

PHYSALOPTERA MORDENS: A NEW INTESTINAL
PARASITE OF MAN.

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DURING a recent visit to Uganda, for the purpose of making a reference collection of the helminthic parasites of that country for the Museum of the London School of Tropical Medicine, I had the opportunity of investigating in the Research Laboratory at Entebbe a curious "ascarid"-like nematode that had been obtained at a post-mortem of a native who had died, in the hospital, of sleeping sickness. From my examination of the material, which had been very kindly placed at my disposal by Dr. Gray of the Royal Society Sleeping Sickness Commission, I was able to determine that the specimens belonged to the genus *Physaloptera*, a genus that had hitherto been found but once in man. It was not possible at the time to say, however, whether the specimens represented a new species or belonged to that founded by v. Linstow in 1902 for those discovered in Southern Russia, and named by him *Physaloptera caucasica*. Since my return to London I have been able to compare the details of organisation of the African form with those given by v. Linstow for *P. caucasica*, and with the other forms that appear in literature, and to satisfy myself that the form met with in Central Africa presents several notable distinguishing characteristics.

The genus *Physaloptera* has representatives in the four

higher groups of the Vertebrata, but has not yet been found to occur in fishes. There are in all fifty-five known species, of which twenty-two occur in the Mammalia.

The genus is, however, a very old one, and contains a number of species that depart very widely from the type as defined by the type-species *P. clausa*. Further, the characters by which many of the species in the genus have been defined are really of generic value, so that, in the absence of the original material, there is little beyond a measurement or two upon which the specificity of several species remains. This is unfortunately true of the description of *Physaloptera caucasica* with which the present species required to be most carefully compared.

The generic characters that appear to be constant for the species of the genus *Physaloptera s. str.* may be summarised as follows:—

The general form resembles markedly that of the genus *Ascaris*, but in the male the cuticle at the posterior end of the body is flattened out to form a somewhat heart-shaped "bursa." In both sexes the cuticle overreaches the mouth structures, forming a sort of cuticular sleeve or collar; it is, moreover, unmarked by the regular transverse striations seen in other forms, although, of course, in contracted specimens, certain transverse groovings appear adventitiously.

The mouth is surrounded by two large fleshy lips, situated laterally. Each lip bears two large submedian flattened papillæ, and is surmounted by a cuticular prong called the external tooth. Beneath this, in the surface in contact with the opposing lip, is a cuticular fold that shows varying form with the different species, and is known as the inner tooth.

The bursa in the male presents a series of papillæ which fall into two classes, pedunculated and sessile. Typically,

there are in each species ten pairs, four pedunculated and six sessile. The pedunculated series lies in a longitudinal row, outside the sessile papillæ. Though the number appears to be constant for most, at any rate, of the species, the relative position of the papillæ to one another seems to be of specific value.

The vulva is situated in the anterior half of the body, and the ova show an exceedingly thick smooth shell, that in itself is highly characteristic.

The species obtained in Uganda and which we shall call *P. mordens*, like *P. caucasica* presents all the characters above defined, as those of the genus in a restricted sense. Its size is very considerable, the male measuring 30 to 50 mm., the female 40 to 55 mm. In shape and general appearance it resembles an immature *Ascaris lumbricoides*—so much so as to lead me to conclude that it may have been frequently overlooked as such in the past, just as *Ascaris mystax* and *Ascaris marginata* have been. To the latter, also, it bears a striking resemblance, the bursal expansion at the tail of the male resembling the cuticular alæ that are present at the head of these two species.

The breadth of the worm is considerable, and varies from two to three millimetres. The body tapers very gradually anteriorly, and ends truncately; posteriorly it tapers rapidly in the female to a sharp tip, lying more in line with the ventral than the dorsal surface, and giving therefore the posterior portion of the worm a somewhat rounded appearance on the whole. In neither sex does the cuticle form posteriorly a præputial fold around the posterior portion of the body, as it does in some species in addition to the characteristic anterior bulging seen in all. The cuticle shows adventitious groovings that have no constant relation to one another. In this species, however, it is not absolutely without structure, exceedingly fine radiate striæ being noticeable.

The mouth parts exhibit several interesting details of structure that are unfortunately unnoted either in the description or in the figure of the corresponding species *P. caucasica*. The two large fleshy lips of *P. mordens* bear in addition to the pair of touch papillæ and the horny "external tooth" common to these forms, a pair of cuticular knobs that jut out and lie in apposition to one another at the outer and posterior limits of the transverse fissure of the mouth, on either side (Fig. 2).

Further, the cuticular fold known as the "inner tooth," lying in the median line on the inner aspect of the lip and overhung by the horny external tooth, presents a sharp-cutting edge towards the lumen of the mouth, and projects forwards, tapering to end anteriorly in a single lancet-like tip.

Both lips are bound together posteriorly by a thick encircling cuticular band, where the cuticle leaves the surface of the anterior part of the body to form the præputial-like fold characteristic of the genus. At a distance equal to three times the transverse diameter of this band, measuring backwards therefrom, are to be found the cervical papillæ.

The alimentary canal shows the usual divisions into œsophagus, intestine, and rectum. The œsophagus, in the specimen figured, measured exactly one-sixth of the body length. It shows transverse muscular striations, and becomes only very gradually more broadened towards its intestinal opening. The chyle intestine commences with a lumen only slightly greater than the external circumference of the terminal part of the œsophagus and gradually becomes narrowed during its whole course to the short rectum, at its junction with which one finds the large unicellular masses that have been noted at this situation in many other groups of nematodes (Fig. 1).

The anus lies on the ventral surface at a distance of

one-eleventh of the body length, in the male, from the tip of the tail.

