

# NEMATODA IN THE COLLECTION OF THE COLOMBO MUSEUM.

By Dr. O. VON LINSTOW.

(Göttingen.)

With two Plates.

THE small collection of endoparasitic Nematodes here described contains representatives of twenty-two species, of which thirteen are new and one is made the type of a new genus, *Ctenocephalus*.

The following is a list of the species recorded, together with their hosts :—

	PAGE
1. <i>Ascaris rotundicaudata</i> , n.sp., from <i>Calotes ophiomachus</i> ...	92
2. <i>A. ceylanica</i> , n.sp., from <i>Haliastur indus</i> and <i>Poliaëtus ichthyaëtus</i> ...	92
3. <i>A. brachyura</i> , n.sp., from <i>Calotes versicolor</i> ...	93
4. <i>A. quadrata</i> , n.sp., from <i>Crocodilus porosus</i> ...	93
5. <i>A. mystax</i> , Zed., from <i>Canis familiaris</i> and <i>Felis pardus</i> ...	94
6. <i>A. vitulorum</i> , Goeze, from <i>Bos indicus</i> ...	94
7. <i>Physaloptera varani</i> , Parona, from <i>Varanus bengalensis</i> ...	95
8. <i>Physaloptera</i> , spec. ? from <i>Calotes versicolor</i> ...	95
9. <i>Spiroptera dentata</i> , n.sp., from <i>Sus cristatus</i> ...	95
10. <i>S. triangulum</i> , n.sp., from <i>Calotes</i> ...	96
11. <i>S. obtusa</i> , Rud., from <i>Mus decumanus</i> ...	96
12. <i>S. bufonis</i> ? Stossich, from <i>Bufo melanostictus</i> ...	96
13. <i>Heterakis trilabium</i> , n.sp., from <i>Centropus sinensis</i> ...	97
14. <i>H. anomala</i> , n.sp., from <i>Tropidonotus piscator</i> ...	97
15. <i>Strongylus pigmentatus</i> , n.sp., from <i>Lepus nigricollis</i> ...	98
16. <i>Cylichnostomum tetracanthum</i> (Mehlis), from <i>Equus caballus</i> ...	99
17. <i>Triodontophorus serratus</i> , Looss, from <i>Equus caballus</i> ...	99
18. <i>Kalicephalus willeyi</i> , n.sp., from <i>Vipera russelli</i> and <i>Columba helena</i> ...	99
19. <i>Oxyuris poculum</i> , n.sp., from <i>Equus caballus</i> ...	101
20. <i>O. acanthura</i> , n.sp., from <i>Calotes versicolor</i> ...	101
21. <i>Ctenocephalus tiara</i> , Von Linstow, from <i>Varanus bengalensis</i> and <i>Varanus salvator</i> ...	102
22. <i>Filaria vivipara</i> , n.sp., from <i>Corvus splendens</i> ...	103

## ASCARIS.

The mouth is surrounded by three lips, of which the dorsal is placed symmetrically across the dorsal middle line, while the two ventro-lateral lips abut upon the ventral middle line; the



intestine is often prolonged into a cæcum, which lies below the œsophagus, and the latter frequently carries a tubular gland which rests upon the dorsal side of the intestine. The male possesses two equal spicula or cirri, but no bursa at the caudal end of the body.

*Ascaris* has the musculature characteristic of Schneider's Polymyaria, and belongs to the division Secernentes, in which the lateral fields or ridges are narrow and project well inwards; each ridge contains a canal, and the two lateral canals unite in front in the mid-ventral line, where they open to the exterior by a common *porus excretorius*, not far behind the mouth.

1.—*Ascaris rotundicaudata*, n.sp.

Pl. I., fig. 1.

Habitat: stomach and intestine of *Calotes ophiomachus* ("kattussa," Sinh.), Colombo.

Cuticula annulate or transversely striate; lips broad and short, denticulate, without intermediate lips, papillæ set far back; dorsal lips nearly quadrilateral with rounded fore-edge, 0.22 mm. broad and 0.068 mm. long.

The œsophagus occupies  $\frac{1}{20}$  of the entire body length in the male,  $\frac{1}{24}$  in the female.

The male has a length of 46 mm. with a diameter of 0.73 mm. The tail is rounded with a conical extremity and equals  $\frac{1}{58}$  of the body length. The cirri or spicula measure 8.8 mm.; at the tail end of the body on each side there are papillæ—thirty-one præ-anal papillæ and three post-anal. The præ-anal papillæ extend forwards to a distance of 3.2 mm. from the caudal extremity. Quite at the posterior end there is also a dorsal papilla.

In the female, with a length of 72 mm. and diameter 1.14 mm., the rounded tail occupies  $\frac{1}{85}$  of the body length, and terminates in a fine conical prolongation. The vagina opens approximately in the middle of the body. The thick-shelled eggs are nearly spherical, 0.078 mm. in diameter; the shell surface is finely granulated.

2.—*Ascaris ceylanica*, n.sp.

Pl. I., fig. 2.

Habitat: (a) intestine of the Brahminy kite, *Haliastur indus*, Bodd., Colombo; (b) stomach of the fish eagle, *Poliaëtus ichthyaëtus*, Horsf., Kalpitiya.

