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LVIII.—A contribution to our knowledge of the Oligochoëta of Travancore

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LVIII.—*A Contribution to our Knowledge of the Oligochæta of Travancore.* By Dr. LUIGI COGNETTI DE MARTIIS, Torino, R. Museo Zoologico.

[Plate XIII.]

THE present paper is the result of the examination of a collection belonging to the British Museum and entrusted to me by Prof. F. J. Bell, who received them from the Trivandrum Museum*.

The first work in which Oligochætes from Travancore are mentioned is a paper by Miss S. M. Fedarb published in 1897 (4). Prof. Dr. W. Michaelsen has recently discussed the drilofauna of the entire Indian Empire and adjacent regions in two valuable works (12, 13). From these works it results that nineteen species of earthworms have already been collected in the State of Travancore.

The collection examined by me contains only one of the species which are contained in Michaelsen's lists, viz. *Glyphidrilus annandalei*, Mich. It contains besides four new species and a "peregrine" species, *Lampito mauritii*, Kinb., which has already been collected in other localities of S. India.

At present our knowledge of the drilofauna of Travancore extends to twenty-four species, as follows:—

Fam. MONILIGASTRIDÆ.

- Drawida barwelli* (Bedd.).
 — *ghatensis*, Mich.
 — *pellucidus* (Bourne), var.
 pallida, Mich.
 — *travancorensis*, Mich.
 — *fakir*, sp. n.
Moniligaster deshayesi, E. Perr.

Fam. MEGASCOLECIDÆ.

Subfam. MEGASCOLECINÆ.

- Plutellus timidus*, sp. n.
Megascolides tenmalai, Mich.
Lampito mauritii, Kinb.
Megascolex insignis, Mich.
 — *konkanensis*, Mich.
 — *travancorensis*, f. *typica*,
 Mich.
 var. *ghatensis*, Mich.
 var. *quilonensis*, Mich.
 — *ratus*, sp. n.
 — *eunephrus*, sp. n.
Pheretima travancorensis (Fedb.).

Subfam. OCTOCHÆTINÆ.

- Octochætus aitkeni* (Fedb.).
 — *pittnyi*, Mich.

Subfam. TRIGASTRINÆ.

- Dicrogaster affinis* (Mich.).
 — *bolani* (Mich.).
 — *travancorensis* (Fedb.).

Subfam. OCNERODRILINÆ.

- Gordiodrilus travancorensis*, Mich.
Ocnodrilus occidentalis, Eisen.

Fam. GLOSSOSCOLECIDÆ.

- Subfam. GLOSSOSCOLECINÆ.
Pontoscolex corethrurus (F. Müll.)

Subfam. MICROCHÆTINÆ.

- Glyphidrilus annandalei*, Mich.

* I have to express my sincere thanks to Prof. F. J. Bell for this new proof of consideration in sending me this very interesting collection.

This paper was already in type when I received, by the kindness of Prof. Dr. W. Michaelsen, his monograph "Die Oligochätenfauna der vorderindisch-ceylonischen Region" (13), issued in September, 1910. In the following pages is found a description of *Glyphidrilus annandalei*, Mich., which I wrote before receiving this monograph. My description agrees with that of Michaelsen; the two descriptions supplement each other.

Fam. Moniligastridæ.

Drawida fukir, sp. n. (Pl. XIII. figs. 1-3.)

A single immature specimen.

External characters.—Length 85 mm., greatest thickness 3 mm.; number of segments 98.

Colour uniformly lilac-grey.

Head prolobous; body cylindrical, slightly reduced in diameter at the tail.

Setæ strictly paired: $aa=bc$; dd a little larger than half the circumference of the body.

Dorsal pores not seen. Clitellum not developed. Nephridial pores from the third segment, on the anterior margin, in the lines of the superior dorsal setæ (d).

At the intersegmental furrow x.-xi., a little laterally to the lines of ventral bundles of setæ, is present a pair of small conical tubercles, contained in two small and not very deep pouches; these tubercles are in relation with the male pores, but I have not been able to determine whether the pores are at the summit or at the base of the tubercles (Pl. XIII. fig. 1). The tubercles correspond in shape with those drawn by Michaelsen (12, pl. xiii. fig. 2) for *Drawida sulcata*, Mich.