The bursa in the male is oval in outline, tapering posteriorly. The papillæ are in number and in general disposition according to the type of the genus, but in minuter detail of the relation of the individual papillæ to one another the following points are to be noted. The external series of four pairs of pedunculated papillæ do not lie in one straight longitudinal series, but are disposed so that the first and fourth pairs lie considerably within the middle, *i.e.* second and third, pairs (Fig. 4).

Of the sessile series of papillæ the only point to note is that, in contrast with the arrangement described and figured for *P. caucasica*, the most anterior of the three hindermost pairs of sessile papillæ on the tail are much more widely separate from one another than are the members of the two succeeding pairs.

As in *P. caucasica* and many other species, the ventral surface of the bursa has a peculiar "rough-shod" marking of the cuticle that lies between the most anterior pair of papillæ and the second pair from the posterior end, the cuticular markings extending between this second last pair and gradually disappearing, doing so more quickly from the sides than in the centre line.

The male genital system consists of three distinctly-defined portions of the long single genital tube and a pair of very unequal spicules. The genital tube lies almost entirely on the ventral aspect of the body cavity, keeping the alimentary canal, in its whole length, on its dorsal aspect. The ejaculatory duct, the most terminal part, measures about one-fourteenth of the body length and shows well-developed musculature in its walls. The portion immediately succeeding, *viz.*, the vesicula seminalis, is a wide and lengthened tube having a peculiarly reticulated wall, and extending forwards without kink or coil for a distance

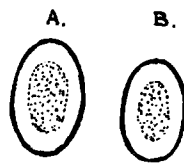
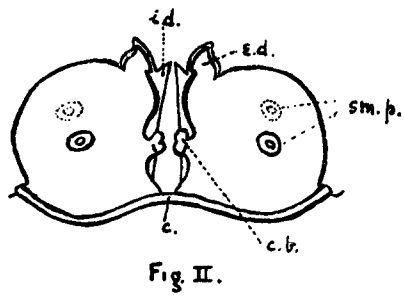
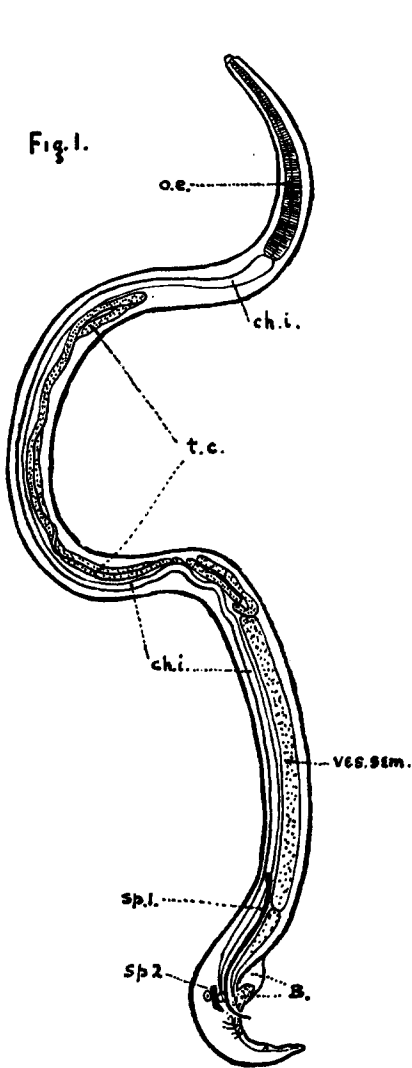
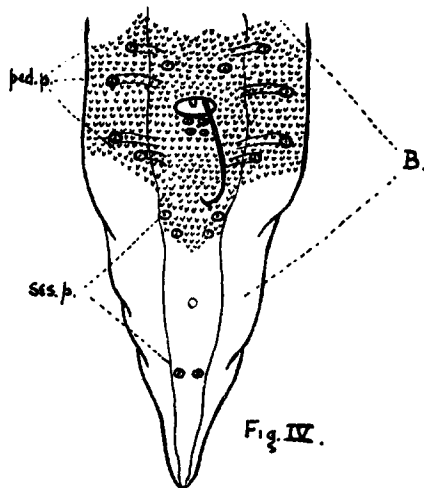


Fig. III.



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PHYSALOPTERA MORDENS, N.SP.

EXPLANATION OF PLATE.

- Fig. 1.—Camera-lucida Drawing of an adult male *Physaloptera mordens*.
Fig. 2.—Mouth parts of *P. mordens*.
Fig. 3.—Ova of *P. caucasica* (A) and *P. mordens* (B), of the same magnification.
Fig. 4.—Ventral aspect of posterior extremity of a male *P. mordens*, showing the arrangement of the papillæ.

EXPLANATION OF LETTERING IN THE FIGURES.

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|---------|---|-----------|----------------------|
| c. | —Cuticular ring embracing the two lips posteriorly. | ses. p. | —Sessile papillæ. |
| c. b. | —Cuticular bosses guarding the mouth laterally. | sm. p. | —Submedian papillæ. |
| ch. i. | —Chyle intestine. | sp. 1. | —Long spicule. |
| B. | —Bursa. | sp. 2. | —Short spicule. |
| ej. d. | —Ejaculatory duct. | t. c. | —Testicle coils. |
| e. d. | —External tooth. | ves. sem. | —Vesicula seminalis. |
| i. d. | —Internal tooth. | | |
| ped. p. | —Pedunculated papillæ. | | |

As already stated, the characters given for *P. caucasica* are few in number. The description of the mouth parts contains only facts of generic importance. Its small size, the different relation of its papillæ to one another, and the difference in size of its spicules and ova will suffice to distinguish it from *P. mordens*.

The type-specimens are deposited in the Helminthological Museum Collection (Human Series, No. 30) of the London School of Tropical Medicine.