This is a fairly large species, allied to *A. microlabium*, but not identical with it. All the specimens are fragmentary, so that measurements cannot be given.



Cuticula annulate ; lips with large intermediate lips without denticulations (Zahnleisten); the inner pulp is produced forwards ; the dorsal lip is 0.099 mm. broad, 0.073 mm. long ; the tail end is conically attenuated.

The male is 1.22 mm. in diameter, the very short tail measures only 0.22 mm., the long cirri measure 5.53 mm.

The female has a diameter of 1.50 mm.; length of tail, 0.32 mm.; spherical thick-shelled eggs, 0.062 mm.

### 3.—*Ascaris brachyura*, n.sp.

Pl. I., fig. 3.

Habitat : intestine of *Calotes versicolor*, Dum. et Bibr., Colombo.

Cuticula broadly annulate ; lips with tooth-rows, the denticles high and acute ; intermediate lips absent ; dorsal lip concave in front, 0.176 mm. broad, 0.097 mm. long ; papillæ large, obliquely placed ; body slender, tail very short and rounded ; the œsophagus extends over  $\frac{1}{14}$  to  $\frac{1}{15}$  of the body length.

The male has a length of 31.6 mm. and a diameter of 0.91 mm.; the tail has a length equal to  $\frac{1}{267}$  of the body, and carries a very fine style-shaped process ; the falciform cirri have rounded ends and measure 0.62 mm. ; at the caudal end on each side there are 22 præ-anal and two post-anal papillæ.

The female attains a length of 34.3 mm. and a width of 0.86 mm.; the tail is  $\frac{1}{200}$  of the entire length, and is destitute of a styliiform process at the end ; the vulva lies somewhat in front of the mid-region of the body, dividing the latter in the proportion of 3 : 5 ; the reproductive organs leave the anterior third of the body free, and behind  $\frac{1}{17}$  ; eggs were not mature.

### 4.—*Ascaris quadrata*, n.sp.

Pl. I., fig. 4.

Habitat : stomach of *Crocodilus porosus*, Gray, Bolgoda.

There is only one specimen in the collection, an immature female, but the formation of the lips is so characteristic, and diverges so much from that of the other Nematodes known from African and American crocodiles, that it is possible to diagnose the species.

The cuticula is finely annulate ; lips without teeth and without intermediate lips ; the dorsal lip is 0.132 mm. broad, 0.088 mm. long, quadrangular, with front angles rounded ; the pulp (*pulpa*) is produced into two quadrangular projections. The length amounts to 15.8 mm., the diameter to 0.55 mm. ; the œsophagus occupies  $\frac{1}{4}$  of the entire length ; a cœcum arises from the intestine



and extends forwards below the œsophagus,  $\frac{2}{3}$  length of latter the short tail is conical,  $\frac{1}{57}$  of the body length.

The Ascaridæ hitherto known from crocodiles are as follows :—

*Ascaris helicina*, Molin ;\* lips with intermediate lips, the pulp gives rise in front to two spheres with forked processes ; body spirally involute ; North America.

*A. agilis*, Wedl. ;† lips with dentigerous ridges (Zahnleisten), narrow at the base ; pulp with three roundish projections : body spirally involute ; Egypt.

*A. lanceolata*, Molin ;‡ lips with two semi-circular dentate ridges in front ; North and South America.

*A. tenuicollis*, Rud., from North and South America, has been so defectively described that it is impossible to recognize the species.

#### 5.—*Ascaris mystax*, Zed.

Habitat : *Canis familiaris*, L. ; passed by a young sucking puppy, Colombo ; also from intestine of young *Felis pardus*, L., Wirawila.

Cf. A. Railliet, *Traité de zoologie médicale et agricole*, Paris, 1895, pp. 402-405, fig. 265.

#### 6.—*Ascaris vitulorum*, Goeze,

= *A. vituli*, Neumann.

Habitat : *Bos indicus*, L. ; passed by a young calf of four to six months, Colombo.

Cf. G. Neumann, *Revue vétérinaire*, Toulouse, 1883, pp. 1-20, pl. III.-IV.

[Collected and presented to the Colombo Museum by G. W. Sturgess, Esq., M.R.C.V.S.]

### PHYSALOPTERA.

Two lateral lips at the head end, surrounded by a circular cuticular sheath ; the musculature is of the type of Schneider's Polymyaria ; the genus belongs to the Secernentes ; at the caudal extremity of the male there is a lancet-shaped or bean-shaped bursa ; the two cirri of the male are unequal ; on each side of the cloacal aperture at the tail end, four stalked papillæ, median and unstalked papillæ in varying numbers.

\* Cf. v. Drasche, *Verhandl. d. k. k. zool-bot. Gesellsch.* Wien, XXXII., 1882, p. 120, tab. IX., fig. 9.

† Wedl, *Sitzungsber. d. k. k. Akad. d. Wissensch. mathem. naturw. Classe.* Wien, Bd. XLIV., 1861, p. 467, tab. I.-II., figs. 12-16.

‡ v. Drasche, *l.c.*, p. 133, tab. X., figs. 5-11.



7.—*Physaloptera varani*, Parona.

Habitat : stomach of *Varanus bengalensis* ("talagoya," Sinh.), Bolgoda. Cf. Parona, *Elminti di Birmania*, 1890, p. 776, tab. III., fig. 1.