Female pores at anterior margin of the xii. segment, in the lines of the superior ventral setæ (b).

Spermathecal pores at intersegmental furrow vii.-viii., a little laterally to the lines of ventral bundles of setæ.

Internal anatomy.—Septa vi.-vii.—viii.-ix. somewhat thickened.

Four strong gizzards are distributed in segments xiii., xiv., xv., and xvi.

The paired hearts are found in segments vi.-ix. At x. segment, close behind the anterior septum, a pair of trunks originate from the dorsal vessel. These two trunks are directed backwards in the ventral region, to unite with the subneural blood-vessel close to the anterior surface of septum xi.-xii.

A large pair of testicular vesicles runs through septum ix.-x. laterally to the gut. The anteseptal part of each vesicle (a little more developed at the left side) is divided into two globular portions by a constriction. The postseptal part is more developed than the anteseptal, from which it is separated by a deep constriction. The postseptal part is irregularly pear-shaped, diminishing in diameter at the posterior end, and it is entirely contained in the x. segment (Pl. XIII. fig. 2). On the left side the postseptal part is longer than on the right, and at the end is rather S-shaped.

A sperm-duct-funnel is found in the postseptal portion of each vesicle, united to its ventral wall just behind septum ix.-x. The sperm-ducts are short and a little undulated; they enter into the proximal part of the prostates. The prostates are white and tubular; they are closely coiled on each side. They are of equal thickness throughout their length, and their distal extremity is provided with a short, thinner, muscular tract.

A pair of enormously developed ovaries lies in the xi. segment, suspended to the anterior septum along a line that almost entirely encloses the gut. The ovaries are enclosed in a very thin-walled periesophageal capsule that extends from septum x.-xi. to septum xi.-xii. At the posterior wall of the ovarian capsule (viz. septum xi.-xii.) are placed, on each side, the orifice of an egg-sac and the funnel of the oviduct. The first is surrounded by a circle and placed dorsally to the gut. The little oviducal funnels are ventral and connected with the short and straight oviducts.

The egg-sacs are cylindrical and prolonged backwards, but contained in the xii. segment, in which they are only once folded. The cavity of the egg-sacs is partially obliterated by a rich network of blood-vessels, but eggs are wanting.

Spermathecae in viii. segment near to septum vii.-viii. Each spermatheca consists of a white, thin-walled, spherical ampulla and a thin, long, bent duct* which traverses the body-wall to open directly to the exterior. Muscular atrial chambers are wanting. The two ampullæ lie dorsally to the oesophagus, and the pole of each ampulla, which is opposite to the origin of the canal, is fastened to the middle line of the posterior surface of septum vii.-viii. by a very short and straight ligament (Pl. XIII. fig. 3).

Hab. Arumanallur, 45 km. E.S.E. from Trevandrum (*Mr. R. Shungara Narayana*, 23. vi. 1910).

This new species of *Drawida* is easily distinguished from

* See Michaelsen. (12) p. 139.

the other species of the same genus by the position of the male and spermathecal pores, number and position of the gizzards, and shape of prostates.

Fam. Megascolecidae.

Subfam. MEGASCOLECINÆ.

Plutellus timidus, sp. n. (Pl. XIII. fig. 4.)

Five mature specimens are in the collection.

External characters.—Length 30–48 mm., thickness about 1 mm.; segments nearly constant in number, viz. 116–119.

Colour violaceous grey, at the clitellum brown violaceous.

Head epilobous, prostomium small. The body is a little compressed behind the clitellum, except the tail.

Setæ paired all along. The dorsal bundles are beyond the lateral lines. About at the x. segment $aa = \frac{5}{3} ab$, $ab = \frac{3}{4} bc$, $bc = cd$, cd somewhat smaller than dd , dd a little larger than $\frac{1}{2}$ of the whole circumference. The middle lateral distances increase in amplitude behind the clitellum, whilst the middle dorsal distance is gradually reduced. At the middle region of the body $aa = \frac{5}{3} ab$, $ab = \frac{1}{2} bc$, $cd = \frac{2}{3} bc$, $dd = cd$. At the tail $aa = ab = \frac{1}{2} bc$, $dd = cd = \frac{1}{2} bc$.

