

# PARASITIC NEMATODES OBTAINED FROM ANIMALS DYING IN THE CALCUTTA ZOOLOGICAL GARDENS.

## PARTS 1—3.

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### PART I. NEMATODES FROM THE GHARIAL.

Linstow (1906) described two Nematodes from the Gharial (*Gavialis gangeticus*, Geoffr.) viz., *Micropleura vivipara* and *Typhlophoros lamellaris*. These are interesting and characteristic parasites for they represent two genera, which have not been found in any other hosts.

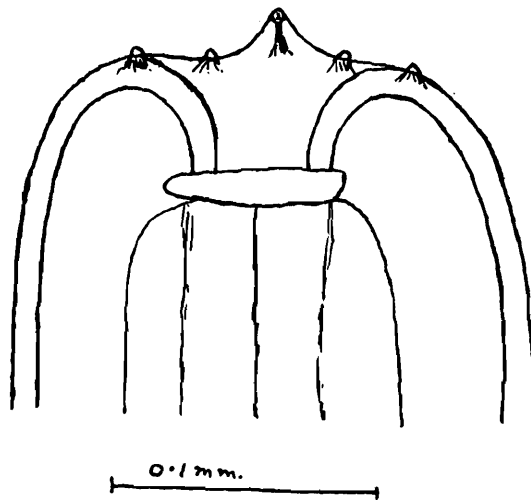
Baylis and Daubney (1922), and Baylis (1924) redescribed the female and male respectively of *M. vivipara*, which corrected Linstow's original description and made several additions to it. I have recently obtained collections of this worm from two Gharials, and have been enabled to modify the above descriptions to some extent, as the material is fixed in a well extended position.

*Typhlophoros lamellaris* has not been recorded since Linstow first found it. I have obtained a few females of this species, only one of which is mature, but from this I am able to elucidate certain characteristics missed or wrongly described by Linstow.

In an editorial note on Linstow's paper there is mention of an unidentified *Ascaris*. I have obtained from one of the Gharials examined a worm with the characters of the genus *Multicaecum*, Baylis, 1923 and from the other a single female also belonging to the Anisakinae but apparently a new genus, so it is probable that one of these species is the one referred to.

#### ***Micropleura vivipara*.**

The description given by Baylis and Daubney (1922) agrees with my material in most cases, but in about half the number, which are



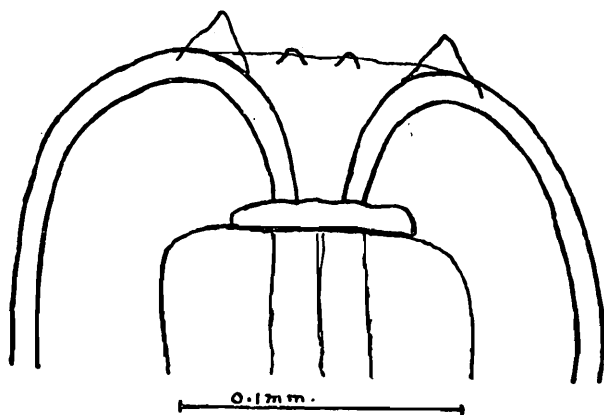
Text-fig. 1.—*Micropleura vivipara*. Anterior extremity, lateral view.

fixed in a well extended position, the large lateral papillae project beyond the anterior end of the worm, and in addition to the sub-dorsal and sub-ventral papillae on each side there are two more papillae close to the base of the lateral papilla (fig. 1). The figure of the female tail by Baylis and Daubney is obviously from a contracted specimen, as the tip of the tail is shown as an irregular knob, which forms an almost equilateral triangle with the two caudal papillae. In my material the tail is much longer and it ends in a rounded tip, over which the cuticle is thicker (fig. 3).

### **Typhlophoros lamellaris.**

In the single mature specimen of this species available the ovaries are well developed although no eggs are yet formed, and as it is 15 mm. in length and 0.29 mm. in diameter it must be practically fully grown, as Linstow gives the length of the female as 16 mm. and the diameter as 0.32 mm.