8.—*Physaloptera*, spec. ?

Habitat : intestine of *Calotes versicolor*, Colombo.

The collection contains only two specimens, which are not sufficiently well preserved to render a specific diagnosis possible.

Length 12·6 to 13·6 mm. ; diameter 0·59 to 1·12 mm. ; lips with three conical projections, of which the central is the highest and carries a tooth at its apex ; the œsophagus is equal to  $\frac{1}{5\cdot7}$  of the body length ; the tail, rounded behind,  $\frac{1}{16}$ th of the entire length.

## SPIROPTERA.

Head sometimes with two lips, sometimes with four, and sometimes with none ; the musculature corresponds with Schneider's *Polymyaria*—*Secernentes* ; male with two unequal cirri ; the caudal papillæ are arranged in two longitudinal rows, and on each side there are four præ-anal papillæ.

9.—*Spiroptera dentata*, n.sp.

Pl. I., figs. 5–7.

Habitat : stomach of wild boar, *Sus cristatus*, Chilaw.

Cuticula finely annulate. The mouth leads into a vestibulum, 0·11 m.m. in length ; its entrance is armed with a dorsal and a ventral tooth ; the mouth is a transverse slit, the border of which shows, both above and below, three notches with papillæ. The œsophagus measures  $\frac{1}{8\cdot6}$  of the entire length, and presents a spiral musculature ; in a young worm of 14·6 mm. the nerve ring surrounds the œsophagus 2·64 mm. from the head end, and at a point situated 0·31 mm. behind it the *porus excretorius* opens.

The male (25 mm. long by 0·79 mm. broad) has a closely involute tail, which resembles that of *Spiroptera strongylina*, Rud. ; the cirri are respectively 0·35 and 0·92 mm. long, the shorter one bearing at its end a barb. Immediately in front of the cloaca, on each side, there are four closely packed præ-anal papillæ ; behind it there is one papilla, and all have long stalks ; the cloaca is surrounded by a broad ring, notched externally ; the bursa shows longitudinal rows of oval scales.

The female grows to a length of 55 mm., with a width of 1·10 mm. ; the short conical tail is curved over the back ; the vulva is placed far behind the middle, and divides the body in the



proportion of 70 : 23; the eggs are small, thick-shelled, and cylindrical, measuring in length and breadth 0.039 and 0.017 mm. respectively.

10.—*Spiroptera triangulum*, n.sp.

Pl. I., fig. 8.

From body cavity of *Calotes ophiomachus* ("katussa," Sinh.), Colombo.

One male specimen, 4.1 mm. long, 0.51 mm. broad; cuticula annulate; at the junction of œsophagus and intestine there is a deep circular constriction of the body wall.

The head is rounded, and presents on each side a triangular mark with a small papilla at the apex; the mouth leads into a small vestibule; the spicula (cirri) are sub-equal and measure 0.41 mm.; they are attenuated and pointed at the end, and show externally a reticulate design; the œsophagus is equal to  $\frac{1}{7.7}$ , the tail to  $\frac{1}{15.3}$  of the entire length; the tail is flattened dorsally; on each side of it are four præ-anal and two post-anal papillæ; the former increase in size from before backwards, and the first post-anal papillæ are finger-shaped.

11.—*Spiroptera obtusa*, Rud.

From stomach of *Mus decumanus*, Pallas, Colombo.

See Von Linstow, Arch. f. microsc. Anat., Bd. 56; Bonn, 1900, pp. 363-366, tab. XV., figs. 3-4.

12.—*Spiroptera*, spec.?

From peritoneum of *Bufo melanostictus*, Schneider, Colombo.

A larva of 35 mm. by 1.18 mm.; head not distinct; reproductive organs not developed.

Stossich\* describes under the name *Spiroptera bufonis* a larva from the peritoneum of the common toad (*Bufo vulgaris*), with a length of 44 mm. and breadth of 1 mm., which closely resembles the present example.

HETERAKIS.

Mouth generally surrounded by three lips; the musculature is of the type of Schneider's Polymyaria; the genus belongs to the Secernentes; caudal extremity of the male provided with a bursa, and in front of the cloacal aperture with a circular sucker, into which radial muscles are inserted; two unequal spicula.

\* Boll. soc. Adriat., vol. XX., Trieste, 1900, p. 5, tab. II., figs. 14-18.



13.—*Heterakis trilabium*, n.sp.

Pl. I., fig. 9.

From the intestine of the jungle crow (*Centropus sinensis*, Illig.), Horana.

Cuticle annulate; three semi-circular lips at the head end, of which the dorsal lip carries two papillæ, the two others one papilla each; the œsophagus occupies  $\frac{1}{13}$  of the total length. The male attains a length of 26 mm. and a breadth of 0.69 mm.; the conical tail is  $\frac{1}{49}$  of the body length and carries on each side four large præ-anal and six post-anal papillæ. One pair of the latter occupies a sub-median position close behind the cloaca. In front of the latter there is a circular sucker. The cloacal aperture is triangular; the long sub-equal spicula measure respectively 1.95 and 1.97 mm.; their hinder end is rounded.