First dorsal pore at the intersegmental furrow xi.–xii. (? x.–xi.).

Nephridial pores, at least before the clitellum, nearly in the lines of the setæ *b*. Clitellum developed all round the body, and occupying segments xiv.–xvii. The intersegmental furrows xiv.–xv., xv.–xvi., and xvi.–xvii. are nearly obliterated.

Male pores on small papillæ on the xviii. segment, about equally distant from the two bundles of setæ. A second pair of papillæ on the xix. segment, close laterally to the ventral setæ *b*. These papillæ are prolonged forwards and obliquely, and they are connected on each side with the anterior papilla (Pl. XIII. fig. 4).

Female pores on the xiv. segment, a little forwards and internally to the first ventral setæ (*a*). These pores are situated in a small transverse-oval area, which is rather more distinct than the clitellum (Pl. XIII. fig. 4).

A pair of spermathecal pores on the viii. segment, in the zone of the setæ, between the lines of setæ *b* and *c*.

Internal anatomy.—First septum v.–vi. very thin; septa vii.–viii.—xii.–xiii. thickened. A not very strong gizzard in the v. segment. Intestine without typhlosole.

Nephridial system meganephric.

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Testes and sperm-duct-funnels free in the x. and xi. segments. A pair of little grape-like sperm-sacs depends from septum xi.-xii. into the xii. segment.

A pair of tubular prostates lies in the xviii. segment, but a short proximal part of these organs stretches out into the xix. segment through septum xviii.-xix. The delicate axial tube of each prostate is not ramified. The sperm-ducts enter the proximal part of the muscular ducts of the prostates, which is a little coiled. There are no penial setæ.

A pair of ovaries and oviduct-funnels in the xiii. segment; a pair of small egg-sacs in xiv.

A pair of spermathecæ in the viii. segment. These organs consist only of a long pear-shaped ampulla. There are no diverticula.

Hab. Muvattupuzha, 170 km. N.N.E. from Trevandrum (*Mr. Shungara Narayana*, 28. iv. 1910).

This interesting new species is distinguished from others of the same genus by the possession of a single pair of spermathecæ. This character requires some slight modification of the definition of the genus *Plutellus* as given by Michaelsen *. Spermathecal pores on the viii. segment, in the zone of setæ, were already found by Michaelsen in his *Plutellus indicus* f. *typica* †, but that species possesses a second pair of spermathecal pores in intersegmental furrow viii.-ix.

Lampito mauritii, Kinb.

Megascolex mauritii, Michaelsen, (7) p. 227.

Lampito mauritii, Michaelsen, (11) p. 160; (12) pp. 103, 178, 179.

Some mature and several young specimens were collected.

Hab. Murukunpuzha, 15 km. N.W. from Trevandrum (*Mr. Shungara Narayana*, 5. v. 1910); Vazhote, 25 km. E.N.E. from Trevandrum (*ditto*, 27. vi. 1910); Shertalay, 150 km. N.N.W. from Trevandrum (*ditto*, 10. iv. 1910).

Megascolex eunephrus, sp. n. (Pl. XIII. figs. 5-7.)

A mature but incomplete specimen.

External characters.—Length 85 mm. (the tail is wanting), greatest thickness (before the clitellum) 3 mm.; number of segments 195.

Colour uniformly lilac-grey.

Head proepilobous. The segments are not biannulated.

* See (7) p. 163, and (10) p. 159.

† See (11) p. 148, and (12) pp. 154, 155.

Number of setæ nearly constant in each segment, about 24, both at the anterior and at the middle and posterior regions. The circles of setæ are regularly but not broadly interrupted ventrally ($aa=2ab$); dorsally the setæ are a little more distant.

Clitellum developed all round the body and occupying segments xiv.-xvii.

First dorsal pore on intersegmental furrow viii.-ix.

On intersegmental furrows (? ii.-iii.) iii.-iv.-viii.-ix. is found a pair of little nephridial pores, in the lines of setæ *e*.

In the middle ventral region of the xviii. segment there are a few large, but well-marked triangular papillæ, which enclose a little triangular area (Pl. XIII. fig. 5). One of the angles of the papilla is directed forwards and extended on the posterior margin of the xvii. segment. Other angles are lateral, and near them are found the male pores, in the lines of setæ *b*.

