

ON SOME OLIGOCHAETA MAINLY FROM ASSAM, SOUTH INDIA AND THE ANDAMAN ISLANDS.

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The present paper contains an account of three collections of Oligochaeta, recently received from the following sources in India :—

- (1) From the Director of the Zoological Survey of India, the late Dr. Annandale ; collected mainly in Assam and the Andaman Islands.
- (2) From the Superintendent of the Madras Museum, Dr. F. H. Gravely ; collected in S. India.
- (3) From the Government Entomologist, Coimbatore ; a few specimens collected in S. India.

I am much indebted to the gentlemen mentioned for the opportunity of examining the collections, which contain a number of interesting species.

Not less interesting, perhaps, than the new species described below is the rediscovery of *Diporochaeta pellucida*, the only Indian representative of its genus, briefly described by Bourne, without indication of locality, thirty years ago.

Family NAIDIDAE.

Genus *Nais* Müll., em. Vejd.

Nais communis Piguet var. *caeca* Steph.

Madras ; in mass of *Plumatella (Afrindella) tanganyikae*. H. S. Rao. Several specimens, but none sexual.

The prongs of the anterior ventral setae (segms. ii-v) are longer and relatively thinner than those shown in the figure accompanying

the original description (4). The forking of the dorsal needles was plainly visible only with the oil immersion ; the points diverge moderately. There was a slight stomachal swelling in segm. viii.

Genus **Pristina** Ehrbg.

Pristina synclytes, sp. nov.

(Plate III, fig. 1.)

Bangalore, Mysore ; ca. 3,000 ft. From Polyzoa covering sticks in the effluent of the activated sludge plant at the Indian Institute of Science. Several specimens, none sexual. Bred in Madras, Feb. 1924. (Madras Museum) F. H. Gravely.

The majority of the worms were *Aulophorus furcatus*, but several examples of the present species were amongst them.

These were small white worms, 5-7 mm. in length (preserved) ; in diameter they were 0.25 to 0.3 mm., diminishing to 0.14-0.17 mm. in the posterior half, the posterior portion being much thinner than the anterior. Number of segments in a chain of two, 71 ; in a specimen from which the posterior individual had been separated off, 44 ; in a single individual, 35, or in another case 61 *plus* a fairly long region in which distinct segments are not differentiated. In the last example the hinder half of the body was narrower, of equal diameter throughout, transparent, with the setal bundles at uniform intervals ; the whole 30 or 40 segments in this part seemed to have been rapidly and recently formed ; the second animal of the chain had been broken off, so that the hinder end was truncated.

$N=18, 20$, or 22 ; seven segments of the anterior end of the posterior animal are formed in the budding zone.

The prostomium is prolonged into a short proboscis, frequently broken off in part or altogether ; the proboscis (exclusive of its base, the prostomium proper) is much shorter than the diameter of the body.

There are no eyes.

The ventral setae, of the usual double-pronged type, are four per bundle anteriorly, three further back, and two in the hinder part of the body. Behind the first few segments the length is from 63 to 71μ ; the prongs are equal in length, but the proximal is about twice as thick at its base as the distal ; the nodulus is distal to the middle of the shaft, the proportions being :—distal to nodulus : proximal to nodulus : $2 : 3$ or $7 : 9$. In the first few segments the proportions of the prongs are about the same as further back, but the proximal curve of the shaft is less marked than in the more posterior setae ; the nodulus is at or very slightly proximal to the middle. There is no noticeable difference in thickness in the setae of different regions.

Thus there is only a slight difference in type between the setae of the anterior segments and those of the rest of the body,—not so marked as in many species of *Nais*, for example. The change of type takes place in this species after segment vii ; this is correlated with the fact that the anterior seven segments are formed in the budding zone. In *Nais*, where the anterior five segments are formed in the budding zone, the change in the type of the setae takes place after segm. v.

The dorsal setae begin in segm. ii. The bundles comprise one needle and one hair seta, or two needles and one hair seta, or two setae of each kind. The hair setae of segm. iii are not specially elongated. The length of the hairs increases from segm. ii backwards in the first few segments; in iv-vi they measure 290, 330, or 350 μ ,—i.e., rather more than the diameter of the body; further back they are shorter,—250 μ ,—still, however, longer than the diameter of the body in that region. There is no serration in the hair setae.