The female (39 mm. by 1.11 mm.) has a conical attenuated tail  $\frac{1}{38}$  of total length, with small digitate prolongation; the vulva lies behind the mid-body, dividing the body in the proportion of 8:5; the thick-shelled smooth eggs are 0.081 mm. by 0.047 mm. broad.

14.—*Heterakis anomala*, n.sp.

Pl. I., figs. 10, 11.

From the stomach of *Tropidonotus piscator*, Schneider ("diaplonga," Sinh.), Colombo.

Cuticle annulate; head with three elongate, sinuate lips; at their base the cuticle is swollen, and presents transverse rings with distinct posterior margins; the œsophagus equals  $\frac{1}{8}$  to  $\frac{1}{9}$  the total length.

The male measures 34 mm. by 1.14 mm.; the caudal end is pointed and occupies  $\frac{1}{43}$  of the body length; on each side there are three præ-anal and four post-anal papillæ; of the latter one pair lies close behind the cloacal orifice, and the next two pairs of lateral papillæ are remarkably large and touch one another; the sub-equal spicula are granulated and measure 1.70 and 1.75 mm.; the sucker-like organ is beset with eight roundish projections, of which the cuticle shows pore canals.

The female is 33 mm. long by 1.14 mm. broad; the finely pointed tail is  $\frac{1}{66}$  of the body length; the vulva opens at two-thirds of the length from the head end; the thin-shelled eggs measure 0.055 mm. by 0.036 mm.

## STRONGYLUS.

Body slender; the musculature is of the type of Schneider's *Meromyaria*, consisting of long rhombs generally arranged in six longitudinal rows; the genus belongs to the Secernentes; male



with two equal spicula ; a wide generally trilobed bursa at the tail end, supported by ribs ; the ribs of the bursa are muscular and terminate with a papilla ; head without buccal capsule, plainly rounded or with simple lips, frequently with six papillæ ; in the female the vulva lies behind the middle of the body.

15.—*Strongylus pigmentatus*, n.sp.

Pl. I., figs. 12, 13.

From stomach of hare, *Lepus nigricollis*, Cuv., Ranna, Southern Province.

This species is allied to *Strongylus retortæformis*, Zed.

The cuticle is annulate ; the head trilabiate, each lip carrying on its summit a small papilla ; the œsophagus occupies in the male  $\frac{1}{14}$ , in the female  $\frac{1}{18}$  of the total length ; the tail is acuminate ; œsophagus, testes, uterus, eggs, and especially the ovaries are coloured black.

Size of the male 7.7 mm. by 0.12 mm. ; the spicula are short, 0.68 mm. ; they are pale brown, and have at the root a scutiform appendix ; they terminate behind in three branches, of which the largest is rounded, the others pointed ; the bursa has two strong lateral lobes and a very narrow median lobe ; the latter is supported by a rib which bifurcates, and each branch again divides into two branchlets which lie close beside one another ; the outer branches are the shorter ; the lateral lobes of the bursa are each supported by six slender ribs.

The female is 10.5 mm. long by 0.14 mm. broad ; the tail is  $\frac{1}{18}$  of the total length ; the vulva is situated posteriorly, dividing the body in the proportion of 37 : 11 ; the eggs are 0.062 mm. long and 0.036 mm. broad.

The species differs from *Strongylus retortæformis*, Zed.,\* in the formation of the head, the pigment, the cirri or spicula, and the position of the vulva. The spicula of *S. retortæformis* end in a point and are undivided and twisted ; the vulva of this species is only 0.75 mm. distant from the end of the tail, in contrast with *S. pigmentata*, where it lies 2.46 mm. from the caudal extremity, the two species being approximately equal in size.

CYLICHNOSTOMUM.

Belongs to the Strongylidæ, Schneider's Meromyaria, and the Secernentes ; at the head there is a buccal capsule surrounded by two lateral and four sub-median papillæ, the lateral projecting freely above the cuticle ; the lumen of the capsule is lined by a

\* See W. Stödter. Die Strongyliden in dem Labmagen der gezähmten Wiederkäuer. Hamburg, 1901, pp. 76-86, 92 ; tab. XI., figs. 6-8, tab. XII.



bacillary layer; the two halves of the male bursa are each supported by ten ribs, of which the second and third lie close together; the 8th, 9th, and 10th are ramifications of one rib.

16.—*Cylichnostomum tetracanthum*, Mehlis.

Passed by ponies on Iranativu; the animals succumbed to enteritis, anæmia, and exhaustion. Presented by G. W. Sturgess, Esq., M.R.C.V.S.

Syn. *Strongylus tetracanthus*, Mehlis; *Sclerostomum tetracanthum*, Wedl.; *Cyathostomum tetracanthum*, Molin.

See A. Looss. The Sclerostomidæ of horses and donkeys in Egypt, Cairo, 1901, p. 124, tab. IV., VI.–XI., XIII.

TRIODONTOPHORUS.

Strongylidæ, Meromyaria, Secernentes; large buccal capsule with six papillæ, two lateral and four sub-median; mouth surrounded by bristles; at the bottom of the capsule are three teeth; male bursa as in the preceding genus.

17.—*Triodontophorus serratus*, Looss.

From *Equus caballus*, L.; passed by ponies on Iranativu. Presented by G. W. Sturgess, Esq.

Cf. A. Looss, *op. cit.*, pp. 83–86, tab. III., figs. 31–38.