Spermathecal pores two pairs, on intersegmental furrows vii.-viii. and viii.-ix., in the lines of setæ *b*.

Internal anatomy.—Septa vi.-vii.-ix.-x. moderately thickened.

A gizzard in the v. segment. The œsophagus is irregularly swollen in segments xv.-xx., but is not provided with calciferous glands. The wide intestine suddenly begins in the xxi. segment. Last hearts in the xiii. segment.

On segments iii.-ix. is found respectively a pair of large nephridia. These organs consist of a proximal portion, from which originates a thin-walled ribbon-like duct, which increases in length from the first to the seventh pair of nephridia and passes through the body-wall at the extreme anterior margin of each segment. The proximal portion of these meganephridia is conspicuous, and consists of a tuft of very thin whitish filaments, each of which contains a long strip of nephridial tubule.

From the x. segment the nephridia are diffused and very small, but on the xiv. and xv. segments, on each side of the œsophagus, is found a pair of meganephridia (besides the small micronephridia) which are similar to those of segments iii.-ix.

Testes and sperm-duct-funnels free in the x. and xi. segments. Two pairs of grape-like sperm-sacs lie in segments xi. and xii., depending from the anterior septum.

The glandular part of the prostates is much lobed and extended into segments xvii.-xx. The muscular duct of each prostate lies in the xviii. segment, in which it describes a curve towards the middle ventral line, from the anterior

septum to the male pore, which is placed just behind the circle of setæ (Pl. XIII. fig. 6). Penial setæ are wanting.

There are two pairs of spermathecæ in segments viii. and ix. The main pouch is club-shaped; the diverticulum is finger-shaped and opens into the distal part of the duct of the main pouch. The length of the diverticulum is nearly equal to a third of the main pouch (Pl. XIII. fig. 7).

Hab. Coorloon (Mr. *Shungara Narayana*, 23. vi. 1910).

An important character of this new species of *Megascolex* is the presence of large paired meganephridia in the anterior segments. Similar nephridia have been found by Prof. Benham in *Megascolex laingii*, Benh.*, but perhaps in the cephalic region only, where they "probably" perform the office of peptonephridia.

Megascolex ratus, sp. n. (Pl. XIII. figs. 8-10.)

Four mature specimens in the collection, but only three of these are complete.

External characters.—Length: A 230, B 260, C 315 mm.; greatest thickness, on x. segment: A 7, B 9, C 10 mm. Number of segments: A 162, B 168, C 218.

Colour dorsally violet-brown or dark violet, ventrally grey; grey lines are present corresponding to the circles of setæ.

Head tanylobous. The prostomium is short, broad, and provided dorsally with longitudinal furrows, prolonged on to the first segment; this segment is provided with several longitudinal furrows, which do not reach the posterior margin. Segments x.-xiii. are biannulated.

Setæ more crowded in the ventral than in the dorsal region, particularly towards the clitellum, where the circles of setæ are interrupted in the middle ventral line ($aa=2\ ab$, $ab=bc=cd\ .\ .\ .$), but the interstice is wanting at the dorsal region ($zz=yz=xy\ .\ .\ .$). Somewhat behind the clitellum the circles of setæ are provided with two middle interstices ($aa=3\ \text{or}\ 4\ ab$, $zz=3\ \text{or}\ 4\ yz$).

There is no great difference in the dimensions of the setæ of a circle. At the x. segment there are about 180 setæ, and in the middle region of the body about 135 setæ on each segment.

Clitellum saddle-shaped, occupying segments xiv.-xviii., unprovided with intersegmental furrows. On the xiv. and xv. segments it is a little more extended than on the following segments (Pl. XIII. fig. 8).

* See (1) pp. 273, 274. "The worm is micronephridic, anteriorly is a large glandular body, which is probably a peptonephridium." As regards the term "peptonephridium," consult my note of 1905 (2).

On the clitellum the setæ are wanting. Male pores on the xviii. segment corresponding to the lines of setæ *h*; between the male pores the setæ are wanting. Each male pore is placed on a whitish tubercle, which is supported by a swollen papilla (Pl. XIII. fig. 8).