The needles are 60-82 μ long, and somewhat bayonet-shaped (fig. 1); they are bifid at the free end, with long prongs,—about 7-8 μ ,—separated by an acute angle; the prong on the inner side of the curve is slightly longer and stouter than the other. There is no perceptible nodulus.

The coelomic corpuscles are spherical, 11-13 μ in diameter, and granular.

Septal glands are present in segms. iv and v. The stomachal swelling occupies viii and part of ix; the dilatation may be slight, but the region is distinguishable by the gut wall being thicker here.

Numerous vascular loops, applied to the inner surface of the body-wall, are seen in the hinder half of the second animal of a chain of two, where they seem to arise as, at first, wide channels, which then become narrower and more definite; I did not see these loops in the anterior animals. In the anterior part of the body the vascular loops are present as far back as segm. vii, but I cannot say exactly how many there are,—I could only see distinctly those in vi and vii.

The specific name signifies “a messmate, a boon companion”; I have applied it to the present specimens since they were found living commensally with a Polyzoan.

Genus **Slavina** Vejd. em. Steph.

Slavina appendiculata (Udek.)

Andaman Is.; on *Spongilla crateriformis* var. *insularis*. N. Annandale. A single specimen, not sexual.

Genus **Aulophorus** Schmarda.

Aulophorus furcatus (Oken).

Bangalore, Mysore; ca. 3,000 ft. From Polyzoa covering sticks in the effluent of the activated sludge plant at the Indian Institute of Science. Numerous specimens, none sexual. F. H. Gravely. Bred in Madras, Feb. 1924. (Madras Museum).

Aulophorus gravelyi, sp. nov.

(Plate III, fig. 2.)

Ennur, Chingleput Dist.; from a pool among felled *Casuarina* trees. 26-28. v. 1922. F. H. Gravely. A number of specimens, none sexual. (Madras Museum).

Small white worms; the flexure of the body usually dorsal, not ventral. Length (preserved) 5-8 mm.; maximum diameter 0.35 mm. Segments 46-73.

The prostomium is short, and very blunt and truncated ; its shape is rather characteristic, resembling that of a dog's snout. There are no eyes.

The ventral setae are three or four in front, and usually three per bundle behind, but occasionally four. They are divided into two groups, an anterior in segms. ii-v, and a posterior, in the rest of the body. Those of the anterior group are 115μ long and 3μ thick ; the prongs are unequal, the outer fully half as long again as the inner, but the two are equal in thickness at the base ; the nodule is at the middle of the length ; the curvatures of the shaft are a little less than in the setae of the posterior group.

The posterior ventral setae differ considerably among themselves in length,—from 62 to 90μ . The variations follow a regular plan, which I have shown to exist also in a number of other worms of the family Naididae (5) ; the outer seta of a bundle is the shortest, the innermost the longest. Thus in one bundle, from the outer to the inner seta, the lengths were 62, 74, 78, 90μ ; in another, 65, 74, 82, 90μ . In thickness the setae are 3μ ; the prongs are of about equal length, but the inner prong is twice as thick as the outer ; the nodule is at the middle or slightly distal to the middle.

The dorsal bundles begin in segm. vi, and are composed of hair-setae and needles, in couples of one hair and one needle ; commonly there are two such couples, occasionally three, in each bundle in the anterior part of the body ; and one in the posterior. The hair-setae are a half to two-thirds of the diameter of the body in length, the maximum length being 240μ though ordinarily they are somewhat less, perhaps 190-200 μ .

The needles (fig. 2) are slightly sickle-shaped, 66-80 μ in length, with a small nodule where the curve begins, slightly distal to the middle of the shaft (distal to nodule : proximal to nodule :: 7 : 9). The tip is bifid ; the prongs, nearly 2μ long and visible with the ordinary high power, are about equal in length and thickness, and are separated by an acute angle ; with the oil immersion, the outer prong is seen to be slightly longer and perhaps a little thicker.

The anus opens into the branchial fossa. There is a pair of palps, bent forwards in the preserved specimens, like a hooked finger. The gills are really four pairs, though only three pairs are to be made out by examination of the whole animal ; this region is unfortunately much contracted in all the specimens. In sections however a more anterior pair appears, small, and largely fused with the lip of the fossa ; this pair is not separately distinguishable in the specimens mounted whole. The second and third pairs are finger-like and rather cylindrical ; the posterior pair are broader and more massive.