KALICEPHALUS.

Head with thick-walled chitinous mouth, laterally compressed, the wall traversed laterally by longitudinal tracts of parenchyma with a dorsal and ventral impression; œsophagus remarkably short and broad, the posterior half thickened to form a bulbus containing valves; the male bursa is broad and trilobed, the cirri are equal; lateral lines narrow and raised, with a vessel; vulva behind the mid-body; the genus belongs to the Strongylidæ, more particularly to the *Sclerostomina*, to the Meromyaria, and Secernentes. The species live in the stomach and intestine of snakes in South America and the East Indies.

18.—*Kalicephalus willeyi*, n.sp.

Pl. I., figs. 14–18.

From the stomach and œsophagus of *Vipera russelli*, Gray (“*tiopolonga*,” Sinh.), Colombo and Weligatta; and from the intestine of *Coluber helena*, Daud., Horana.

The mouth cavity is large, compressed, and traversed by three paired parenchymatous bands ending in front in papillæ; there is a dorsal and ventral notch, rounded in front, acute behind;



the cuticle is smooth; the short œsophagus occupies in the male  $\frac{1}{15}$ , in the female  $\frac{1}{32}$  of the body length; the posterior half expands to form a bulbus with valves; the nerve collar surrounds the œsophagus approximately in the middle at its thinnest portion; the *porus excretorius* discharges below the middle of the œsophageal bulbus in the female 0.39 mm. from the head end. Along the dorsal surface of the œsophagus occurs a gland, the duct of which lies at the dorsal side of the mouth opening; shortly before the orifice is reached the duct expands into a vesicle. The intestine has a thick lining membrane which is united with the outer or basement membrane on each side. The lateral ridges occupy the 10th part of the periphery of the body wall and project inwards far beyond the musculature; they are divided by a septum into a dorsal and a ventral half, and at the inner edge of the septum there is a canal with triangular lumen.

The material consisted of a very large number of females with only one male, which was 5.9 mm. in length and 0.33 mm. in diameter; the bursa is trilobed, the unpaired median dorsal lobe is supported by a forked rib, the inner fork again divides at the end; the lateral lobes have four ribs each, of which the anterior is double, while the others arise from a common root; the thin cirri measure 0.37 mm.

The female attains a length of 19 mm. with a breadth of 0.51 mm.; the vulva is circular and rather prominent, lying behind the middle, and dividing the body in the proportion of 18:5; the eggs measure 0.057 mm. by 0.036 mm.

The genus *Kalicephalus* was established by Molin,\* who described seven species from Brazil, of which one was figured, viz., *K. inermis*. One of Molin's seven species, *K. appendiculatus*, was subsequently re-discovered by Stossich,† who also described an eighth species under the name *Strongylus ersiliae*,‡ from the Indian *Python molurus*. The species here described is therefore the ninth of the genus.

#### OXYURIS.

Belongs to the Meromyaria and the Secernentes. The œsophagus is long, terminating in a bulbus containing valves; male with one cirrus; frequently three papillæ on each side of the tail; female with long acuminate tail; eggs generally asymmetrical; the species live in mammals, amphibia, reptiles, insects, and myriopods.

\* Il sottordine degli Acrofalli. Mem. Ist. Venet., vol. IX., Venice, 1861, pp. 114-125, tab. VII., figs. 1-3.

† Boll. Soc. Adriat., vol. XX., Trieste, 1900, pp. 2, 3, tab. I., figs. 7, 8, tab. II., fig. 9.

‡ *Ibid.*, vol. XVII., 1896, p. 124, tab. IV., figs. 11-13.



19.—*Oxyuris poculum*, n.sp.

Pl. II., figs. 19-21.

Passed by ponies on Iranativu. Presented by G. W. Sturgess, Esq., M.R.C.V.S.

This species is nearly related to *Oxyuris curvula*, Rud., having the same form as the latter; the mouth is hexagonal with two large lateral papillæ in contradistinction to the six papillæ of *O. curvula*; the œsophagus in the male occupies  $\frac{1}{7.7}$  of the total length, terminating in a bulbus; the ducts of the three œsophageal glands lie quite anteriorly in the lumen of the œsophagus, and are cup-shaped with denticulate margin, whereas in *O. curvula* they are tubular.

The male is 14.2 mm. long by 0.99 mm. in diameter; the cirrus is 0.44 mm. long, finely acuminate; the tail carries four papillæ, of which two lie at the posterior angles of the quadrangular portion of the body and two are placed ventrally. The six median papillæ of *O. curvula* are absent in the present species.

The female has a long filamentous hind body, and attains a length of 65 mm. and breadth of 2.57 mm.; the eggs have a double shell; the outer shell is perforated at one pole, the orifice being closed by a plug; the eggs measure 0.081 mm. by 0.047 mm., those of *O. curvula* being 0.099 mm. by 0.042 mm.

20.—*Oxyuris acanthura*, n.sp.

Pl. II., fig. 22.

From rectum of *Calotes versicolor*, Dum et Bibr., Colombo.

Head rounded, without lips and papillæ; the œsophagus is long and narrow, ending behind in a strong bulbus; in the male it is  $\frac{1}{4.5}$  of the total length, in the female  $\frac{1}{4}$ ; the intestine is wider than the œsophageal bulb; the cuticle is deeply ringed.