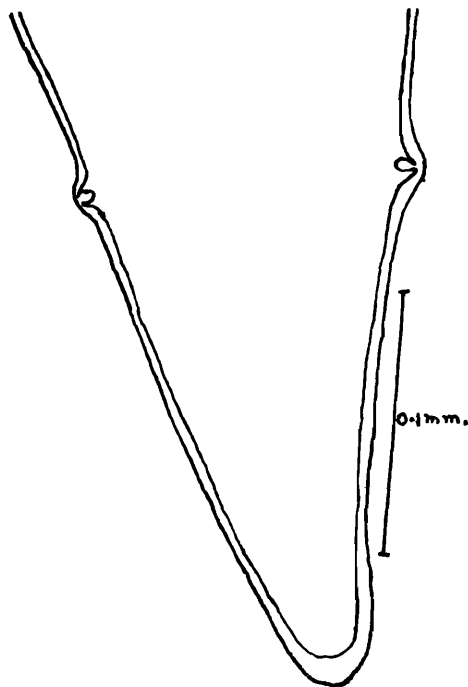
Linstow states that there is no excretory pore, but in all my specimens both the pore, which is 0.44 mm. from the anterior end, and the canal



Text-fig. 2.—*Micropleura vivipara*. Anterior extremity, dorsal view.

leading from it, are exceptionally distinct. The lips also vary somewhat from that shown in Linstow's figure. The dorsal lip is broad and is surmounted by a triangular cuticular prolongation (fig. 4), and the sub-ventral lips are broad (fig. 5). The mouth opening leads into a diamond-shaped buccal cavity. The oesophagus in the mature specimen is 1.78 mm. in length. Linstow describes an intestinal diverticulum lying dorsal to the oesophagus and reaching the anterior end of the worm. In my mature specimen this diverticulum ends 0.475 mm. from the anterior end, and in the immature example this distance is proportionately less. In addition to the diverticulum there is a complicated ventriculus arising from the ventral surface of the end of the oesophagus, which consists of two anterior and three posterior caeca similar to that seen in *Multicaecum agile* (Wedl., 1836), but it is much shorter than in this species, being only 0.128 mm. from the anterior end of the anterior caeca to the posterior end of the posterior caeca (fig. 6). The vulva is an inconspicuous opening 7.65 mm. from the anterior end, and in this respect agrees with Linstow's description. A muscular vagina, 0.99 mm in length, runs posteriorly from the vulva and the two uterine branches run anteriorly and posteriorly respectively. Linstow says the posterior

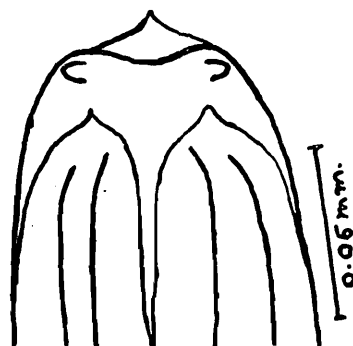
end of the female curves dorsally. In my material this portion of the worm curves ventrally and the sharp cuticular point makes a dorsal



Text-fig. 3.—*Micropleura vivipara*. Female tail, lateral view.

bend. The distance from the anus to the tip of the tail is 0.208 mm., which is the same as in Linstow's material (fig. 7). The two roundish projections in front of the anus mentioned by Linstow could not be made out.

Although certain differences from Linstow's description exist in my material these are slight, and there seems to be little doubt that it is the same species, and the remarkable cuticular ornamentation around the cephalic extremity is the same in both cases.



Text-fig. 4.—*Typhlophoros lamellaris*. Anterior extremity, dorsal lip.

The presence of an oesophageal ventriculus of the same character as in *Multicaecum* is of considerable interest, but this point alone is not sufficient to make advisable the inclusion of *Typhlophoros lamellaris* in the former genus, for it differs in many other points. For example the lips are not divided from the rest of the body, dentigerous ridges and interlabia are absent, and the distinctive cuticular cordons on the anterior end of the worm are present.

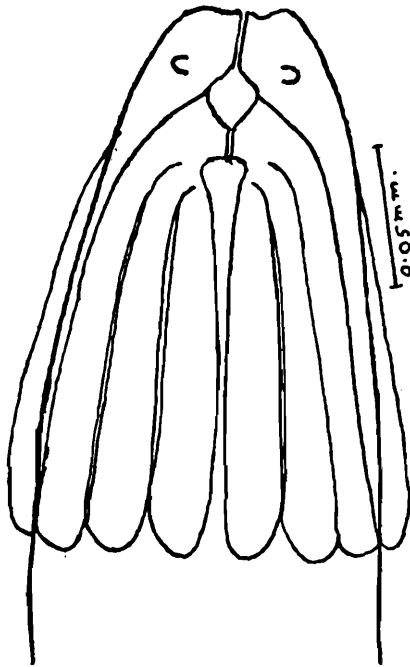
It is proposed to alter the generic definition of *Typhlophoros* as follows, to agree with the additional characters noted in the present instance.