No coelomic corpuscles are to be seen.

There is no stomachal dilatation ; indeed there is very little differentiation of the alimentary canal, which simply presents a series of segmental swellings throughout the length of the body. Chloragogen cells begin in segment vi.

The dorsal vessel is ventrally situated and on the left side for the greater part of its extent ; it becomes dorsal in segm. vi.

No budding zone was seen in any of the specimens. Some have no branchial fossa, and appear as if broken off at the hinder end, which is widely open, but without gills or palps. Probably, therefore, fragmentation takes place without the previous formation of a budding zone.

Family TUBIFICIDAE.

Genus **Limnodrilus** Clap.

Limnodrilus socialis Steph.

Coonoor Ghat, Nilgiris; ca. 5,500 ft. 6. vi. 1921. F. H. Gravely. Numerous specimens. (Madras Museum.)

Madras. 8. vi. 1922. Numerous specimens. (Madras Museum.)

Family MONILIGASTRIDAE.

Genus **Moniligaster** E. Perr.

Moniligaster deshayesi E. Perr.

Kavalai, Cochin Forest. Sept. 1914. A single specimen. (Madras Museum.)

This species is still somewhat of a rarity. I add a few notes on certain features of the present specimen.

Length 118 mm.; diameter 6 mm. Segments 128. Colour a reddish brown, like other worms in the same tube.

Prostomium small, prolobous, withdrawn under cover of segm. i. The setal distance *aa* is equal to *bc*, or in places seems a trifle less; *dd* is equal to half the circumference. The male pores are between the lines *b* and *c*, but much nearer *b*, the lower end of the lip surrounding the orifice being almost in *b*.

The gizzards are six in number, in segms. xii-xvii, the first the smallest, the last the largest. The testis sacs, suspended by septum 9/10, project about as much forwards into ix as backwards into x. The prostates are extremely large, extending back to the level of the hinder end of segm. xv; this they do by bulging back septum 13/14. The atrial gland, of considerable size, is contained entirely in segm. vii, occupying the whole length of the segment; it is slightly bilobed; the duct is short, moderately stout, slightly curved, and shining.

Septum 4/5, which is slightly strengthened, is directed backwards, so that it is inserted along the same line as 5/6, which is directed forwards. This peculiarity has been noted in some previous examples.

Remarks.—The present specimen differs from the type form of the species in having a larger number of gizzards, which are placed further forwards; in the fact that the testis sacs extend forwards into ix; and in having the atrial glands merely bilobed (and that not very markedly) instead of divided into two separate parts each with its own stalk.

It thus approaches var. *gravelyi*, in which the atrial gland is entirely single and undivided; but is distinguished, in addition to the character of the atrial gland, by the position of the male pores (nearer *b* in the present specimen).

Moniligaster perrieri Mich.

Tirumalai Hills, Chittoor Dist., Madras; under stones near a stream. June 1914. Four specimens, three being sexually mature. (Madras Museum.)

Genus **Drawida** Mich.**Drawida annandalei** Steph.

Kandlamadagu, Chittoor Dist. ; ca. 2,500 ft. 17. ix. 1923. E. Barnes. Three specimens, sexually mature. (Madras Museum).

My former description of this species was written from a single specimen, which was sectioned. I therefore give the following account of the more ample material now available, which I have examined by the usual method of dissection.

External Characters.—Length 50-62 mm. ; diameter in the genital region 2.75 mm., elsewhere 2 mm. Colour bluish green anteriorly and dorsally, paler behind and ventrally. Segments of the longest example 181 ; no secondary annulation.

Prostomium prolobous.

Dorsal pores absent. Nephridiopores in line with *cd*.

Setae closely paired ; *aa* is slightly less than *bc* (about $\frac{5}{8}$ *bc*) ; *dd* is equal to half the circumference.

The clitellum extends over x-xiii (=4) ; the colour is slightly paler and the body thicker here ; the intersegmental furrows are however well-marked.