The male (2.29 mm. by 0.37 mm.) has a rounded tail end with a curved process bearing on each side one papilla, while the body has two papillæ on each side; the cirrus measures 0.065 mm.

The female is 5.84 mm. long and 0.55 mm. broad; the rounded tail,  $\frac{1}{15}$  of the body length, ends with a style-shaped process; the vulva lies behind the mid-body, dividing the body in the proportion of 7:5. Eggs were not mature.

The species has affinity with *Oxyuris brevicaudata*, Duj., from *Ascalobotes fascicularis*. Parona\* refers to an unnamed *Oxyuris* from *Calotes*, spec., with a length of 20 mm., the vulva opening in the anterior third of the body.

---

\* Elminti di Birmania. Ann. Mus., Genova, ser. ii., vol. VII., 1890, p. 771.



## CTENOCEPHALUS, n.g.

At the head end a dorsal and a ventral erectile lip, whose end lobes interdigitate; four cervical glands with two orifices in the dorsal lip; cephalic cuticle thickened like a turban with transverse grooves; low and narrow lateral lines without vessel; excretory pore absent; two equal cirri; belongs to the Poly-myaria and Resorbentes.

21.—*Ctenocephalus tiara*, Von Linstow.

Pl. II., figs. 23–27.

From stomach of *Varanus bengalensis*, Daud. (“talagoya,” Sinh.), Bolgoda, and from stomach of *Varanus salvator*, Gray (“kabaraguwa,” Sinh.), Horana.

I described this species in the year 1879 under the name *Ascaris tiara*.† I now perceive that it must form the type of a distinct genus. The original specimens were taken from the Natal monitor, *Varanus ornatus*, Daud.

The formation of the head is very remarkable, comprising a dorsal lip with three rounded projections and a ventral lip with four similar processes, interdigitating; the lips can also separate from one another and be erected; in their hinder portion there are four club-shaped glands with round lumen, reaching backwards 0.2 mm.; outwardly the glands are furnished with spiral muscles; the two glands on the right and left side, respectively, unite into a common duct, and both ducts (right and left) open to the exterior on the dorsal lip; the cuticle is deeply grooved at intervals of 0.088 mm.; the œsophagus measures  $\frac{1}{3}$ – $\frac{1}{4}$  of the total length; the tail is conical; dorsal and ventral tracts narrow; the lateral tracts (“Seitenfelder”) are broad and low, and do not project inwards beyond the musculature; they occupy, on each side,  $\frac{1}{8.7}$  of the periphery of the body; a septum divides them into dorsal and ventral halves, but there is no vessel and consequently no *porus excretorius*.

The worms had bored with their heads deep into the wall of the stomach, which had grown firmly round them; the nutrition, therefore, cannot take place through the mouth, but evidently, as with *Filaria* and all other Resorbentes, through the cuticle; the lateral fields appear to play the part of absorbing organs.

The male is 18–20 mm. long and 0.63–1 mm. in diameter; the tail measures  $\frac{1}{3.5}$  of the total length; the two falciform cirri have pointed ends and a length of 1.6 mm.; there are on each side of

† Württemb. naturw. Jahresh. Jahrg., XXXV., Stuttgart, 1879, p. 320, tab. V., fig. 1.



the tail two præ-anal, one large par-anal, and three post-anal papillæ.

The length of the female amounts to 25–28 mm., with breadth of 1·2–1·3 mm.; the tail measures  $\frac{1}{46}$  of the length of the body; the vagina opens behind, dividing the body in the proportion of 50 : 11; the eggs are 0·065 mm. by 0·042 mm. in size; they have thin shells, and their surface is beset with fine granulations.

#### FILARIA.

Belongs to the Polymyaria and the Resorbentes; elongated Nematoda; low and broad lateral fields, which generally occupy  $\frac{1}{6}$  of the circumference of the body; excretory pore absent; caudal end of the male generally spiral; two unequal cirri; at the tail end two rows of papillæ, on each side four præ-anal; in the female the vulva lies quite in front.

The species occur in Vertebrata, especially mammals and birds, in all organs except in the digestive tract.

#### 22.—*Filaria vivipara*, n.sp.

From the peritoneum of *Corvus splendens*, Vieillot, Colombo.

The material only contained females, 16–21 mm. long and 0·32 mm. broad; the œsophagus measures  $\frac{1}{28}$ , the tail  $\frac{1}{85}$  of the total length; the generative orifice lies in front 1·5–1·8 mm. from the cephalic extremity; the eggs with membranous chorion measure 0·039 mm. by 0·031 mm.; the species is viviparous,\* and the uterus and vagina were filled with immense numbers of embryos. Both ends of the body are rounded; on each side of the head a small papilla; lateral fields  $\frac{1}{6}$  of the periphery. The embryos are 0·043–0·364 mm. long and 0·0052 mm. broad, relatively very long and slender; the head of the embryo is rounded, the tail pointed, and no internal organs can be distinguished.

Presumably the embryos penetrate into the vascular system of the bird, where they live as blood-filariæ.

---

\* See "Spolia Zeylanica," part II., p. 28.