There are other paired papillæ on intersegmental furrows xvi.-xvii., xix.-xx., xx.-xxi., and xxi.-xxii., crowded in the middle ventral line. The last or the last two pairs of papillæ may be wanting; the pair of intersegmental furrows xvi.-xvii. is more developed and swollen than other pairs (Pl. XIII. fig. 8). Female pores in the anterior part of the xiv. segment, about in the lines of the setæ *a*, in a transversely extended little area, placed towards the circle of the setæ.

Spermathecal pores two pairs, hidden in intersegmental furrows vii.-viii. and viii.-ix. in the lines of the setæ *f*.

Internal anatomy.—Septa vii.-viii.—xii.-xiii. much thickened.

A strong gizzard in the vi. segment. The sacculated intestine begins in the xiv. segment. Last hearts in the xiii. segment.

Micronephridia very small.

Two pairs of testes and sperm-duct-funnels lie ventrally in the x. and xi. segments. The testes and funnels of a single segment are included in a pair of large and a few lobated capsules, which join dorsally to the oesophagus. These capsules are compressed between the strong funnel-like septa ix.-x., x.-xi., and xi.-xii., to which they are united only in the ventral region of the body; in other regions they are free. It is to be noted that the capsules round the oesophagus are traversed by little muscular bundles, which go from one septum to another, and sometimes are prolonged to the body-wall.

A pair of white, finger-shaped sperm-sacs depends from septum ix.-x. into the ix. segment; a second pair of similar sacs depends from septum xi.-xii. into the xii. segment. The sperm-sacs are somewhat smaller than the testicular capsules.

The prostates consist of a strong, cylindrical, muscular duct; that from the male pore goes laterally, and then backwards into the xix. segment, to unite with the glandular portion. This portion is well developed and provided with grooves which form lobes at the margins. The glandular portion extends from the xix. to the xxii. segment inclusive (Pl. XIII. fig. 9).

There are two pairs of spermathecae in the viii. and ix. segments. The main pouch consists of a sac-shaped trans-

versely striped ampulla, which is somewhat broader distally than at the rounded proximal end, and of an abruptly separated duct, about a third as long and as broad as the ampulla. Into the proximal end of this duct opens a small diverticulum, which contains some (4-5) oval seminal chambers. The diverticulum is enclosed in the duct-wall, but projects above its surface (Pl. XIII. fig. 10).

Hab. Coorloon (*Mr. Shungara Narayana*, 23. vi. 1910).

The diverticulum of the spermathecæ enclosed in the duct-wall is an important feature of this new species, which also appears in *Megascolex cæruleus*, R. Templ. *, and *M. hendersoni*, Mich. †, but *M. ratus* is distinguished from these two species by well-defined characters, viz., papillæ, number and shape of the sperm-sacs, &c.

Fam. Glossoscolecidae.

Subfam. MICROCHÆTINÆ.

Glyphidrilus annandalei, Mich. (Pl. XIII. figs. 11 & 12.)

Glyphidrilus annandalei, Michaelsen, (13) p. 101.

Nine mature or nearly mature specimens, six of them complete and three incomplete young specimens.

External characters.—The longest, but not fully mature, specimen measures 165 mm. in length, and 2.5-3 mm. in greatest (at the x. segment and clitellum ‡) or 1 mm. in smallest thickness (at the posterior end). This specimen is composed of 205 segments, but the tail is wanting. Other mature or nearly mature specimens: length 90-128 mm., greatest thickness 3.5-4 mm., smallest thickness 1-1.5 mm.; number of segments 125 (for a length of 90 mm.) to 322 (for a length of 128 mm.).

The shape of the body is very similar to that of *Criodrilus* and *Alma*. The anterior region is conical and provided at the end with a broad and short prostomium.

In some specimens there is a small transverse furrow on the dorsal surface of the prostomium, which determines the head prolobous.

Segments i.-iii. are short, iv.-xii. are the longest of all, and appear more or less distinctly triannulated.

In the mature specimens the body is somewhat depressed between the xxv. and xxxv. segments, and this depression extends often to all the clitellar region.

* See Michaelsen, (7) p. 232, ubi liter.

† See Michaelsen, (11) p. 162, and (12) p. 184, pl. xiii. fig. 23.