A transversely oblong area with rounded ends takes up the posterior half of segm. x and the anterior half of segm. xi ; it extends laterally to between the lines of *b* and *c*. Its extent is delimited by grooves at its lateral boundaries, and to a slight extent also along the greater part of its anterior and posterior borders,—though here the difference is rather one of texture and colour. Almost in its centre, rather over the hinder part of segm. x, is an oval, raised and wrinkled, somewhat indefinite papilla, comprised within the limits of the interval *aa* ; but this could only be called well-marked in one of the three specimens.

Near the lateral margins of this modified area are a pair of transverse grooves, differing in extent and depth in the several specimens, with prominent anterior lips, their centres in the line of setae *ab* ; these possibly correspond to the line of groove 10/11, and may contain the male pores, though I could not find any indication of an aperture in them ; from internal dissection the pores should about correspond to these grooves in position.

The female apertures appear to be indicated by a slight whitening of the lip of groove 11/12 in line with *b*.

The spermathecal pores are apparently also in line with *b*, in 7/8 or rather on vii just in front of the groove.

Internal Anatomy.—Septa 5/6-8/9 are somewhat (not much) strengthened.

There are three gizzards, in segms. xiii-xv ; these have the form of three narrow rings, each being small and narrow antero-posteriorly.

The testis sacs are smoothly rounded, slightly longer than broad, suspended but not constricted by septum 9/10 ; a third or a quarter of each sac is contained in segm. ix, the rest in x.

The vas deferens is little coiled, and is situated on the posterior side of the septum ; after reaching the body-wall it runs up on the anterior face of the prostate to enter it on this face near the upper surface.

Each prostate is spherical, covered with papillose soft and closely set projections, and sessile on the body-wall in the line of the setae *ab*.

The septa limiting the ovarian chamber are widely separated above, where they join the dorsal body-wall; the chamber is thus incomplete.

The ovisacs extend a considerable distance backward,—to segm. xviii on one side, to xvi on the other.

The spermathecal ampullae are small and almost spherical. The duct, on the posterior face of septum $7/8$, is convoluted. The atrium is a teat-like projection, of moderate size, which joins the body-wall in the line of setae *b*; the spermathecal duct enters it on its posterior side.

Drawida burchardi Mich.

Andaman Is., Sta. 10, thick jungle below the summit of Mt. Harriet, ca. 900 ft.; immediately under casting of *Pheretima harrie ensis* (v. *post.*). 4. xii. 1923.

N. Annandale. Three specimens, mature but without clitellum.

Amingaon, near Gauhati, Assam; Sta. 4, a cutting in a hill. 14. iii. 1924. S. L. Hora. Several specimens, sexual but without clitellum.

The present species was described by Michaelsen (2) from a single specimen collected in Sumatra; the same author, in a subsequent paper (3), has given a few notes on some examples from the same locality as some of those now under consideration (Mt. Harriet). I subjoin a few observations on the present specimens, since the differences from previous accounts are not altogether inconsiderable.

The length of the specimens from Mt. Harriet was about 50-55 mm., of those from Assam 70-80 mm.,—not greatly different from that previously recorded. The thickness however seems in these examples to be much greater,—3 to 4 mm. as against 1.4 mm. in the original description. The interval *aa* in the present specimens is usually about $\frac{4}{5}$ *bc*, while *dd* may be equal to half the circumference, or slightly more, or slightly less. The gizzards are in segments xiv-xvi. The vas deferens is wholly in segm. x. There is a complete annular ovarian chamber. The testis sacs are wholly contained in segm. x, except in one case where a rounded lobe projects forwards into ix.

Perhaps the most interesting peculiarity however is the presence of a few dorsal pores in one of the examples from Mt. Harriet. The usual position of the pores is indicated by dark dots, but these are not for the most part pervious, and no fluid could be squeezed through,—except for a short region about the junction of the anterior and middle thirds of the body, where a number of pores were quite patent. *D. barwelli* is the only other species of the genus in which patent dorsal pores have been found.

Drawida hodgarti Steph.

Amingaon, with the last species. Six specimens, not all mature.

The previous record of the species is from Rangamati, Chittagong Hill Tracts. The present specimens show a few slight differences from the former description:—*dd* is equal to or slightly less than half the circumference (in the original specimens *dd* is greater than half the circumference); and the position of the male pores is rather further out here,—between *b* and *c*, but nearer to *b* (just outside *b* in the original specimens).