*Typhlophoros*. Anisakinae. Mouth with simple lips, not separated from the rest of the body by a groove, interlabia and dentigerous ridges absent. Behind the lips the anterior end is furnished with longitudinal cuticular ridges. Intestinal caecum running forward from the oesophago-intestinal junction. Oesophageal ventriculus, consisting of two anterior and three posterior caeca, present. Vulva a little in front of the middle of the body.

### **Multicaecum** sp.

Baylis (1923) redescribed *Ascaris agile* Wedl, 1862, from *Crocodilus niloticus*, and made it the type of a new genus, *Multicaecum*.

I recently recovered a number of immature male and female worms from the stomach of a Gharial. Although they are only about half the size of Baylis' material they appear to agree in all essential points



Text-fig. 5.—*Typhlophoros lamellaris*. Anterior extremity, ventral view.

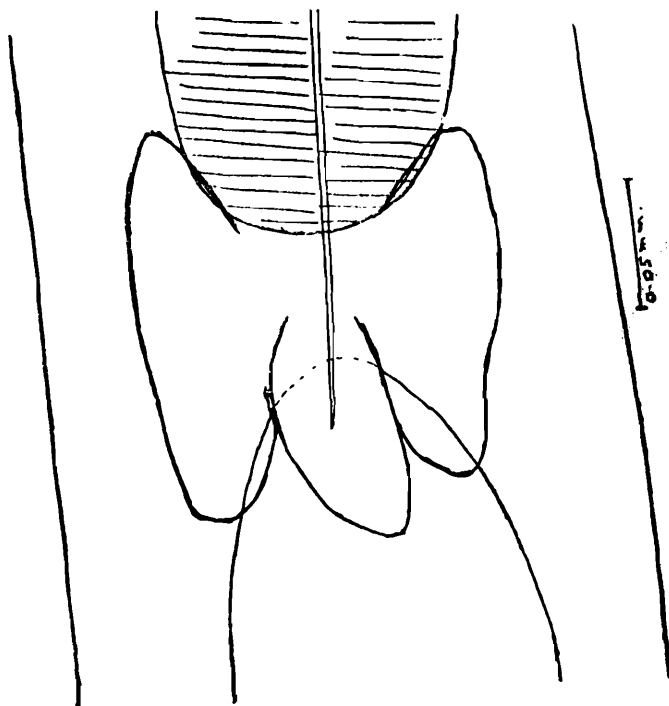
with *Multicaecum agile* as described by him. It is possible that the present specimens may represent a new species of *Multicaecum*, but in the absence of mature worms it is not possible to be definite on this point. Therefore, pending the discovery of fully grown worms of this species in a Gharial, it is proposed to merely record the presence in this host of a species of the genus *Multicaecum*.

### **Polycaecum gangeticum**, n. g., n. sp.

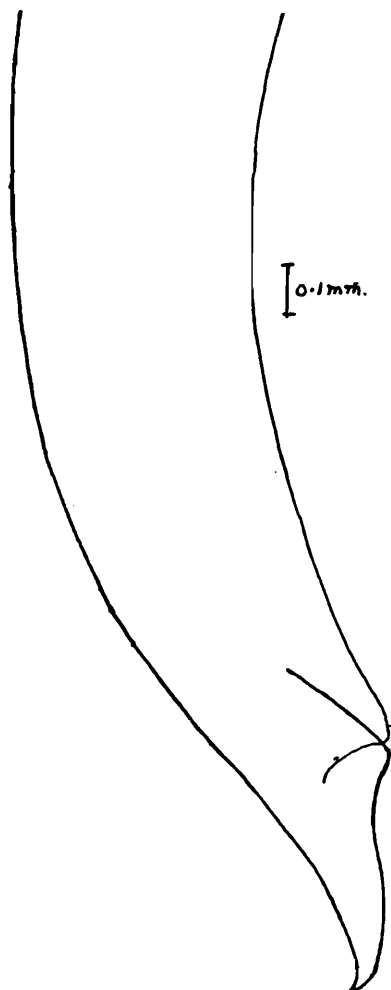
A single immature female, apparently the representative of a new genus, was found in the intestine of a Gharial.

