure of these processes ; but after repeated investigation I found that each terminated at one end in a free extremity, of a bell shape, and brownish red colour, which was beautifully fimbriated. This free extremity moved about in the interior of the animal in various directions with great freedom ; and the difficulty of making out the structure of these bodies was chiefly owing to the diversity of shape and appearance which under these circumstances they presented. They probably had some connection with the alimentary canal, as they accompanied it in its frequent movements in the longitudinal direction. From the other extremity of each of these bodies there appeared to proceed a small convoluted tube, and the two, after running together for a short distance along the digestive tube, joined the oviducts ; but this junction was not very clearly seen. The oviducts consisted of two small tubes which were distinctly traced commencing at the vulva, and then twining in a very tortuous manner around the alimentary canal, about as far as half way between the anus and vulva.

I made many careful examinations of the smaller worms, but I could distinguish neither penis nor any genital apparatus whatever ; though, in some of the specimens, I observed, near the anterior extremity, dark-coloured transverse lines, similar to those marked in the vicinity of the vulva in the female. Can these be young worms, the sexual

organs of which have not yet been developed, or are they not animals of the male sex? There is certainly not sufficient evidence to warrant any positive conclusion; but, inasmuch as in most of the nematoid worms there is the same disparity in the sizes of the two sexes, as in those of the worms in this case, and, with the exception of the dark lines just alluded to, as the smaller specimens exhibited no trace of the complicated structures remarked in the female, I have preferred considering them, at present, as belonging to the opposite sex.

From the above description, those conversant with the structure of the entozoa, will readily recognise a true nematoid structure. These worms differ, however, from all the known genera of this class, not only in wanting the characters by which they are distinguished, but in possessing several peculiarities in structure, namely, a well-marked annulated body, an anal aperture of a labiated form, and a tegument armed throughout with spines. Referring, therefore, this entozoon to the order Nematoidea of Rudolphi, in which it would constitute a new genus, its character may be thus described:

Genus DACTYLIUS.*

Corpus teres elasticum annulatum et utrinque attenuatum, caput obtusum os orbiculare, anus trilabiatus.

* From δακτύλιος, annulus.

DACTYLIUS ACULEATUS.

Capite obtuso, toto corpore aculeorum serie multiplici armato, caudâ obtusâ et annulatâ.

Hab. in Hominis vesicâ urinariâ.

Spines are found attached to the head in many different species of the entozoa ; but the existence of these curious dermal processes on the body has been observed in only one worm of the nematoid class, the *strongylus horridus*, an animal found by Rudolphi in the œsophagus of the water-hen. In this worm they consist of reflected hooklets, and are arranged in four longitudinal rows, but they are only continued for a short distance along the body, and, in the representation given of them,* appear to be single instead of occurring in clusters, as in the *dactylus aculeatus*. Professor Owen, in speaking of these epidermic processes, which he considers serve as prehensile instruments to retain the proboscis and the worm in its position, remarks, "when they are spread over the surface of the body, they may have the additional function of aiding in the locomotion of the species, analogous to the spines which arm the segments of the œstrus, which passes its larva state, like any entozoon, in the interior of the stomach and intestines of a higher organized animal."†

* Entozoorum Historia Naturalis, vol. i. tab. 3, figs. 8 and 9.

† Cyclopædia of Anatomy and Physiology, Art. Entozoa, vol. ii., p. 127.

The *dactylius aculeatus* will probably be regarded as possessing greater zoological than pathological interest.

The only nematoid worms of the class previously known to infest the urinary organs of man, are the *strongylus gigas* and the *spiroptera hominis*,* from both of which the *dactylius* differs in many important particulars.

It is worthy of remark that, in this case, there was no corresponding derangement of the urinary organs, the discovery of the worm in the urine having been quite accidental. This seems, therefore, to be another example, in addition to those afforded by the *trichocephalus dispar*, and *trichina spiralis*, of worms infesting man without causing any symptoms or exerting any injurious effect on the part where they exist, and being developed apparently in a healthy condition of the tissues. I believe that parasitic animals occur in the human body far more frequently than is generally supposed, being commonly overlooked from the minuteness of their size. In support of this opinion I may remark, that the species of entozoa which is present in man more commonly perhaps than any other, the *trichocephalus dispar*, was not discovered till the middle of the last century, and until very recently was scarcely known in this country. Dr. Baillie, after describing it, states, "it is not only rare in this country, but I

* The worm voided by the woman whose case is described by Mr. Lawrence in the second volume of the Society's Transactions.

believe in every other ;”* and Dr. Hodgkin observes, “ though I have frequently and carefully sought for this worm, I have only once been able to find it.”† Yet, if diligent search were made, one or more would probably be found in the large intestines of most bodies after death. Dr. Bellingham of Dublin examined successively the intestinal canal of twenty-nine individuals who died in St. Vincent’s hospital, and in twenty-six out of the twenty-nine he found a greater or less number of these worms.‡ During the last winter they were detected in many of the bodies examined at the London Hospital ; indeed, in nearly all the cases in which much pains were taken in looking for them, in the intestinal canal of healthy persons destroyed by severe injuries, as well as of those cut off by acute and chronic diseases. Mr. Cooper, surgeon, of Greenwich, has furnished me with an account of seventeen cases in which he searched for the trichocephalus, and of these it was found to be present in eleven. He states that he has observed it many times since, but he has kept no account. In one instance he found as many as twelve, and in another eight. Though the trichocephalus generally inhabits the cæcum, it was ob-

* Engravings to illustrate Morbid Anatomy, p. 89.

† Lectures on the Morbid Anatomy of the Serous Membranes, p. 207.

‡ Dublin Journal of Medical Science, vol. xii., p. 346. In a more recent number of this Journal Dr. B. states, that he detected the trichocephalus in forty-nine cases out of fifty-five.

served, also, in these cases, in various parts of the colon, and in the appendix vermiformis. The frequency of these worms has been well attested by numerous observers both in Germany and France ; and, during the fearful ravages of the cholera at Naples, it was ascertained by M. Thibault that they existed, not only in the bodies of all persons dying of this disease, but as constantly, also, in the intestinal canal of individuals destroyed by other affections. In the inspection of the bodies of eighty persons dead of various diseases, the trichocephalus was found in all of them without exception.*

Whilst Mr. Quekett and myself were engaged in examining a specimen of the dactylius, we detected, floating in the urine around it, an animalcule of an oval shape, furnished with eight orbicular spots, and a central cavity or depression, which moved about freely in the fluid, by means of a series of fine vibratile cilia arranged around the body.† This animalcule must be referred to the polygastric infusoria. Its occurrence in the urine, in full activity, is a circumstance not devoid of interest.

P. S. The morning after the paper had been read at the meeting of the Society, Mr. Drake, at my suggestion, administered to his patient small doses

* Encyclographie des Sciences Medicales, Aout 1837. Sociétés Savantes, p. 183.

† See Plate IV. fig. 6.

of the oleum terebinthinæ, and from that time no worms, either living or dead, have been observed in the urine. For a few days previously, however, the worms had been passed less frequently, and in smaller numbers.

T. B. C.

June 26.