Drawida papillifer Steph.

(Plate III, fig. 3.)

Amingaon ; a small island in Jaulah Lake. 13. iii. 1924. S. L. Hora. A number of specimens, sexually mature, in not very good condition.

As my previous description was written from a single specimen, I subjoin a few notes on the present examples.

External Characters.—Length of well-developed specimens 100 mm., and diameter 3 mm. ; but sexually mature specimens are present of a length of only 70 mm., and diameter 2 mm.

Prostomium small, prolobous.

The setae are very minute, indeed hardly visible over most of the body, and their position can only be made out by noting certain markings in the body-wall, due to separation of muscular bundles or differences of tinting along certain lines. In the anterior part of the body $aa=bc$, and dd is rather less than half the circumference ; further back aa is rather less than bc , and dd is equal to half the circumference.

The male pores are bounded behind by a transverse swelling which forms a prominent posterior lip ; the anterior border may also take the form of a lip, or may be a slight depression. The pores themselves were not actually visible ; what is seen is a transverse fissure with its centre midway between b and c . In the neighbourhood of these fissures are a few tiny papillae, with a slight depression in the centre, not unlike the small papillae of *Pheretima hawayana* ; they have no definite positions.

The female pores were not seen ; possibly they are in line with b .

The spermathecal pores are fairly conspicuous, and have their centre a little below c . In their neighbourhood are a few small papillae of the same kind as those near the male pores.

Internal Anatomy.—Besides the three gizzards, in segments xvi-xviii, there was a rudimentary gizzard in xix, and perhaps also some slight strengthening of the gut wall in xv.

The testis sac on the left side of the specimen dissected was very large, of an elongated ovoid shape, not constricted by the septum, extending in front to the anterior limit of segm. ix and behind to the level of septum 12/13. The sac on the right side is much smaller and does not pass the limits of segm. x ; it is irregular in shape.

The vas deferens is long and thin, and forms a close coil in segm. x ; it enters the prostate not far from the ental end of the latter.

The prostate is elongated and curved, with a "glandular" surface ; the ental end is swollen and rounded, the ectal three-fifths is narrow and cylindrical (fig. 3).

The spermathecal atrium is of an elongated pear-shape ; it is joined by the spermathecal duct near its lower end.

Drawida pellucida (A. G. Bourne) var. **pallida** Mich.

Horsleykonda, Chittoor Dist. ; ca. 3,000-4,100 ft. 11-16. ix. 1923. E. Barnes
A single specimen. (Madras Museum).

Length 48 mm. ; diameter 3 mm. Segms. 163 ; all the segments except those at the anterior end are very short. Colour greyish, only slightly pigmented ; dorsal and ventral surfaces the same,

The setal interval *aa* is three-fourths or four-fifths of *bc*; *dd* is equal to half the circumference.

The gizzards are three in number, in segms. xv-xvii.

The prostates are hemispherical and sessile on the body-wall; they have a smooth, slightly shiny surface, without "glandular" investment.

The spermathecal atrium is a short cylindrical "teat-like" thickening of the end of the duct, mainly or entirely concealed in the lower part of the septum and the body-wall.

***Drawida robusta* (A. G. Bourne) var. *cochinensis*, var. nov.**

(Plate III, fig. 4.)

Chalakudi, Cochin State. Sept. 1914. Two specimens, sexually mature. The anterior end of the largest injured. (Madras Museum.)

Kavalai, Cochin Forest. Sept. 1914. A single specimen, sexually mature. (Madras Museum.)

External Characters.—Length 125-130 mm.; diameter 5-7 mm. Colour a rather pale brown, the same on both surfaces. Segms. 187, the hinder end tapering. The body is slightly depressed; there is a thickened region laterally on each side, mainly above the level of the setae *cd*, in which the intersegmental grooves are strongly marked and deeper than in the rest of their extent.

The prostomium is absent, or perhaps withdrawn into the buccal cavity.

Dorsal pores are absent. The nephridiopores are in *cd*.

The setae begin in segm. ii, and are closely paired; *aa* is sometimes equal to, sometimes a little less than *bc*; *dd* is slightly more than half, perhaps about five-ninths of the circumference.

The clitellum is not distinguishable.