Although the ovaries are not fully formed, other characters are sufficiently clear to enable a description being given. The worm is

11.5 mm. in length and 0.226 mm. in greatest diameter. The mouth is surrounded by three lips not marked off by a groove from the body,

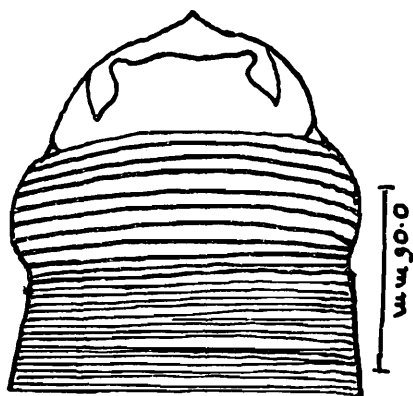


Text-fig. 6.—*Typhlophoros lamellaris*. Region of oesophago-intestinal junction showing oesophageal ventriculus and caeca.



Text-fig. 7.—*Typhlophoros lamellaris*. Female tail, lateral view.

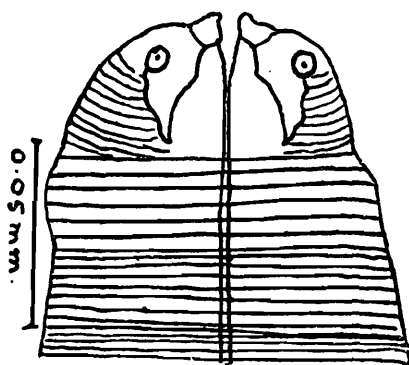
and there are no interlabia. The dorsal lip is triangular in shape and the sub-ventral lips are broad and crescentic, the tips being formed by clear cuticular caps (figs. 8 and 9). Immediately behind the lips there is a circular swelling, which is more pronounced dorsally and laterally than it is ventrally. The whole cuticle is covered by transverse striations, which are distinctly coarser on the cephalic swelling than they are on the rest of the body (fig. 8). The excretory pore opens 0.416 mm. from the anterior end. The oesophagus is long and straight and measures 2.675 mm. in length. It ends in a short ventriculus, which gives off five caeca; the two anterior caeca are very unequal, and of the three posterior caeca the central one is much shorter than the other two (fig. 10). The longer anterior caecum and the two longer posterior caeca are about 0.396 mm. in length. There is also a long



Text-fig. 8.—*Polycaecum gangeticum*. Anterior end, dorsal view.

intestinal caecum running forward dorsal to the oesophagus and about 1.98 mm. in length. The vulva opens exactly in the middle of the body, being 5.75 mm. from the anterior end. The vagina runs posteriorly from the vulva. The tail is straight and ends in a blunt tip surmounted by a fine cuticular point. The distance from the anus to the tip of the tail is 0.176 mm., and there is a long cuticular rectum connecting it with the termination of the intestine (fig. 11). No eggs are present.

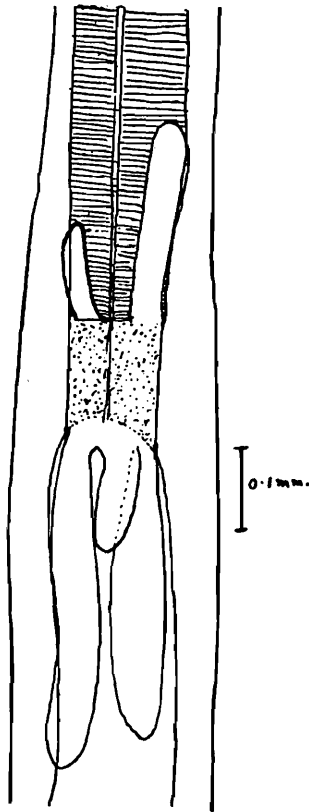
This worm differs from the two other genera which have an oesophageal ventriculus giving off five caeca, and both of which occur in the



Text-fig. 9.—*Polycaecum gangeticum*. Anterior end, ventral view.

Gharial, it is therefore considered necessary to create for it a new genus for which the name *Polycaecum* is proposed, and the name of the type-species is *P. gangeticum*, n. sp.

Definition of the genus *Polycaecum*. Anisakinae. Mouth surrounded by three lips not separated from the rest of the worm by grooves, and without interlabia. Immediately behind the lips there is a cuticular collar bearing coarser striations than the rest of the body. The oesophageal ventriculus gives off two anterior and three posterior caeca, and



Text-fig. 10.—*Polycaecum gangeticum*. Region of the oesophago-intestinal junction showing the oesophageal ventriculus and caeca.

there is an intestinal caecum running forward dorsal to the oesophagus. The vulva opens near the middle of the body. Male unknown.