‡ The fin-like lateral plates are not included.

The posterior third of the body is coiled and distinctly tetragonous; the transverse section of the tail is trapezoid, the largest side corresponding to the dorsal surface of the body, and the four angles to the bundles of the setæ.

The tail is smaller than the cephalic region. The anal pore appears as a short longitudinal cleft in the middle dorsal line of the last three segments.

Colour violet-grey, clearer and with a tendency to rose-colour at the clitellum, especially on segments . . . xvii.-xxxiii. . . .

The body-wall is very thin, especially at the tail, and internal organs can be seen through them: for example, the spermathecae on intersegmental furrows xiii.-xiv. to xvi.-xvii. in mature specimens.

The setæ are paired, but not strictly. On x. segment aa nearly = $2 ab$, $ab = \frac{1}{2} bc$, $cd = ab$, dd a little larger than $2 cd$ or than aa . On the posterior half of the body the setæ are more strictly paired: aa nearly = $3 ab$, $aa = bc$, $ab = cd$, dd nearly = $4 cd$.

All mature specimens are provided with unpaired middle ventral papillæ on segments (xii.) xiii. to the xviii. . . . xxiii. (xxv.). In one specimen there are also small median papillæ on segments xxxiii.-xxxv.

Paired lateral papillæ are found close laterally to the setæ b of segments xviii.-xxvi. and xxxiv.-xxxv. Some specimens are also provided with scattered paired papillæ on segments xvi., xvii., and xxvii.-xxxiii., or on some of these (Pl. XIII. fig. 11).

All the papillæ are slightly swollen, more so near the posterior than the anterior margin of their respective segments. Each papilla has the appearance of a little grey round stain, which is provided in its centre with a small whitish circle (Pl. XIII. fig. 12).

The clitellum is developed all round the body, and occupies at most twenty-five segments. Indeed, in a specimen from Achencoil River banks it extends from the xv. to the xxxix. segment, and is more or less evident from its rose-grey colour, and for the slight tumefaction, which is in relation to a greater quantity of glandular cells in the epidermis.

In other specimens the posterior margin of the clitellum is between the xxxv. and xl. segments, while its anterior margin seems to be constantly on intersegmental furrow xvii.-xviii. All the intersegmental furrows of the clitellum are recognizable, but not very distinctly those included between the xxv. and xxxiv. segments (Pl. XIII. fig. 11).

The clitellar region may be depressed, at least partially, and its lateral margins, often rather sharp, are provided with

two small longitudinal stripes, which are interrupted at the intersegmental furrows. The stripes extend on segments xviii. to xxvi. ($\frac{1}{2}$ xxvii.) and on segments ($\frac{1}{2}$ xxxii., xxxiii.) $1/n$ xxxiii. and xxxiv. They are placed laterally to the lines of setæ *b*; between these lines and stripes are found the paired lateral papillæ. Close ventrally to the stripes, for their whole length, are two thin grey bands, which are interrupted, as are the stripes, on the space between segments xxvi. and xxxiii. or xxxiv. (Pl. XIII. fig. 12).

In this space the body-depression is greatest, and the lateral margins are quite sharp and expanded to form two fin-like plates, a little undulated, which extend to segments xxvii.—xxxii. or $\frac{1}{2}$ xxxiii. (or xxxiii.), being in the lines of the stripes described above (Pl. XIII. fig. 11). Each plate is about 1 mm. wide, their margins are parallel, and their ends diminish rapidly in breadth.

The two stripes, with the adjacent grey bands, are similar to the tubercula pubertatis of some Lumbricidæ—for example, of *Octolasion complanatum* (Ant. Dug.)*,—and the fin-like plates correspond to the organs which in other species of *Glyphidrilus* have been named by Rosa † “tubercula pubertatis,” by Horst ‡ “clitellar ridges,” and by Michaelsen § “Pubertätstuberkei - Wälle,” “clitelliale Längswülste,” “Pubertätssäume.”

It seems to me that these fin-like plates may be regarded as corresponding to those curious appendages which have been described in the Criodriline genera *Alma* and *Criodrilus* under the name of “penes.” They are provided, among other things, with a rich vascularization || like the last-named organs. The whole shape is altogether different.

The nephridial pores are in the lines of setæ *b*.