The male pores are in 10/11, between *b* and *c*, slightly nearer *c*; they are slitlike, with rather prominent lips.

The female pores are small, in 11/12, in line with *b*.

The spermathecal pores are inconspicuous, in 7/8, in line with *c*.

Internal Anatomy.—Septum 5/6 is slightly, 6/7, 7/8 and 8/9 much thickened; 9/10 is slightly thickened, the rest thin.

The gizzards in one of the specimens from Chalakudi are five in number, in segms. xvii-xxi, and there is in addition some strengthening of the gut wall for several segments in front of this. In the specimen from Kavalai the gizzards were six in number, in segments xv-xx, increasing in strength from before backwards.

The testis sacs may extend far backwards,—in the specimen from Kavalai to xiii and xiv on the two sides respectively, the necks of the sacs passing underneath the ovarian chamber. In the specimen from Chalakudi which was dissected, the sacs were irregular in shape, of moderately large size, that of the right side contained wholly in x; that of the left side in xii, attached to septum 9/10 by a neck which passed through segm. x and underneath the ovarian chamber.

The vas deferens forms many coils in segm. ix but not in x; it enters the prostate on the anterior face of the latter.

The prostate is subspherical in form, with a "glandular" surface, which has a granular appearance in consequence of being clothed with numerous closely set minute mamillations. Each prostate is attached by a short thick stalk, almost as wide as the gland itself, which penetrates within the body-wall.

The ovarian chamber, the representative of segm. xi, is narrow and completely closed off from the body-wall above.

The ovisacs are small, elongated but very narrow, curled, tapering towards the free end, and confined to segm. xii.

The spermathecal duct is much coiled on the posterior face of septum 7/8; it penetrates the septum close to the body-wall, and then ascends to enter the atrium; its last part is somewhat stouter than the rest and shiny.

The atrium is of moderate size, contained wholly in vii, firm, slightly bilobed, the posterior lobe extending further upwards than the anterior; the duct enters on its inner face, between the two lobes (fig. 4). On the left side of the Kavalai specimen the atrium could not be called even slightly bilobed; it was ovoid in shape, its long axis antero-posterior, with a slight bulging on the upper surface.

Remarks.—The present variety differs from the *forma typica* in the setal relations (which are like those of var. *ophidioides*), in the number and more especially in the position of the gizzards; and particularly in the shape of the atrium, which in the typical form is fully bilobed, one lobe in segm. vii and one in viii. From var. *ophidioides* it differs in size, colour, and number and position of gizzards.

Drawida agricola, sp. nov.

Taliparamba Farm, Malabar District; among ginger roots. 4. x. 1923. Y. R. Rao. (From the Government Entomologist, Coimbatore.) Three specimens and one fragment, one of the specimens being sexual, but not fully mature.

The most advanced specimen was not fully mature, and I describe it with some diffidence; the chief diagnostic characters are however recognizable. It will be seen that the organs are one segment further forwards than normal,—probably an individual peculiarity only.

External Characters.—The largest specimen was 32 mm. long, but was incomplete behind; the fragment included in the tube probably belongs to it; in this case its length would be 43 mm. Diameter 2.5 mm. Segments 120 *plus* 53 in the separate fragment, = 173; the segments are very short. Colour dark brown, slightly darker dorsally.

Prostomium prolobous.

No dorsal pores.

Setae closely paired; *aa* rather less than *bc*; *dd* rather more than half the circumference.

Clitellum not present.

Male pores in 9/10, between *b* and *c*, rather nearer *c*.

Female and spermathecal pores not distinguishable; from internal dissection the spermathecal apertures are in line with *cd*.

Internal Anatomy.—Septa 5/6-8/9 are considerably thickened.

There are four gizzards, in segms. xi-xiv ; that in xi is small and weak, those in xii-xiv large and strong.

The testis sacs are (in the present specimen) small ; they project forwards into segm. viii, but the larger portion is in ix ; there is not however much difference in size of the parts in viii and in ix.

The vas deferens consists of a number of loops in segm. ix ; there are none in viii. It enters the prostate at the anterior and inner margin of the latter.

The prostate is hemispherical, soft, not shiny, and sessile on the body-wall.

There is a complete ovarian chamber.

The ovisacs are small (in the present specimen), cylindrical and projecting into segm. xi.