NOTE.—As only a single immature female of this species is known it is probable that the dimensions of the worm given above are less than they would be in fully grown specimens.

The type-specimen is in the Indian Museum, Calcutta.

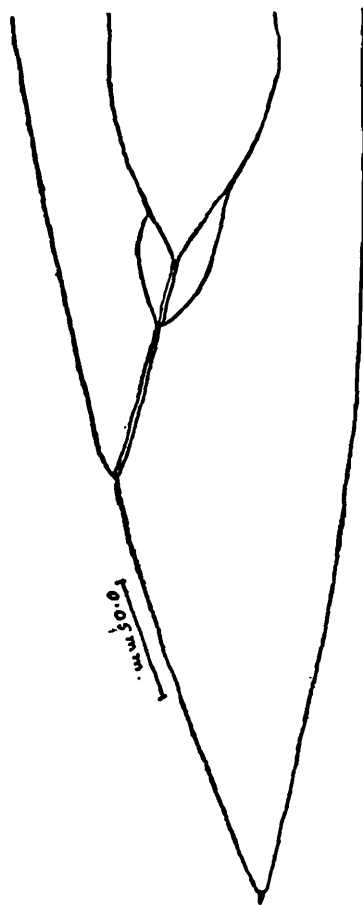
### ***Goezia gavalidis*, n. sp.**

A single female specimen of this worm was found in the stomach of a third Gharial, which was examined recently.

The worm is 6.6 mm. in length, and 0.6 mm. in maximum diameter, which is well behind the middle of the worm. The anterior end is bluntly rounded and it is surmounted by three large lips (figs. 12 and 13). The dorsal lip appears as a large oval pulpy mass surrounded by thick cuticle, and two pointed papillae arise from its inner surface. The subventral lips each have a prominent angle which curves outwards and backwards (fig. 12).

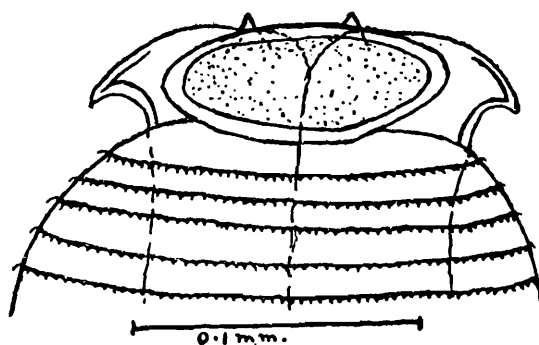
The cuticle is covered with prominent circular striations about 0.048 mm. apart and which bear on their posterior borders rows of

finely pointed spines directed backwards. These striations and spines extend for the whole length of the worm, and are of approximately



Text-fig. 11.—*Polyscaecum gangeticum*. Female tail, lateral view.

the same size, except on the tail itself where the striations are closer together and the spines are very minute. The vulva opens 2.8 mm.

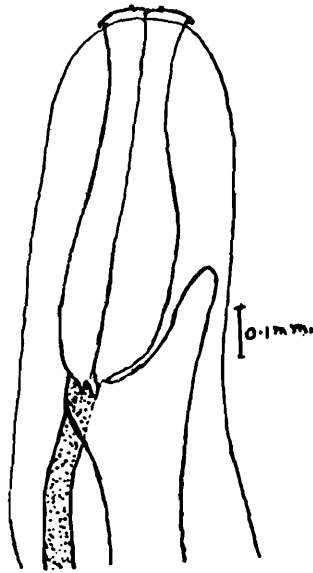


Text-fig. 12.—*Goezia gavioidis*. Anterior extremity, dorsal view.

from the anterior end. The vagina is a much convoluted tube which curves forward only a little distance in front of the vulva, it then bends backwards and divides into the two uteri. These tubes pursue a posterior course and finally enter the ovaries, which run a very convoluted course almost to the posterior end of the worm. The oesophagus is 0.75 mm. in length with a very slightly marked posterior bulb. There is a long thin glandular appendix, which arises from the posterior end of the oesophagus and is 1.5 mm. in length. There is also a short diverticulum, which arises from the intestine at its junction with the oesophagus



and which runs forwards for about 0.2 mm. (fig. 13). The intestine is thin-walled with a very wide lumen. It ends in an anus which is 0.2 mm.