I found the male pores only in two specimens. They appear as two point-like depressions on intersegmental furrow xxix.—xxx. in the lines of setæ *b*.

The female pores are not visible.

The small spermathecal pores are distributed in various numbers—to six pairs—on intersegmental furrows xiii.—xiv. to xvi.—xvii. On each side they are contained between the

* See the figure of the clitellar region of this species given by Rosa, (14) pl. i. fig. 4.

† See Rosa, (15) p. 387, pl. xii. fig. 1.

‡ See Horst, (5) pp. 38, 76, and pl. ii. fig. 18.

§ See Michaelsen, (6) pp. 196, 197, 242, and pl. xiii. fig. 1 *cv.*; (7) pp. 459–461; (8) p. 36; (13) p. 102.

|| See Horst, (5) p. 39. The structure and development of the “penes” of the Criodrilinæ are the subject of a recent paper by me (3).

first and last lines of setæ, rarely more ventrally, and they are, nearly always, quite in the lines of the setæ.

Internal anatomy.—The septa 6-7 to 11-12 are slightly thickened.

A moderately developed oblong gizzard occupies the entire length of the viii. segment and a little part of the vii. The intestine begins in the xiv. segment. There are three pairs of hearts in segments ix., x., and xi.

Two pairs of testes and sperm-duct-funnels lie free in segments x. and xi. The sperm-sacs are paired and placed in segments ix., x., xi., and xii. Those of the first three pairs are nearly equal in size, but those of the last pair are somewhat larger, and push backwards the two thin septa xii.-xiii. and xiii.-xiv.

No prostates are recognizable with the dissection lens.

The ovaries depend in the xiii. segment from the ventral margin of septum xii.-xiii.

The spermathecae are quite intersegmental in position, and they appear as white little spherical bodies, which are visible through the thin body-wall. They are not provided with a distinct duct. Their number may reach to six pairs on each of the intersegmental furrows xiii.-xiv., xiv.-xv., xv.-xvi., and xvi.-xvii.

Hab. Achencoil River banks (*Mr. Shungara Narayana*, 3. v. 1910), Arumanallur, 45 km. E.S.E. from Trevandrum (*idem*, 23. vi. 1910), ? Azhagiapandipuram, 55 km. E.S.E. from Trevandrum (young specimens, *idem*, 20. vii. 1910).

A specimen from the second locality shows its external and internal organs transferred three segments forwards. Its male pores are on intersegmental furrow xxvi.-xxvii., a little laterally to the lines of setæ *b*. The anterior end is regularly shaped and shows no signs of regeneration.

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EXPLANATION OF PLATE XIII.

List of the Abbreviations.

cl. = clitellum, *n.c.* = neural chord, *æ.* = œsophagus, *p.* = fin-like plate,
s. = septum.

Drawida fakir, sp. n.

- Fig.* 1. Ventral view of x. and xi. segments, with the male tubercles at the intersegmental furrow. $\times 6$.
- Fig.* 2. Testicular vesicle of the right side, seen laterally. $\times 6$.
- Fig.* 3. Hinder surface of septum vii.-viii., with a transverse section of the œsophagus and the two spherical spermathecae, provided with coiled duct. $\times 6$.

Plutellus timidus, sp. n.

- Fig.* 4. Ventral view of the clitellum and adjacent region (semidiagrammatic). $\times 6$.

Megascolex eunephrus, sp. n.

- Fig.* 5. Ventral view of the xviii. and adjacent segments (semidiagrammatic). $\times 6$.
- Fig.* 6. The right prostate. $\times 6$.
- Fig.* 7. A spermatheca. $\times 6$.

Megascolex ratus, sp. n.

- Fig.* 8. Ventral view of the clitellar and adjacent regions (semidiagrammatic). $\times 6$.
- Fig.* 9. The right prostate. $\times 2\frac{1}{3}$.
- Fig.* 10. A spermatheca. $\times 6$.

Glyphidrilus achencoili, sp. n.

- Fig.* 11. Ventral view of the anterior and clitellar regions (diagrammatic). The greatest number of papillæ are figured. $\times 2$.
- Fig.* 12. Ventral view of three segments of the clitellar region before the fin-like plates. $\times 6$.