## EXPLANATION OF PLATES

*Illustrating Dr. von Linstow's Paper on Nematoda in the Colombo Museum.*

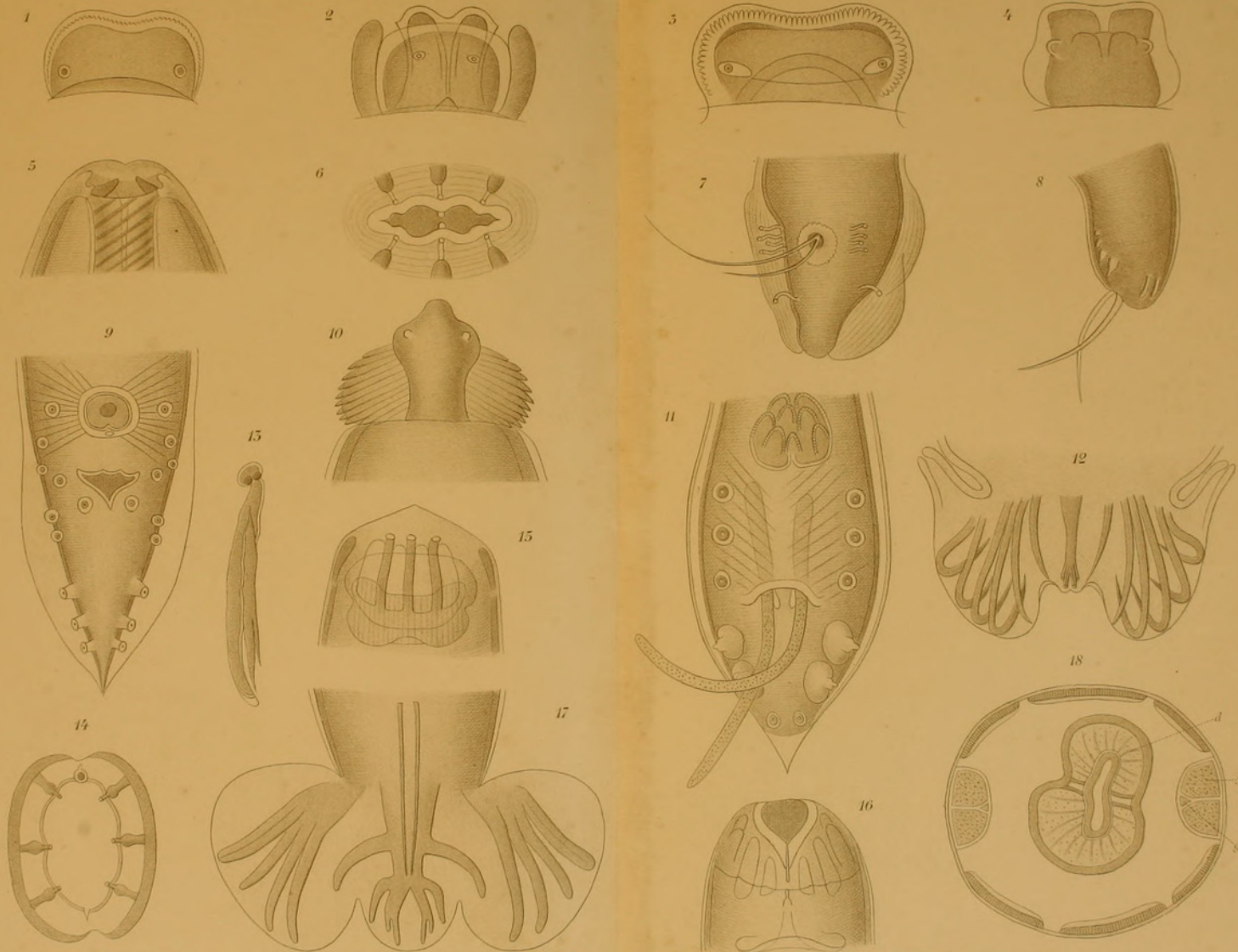
## PLATE I.

- Fig. 1.—*Ascaris rotundicaudata*. Dorsal lip.  
 Fig. 2.—*A. ceylanica*. Dorsal lip.  
 Fig. 3.—*A. brachyura*. Dorsal lip.  
 Fig. 4.—*A. quadrata*. Dorsal lip.  
 Fig. 5.—*Spiroptera dentata*. Head end from the side.  
 Fig. 6.—Same. Frontal view of head.  
 Fig. 7.—Same. Tail end of the male.  
 Fig. 8.—*Spiroptera triangulum*. Tail end of male.  
 Fig. 9.—*Heterakis trilabium*. Tail end of male; cirri omitted.  
 Fig. 10.—*H. anomala*. Head.  
 Fig. 11.—Same. Tail end of male.  
 Fig. 12.—*Strongylus pigmentatus*. Bursa of male.  
 Fig. 13.—Same. Cirrus of male.  
 Fig. 14.—*Kalicephalus willeyi*. Frontal view of head.  
 Fig. 15.—Same. Side view of head.  
 Fig. 16.—Same. Dorsal view of head.  
 Fig. 17.—Same. Bursa of male.  
 Fig. 18.—Same. Transverse section of body; *d.* intestine; *s.* lateral field; *g.* lateral vessel or canal.