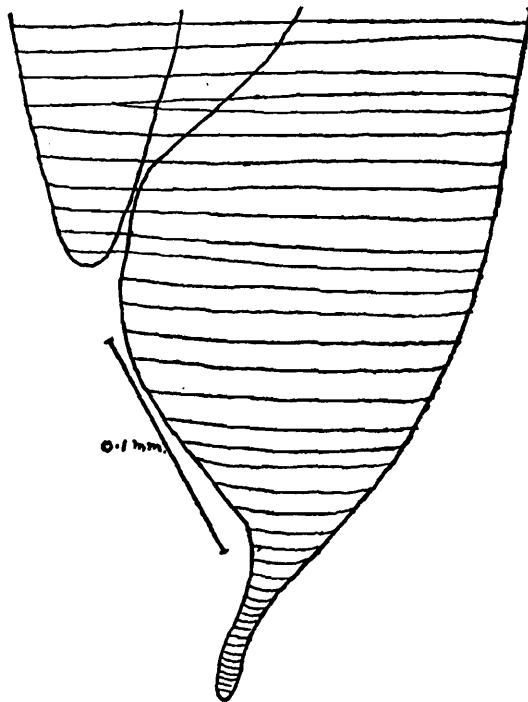


Text-fig. 13.—*Goezia gavialedis*. Anterior extremity, low power to show intestinal appendages. Spines not shown.

from the tip of the tail. The worm is broad to behind the anus, a little distance posterior to which it suddenly becomes narrower to end in a relatively long thin point (fig. 14).

Male unknown.

The large lips, the circular rows of cuticular spines, the shape of the tail, and the characteristic appendages to the intestinal tract place this worm in the genus *Goezia*.



Text-fig. 14.—*Goezia gavialedis*. Posterior extremity of female, lateral view. Spines not shown.

The existing members of this genus are four in number *viz.*, *G. ascaroides* (Goeze, 1782), *G. annulata* (Molin, 1860), *G. kollari* (Molin,

1858), and *G. spinulosa* (Diesing, 1839). They originally existed under many different generic names, and they were placed in the genus *Goezia* Zeder, 1800, by Railliet and Henry (1915), who did this on the published descriptions of the worms, and without examining any material. These worms do not appear to have been described since their original discovery so the descriptions are naturally incomplete according to modern standards. It is therefore not possible to say with absolute certainty that the present worm is a new species, but it is considered probable that it is so, in view of the different host and locality in which it has been found. At the same time it must be remembered, that although all the members of this genus hitherto described have been found in fish, the present worm is in a fish eating animal, and it is possibly a true parasite of a fish, which has only been liberated by digestion from its true host in the stomach of the Gharial in which it was found.

The type-specimen is in the Indian Museum, Calcutta.

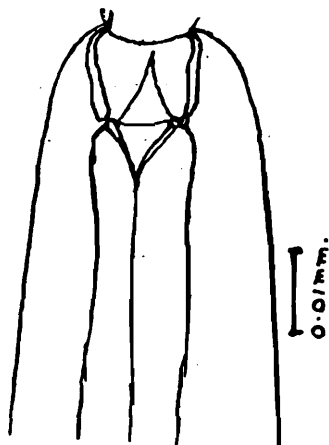
#### PART 2. THE SUBFAMILY AMIDOSTOMINAE TRAVASSOS, 1919.

Baylis and Daubney (1926) raised this sub-family to family rank without making any change in it, but this seems an unnecessary elevation of a small group of Nematodes, which show sufficiently close affinities with the Trichostrogylinae to be classed in the family Trichostrogylidae.

#### *Amidostomum fuligulae*, n. sp.

This worm was found on the first occasion in the gizzard of a Golden-Eyed Pochard (*Fuligula cristata*). It has since been recovered from *Aythya ferina*, and several ducks, which were not identified.

The worms are slender and slightly attenuate anteriorly, and they have fine transverse cuticular striations. The head is narrow and rounded, with four fine hair-like sub-median papillae projecting anteriorly. There is a relatively large thin-walled buccal capsule. There



Text-fig. 15.—*Amidostomum fuligulae*. Anterior end, dorsal view.

is a large triangular dorsal tooth, which extends forwards from the oesophagus almost to the mouth of the capsule, and in addition there are two small knob-like accessory sub-ventral teeth. These latter teeth really appear to be the thickened anterior ends of the two sub-dorsal