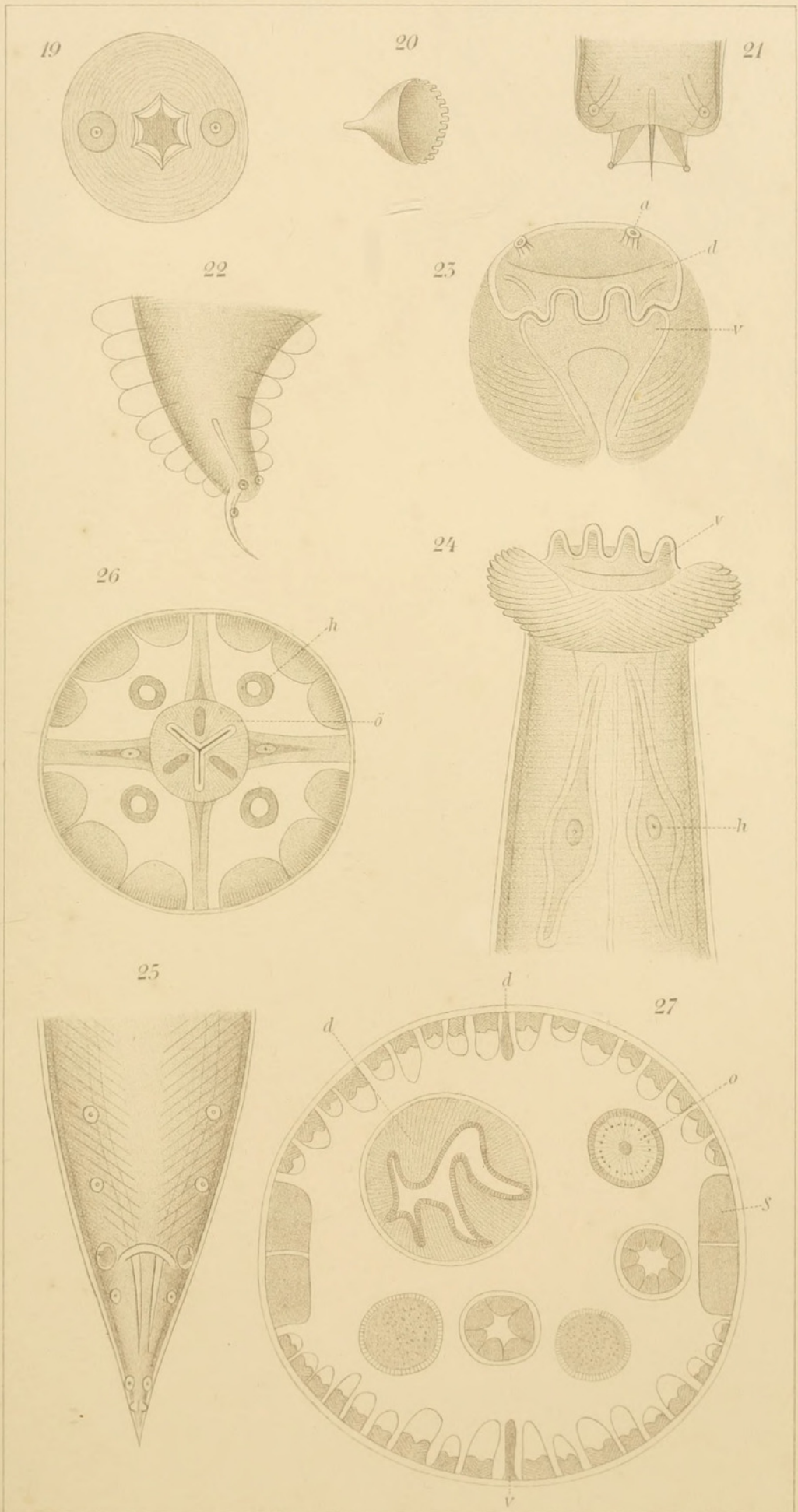
## PLATE II.

- Fig. 19.—*Oxyuris poculum*. Frontal view of head.  
 Fig. 20.—Same. A cup-shaped expansion of the duct of the oesophageal glands.  
 Fig. 21.—Same. Tail end of male.  
 Fig. 22.—*Oxyuris acanthura*. Tail end of male.  
 Fig. 23.—*Ctenocephalus tiara*. Frontal view of head; *d.* dorsal lip; *v.* ventral lip; *a.* external orifice of the cervical glands.  
 Fig. 24.—Same. Ventral view of head; *v.* erected ventral lip; *h.* cervical gland.  
 Fig. 25.—Same. Tail end of male.  
 Fig. 26.—Same. Transverse section through the neck region; *o.* oesophagus; *h.* cervical gland.  
 Fig. 27.—Same. Transverse section through a female; *d.* dorsal tract; *v.* ventral tract; *s.* lateral field; *d.* intestine; *o.* ovary.













Linstow, Otto von. 1904. "Nematoda in the collection of the Colombo Museum." *Spolia zeylanica* 1, 91–104.

**View This Item Online:** <https://www.biodiversitylibrary.org/item/41908>

**Permalink:** <https://www.biodiversitylibrary.org/partpdf/34018>

**Holding Institution**

MBLWHOI Library

**Sponsored by**

MBLWHOI Library

**Copyright & Reuse**

Copyright Status: Public domain. The BHL considers that this work is no longer under copyright protection.

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.