The atrium is a small rounded sac in segm. vi, discharging in line with the lateral setae ; the spermathecal duct joins it on its upper surface.

Family MEGASCOLECIDÆ.

Sub-family MEGASCOLECINÆ.

Genus *Plutellus* E. Perr.

Plutellus macrochaetus, sp. nov.

(Plate III, figs. 5, 6.)

Korangumudi Estate, Valparai, Anamalai Hills ; 4,500 ft. ; at the base of Cardamum plants. 5. ix. 1923. Two specimens, one rather immature. (From Government Entomologist, Coimbatore.)

External Characters.—The larger and more mature specimen measured 69 mm. in length, and 3 mm. in diameter. Colour greyish, only slightly pigmented, but rather more so in the anterior than in the posterior part ; dorsal and ventral surfaces much the same. Segms. 183.

Prostomium epilobous $\frac{1}{2}$, narrow, open behind, constricted and divided by a transverse groove at the middle of its length.

Dorsal pores from groove 10/11.

The setae are paired ; in the middle of the body $ab = \frac{1}{3}aa = \frac{3}{8}bc = \frac{4}{5}cd$; behind the genital region $ab = \frac{1}{3}aa = \frac{1}{2}bc = \frac{3}{4}cd$; while in the anterior segments $ab = \frac{2}{5}aa = \frac{1}{2}bc = \frac{3}{4}cd$; dd = half the circumference in the middle of the body, rather less than half at the hinder end.

The clitellum includes xiv- $\frac{1}{2}$ xviii ($=4\frac{1}{2}$) ; ventrally however xviii is not modified.

The male pores are on xviii, on minute papillae in line with the setae *ab*.

The female pores are paired, close together near the middle line on the anterior part of xiv.

The spermathecal pores are two pairs, in $\frac{7}{8}$ and $\frac{8}{9}$, apparently between the lines of *a* and *b* ; from internal dissection they seem to be almost in *a*.

Internal Anatomy.—Septa $\frac{4}{5}$ and $\frac{5}{6}$ are very thin ; $\frac{6}{7}$ — $\frac{10}{11}$ are moderately strengthened, $\frac{9}{10}$ most so ; $\frac{11}{12}$ and $\frac{12}{13}$ are slightly thickened.

The gizzard is elongated and cylindrical ; it is contained mainly in vi, septum 5/6 being attached round it about a quarter of its length from its anterior end.

There are no calciferous glands. The intestine begins in xviii.

The last heart is in xiii.

The nephridia in the anterior part of the body are all of the tufted kind. These are large in segms. v and vi, opposite the anterior and posterior ends of the gizzard ; those situated at the sides of the oesophagus diminish in size backwards as far as xiii ; they are large in the clitellar region ; thenceforward they are of moderate size, one on each side, not apparently (though the condition of the specimen leaves much to be desired) split up into independent micronephridia,—all the tubules of a tuft discharge in common by a single duct.

In the hinder fourth of the body there are meganephridia of the usual form,—a long loop stretching out on the body-wall, with a more coiled (or possibly slightly tufted) portion ventrally ; on a number of these a funnel was seen, with the usual relation to the septum (confirmed microscopically).

Testes and funnels are free, and are present in segm. xi only.

The seminal vesicles are in segm. xii ; they are large, meeting each other dorsally ; each resembles a bunch of grapes, being composed of a large number of small round lobules.

The prostates are tubular ; each forms a stout coil. The ducts are very short and thin,—disproportionately small in relation to the size of the glands.

Ovaries and funnels are contained in xiii. There are small ovisacs in xiv.

The spermathecae are two pairs ; the ampulla is an elongated, narrow, irregularly shaped and irregularly twisted sac ; the duct is short and thin. There is a single diverticulum, cylindrical, slightly dilated at its ental end, irregularly curved, as long as or rather longer than the ampulla when both are straightened out ; it joins the side of the duct (fig. 5). The central lumen of the diverticulum is tortuous at its ental end, which glistens owing to the contained spermatozoa ; under the microscope the appearance resembles that of a few incompletely separated seminal chambers.

The penial setae (fig. 6) are enclosed in extremely long sacs, two on each side, mainly composed of muscular strands. The setae are 5.5 mm. long, and 9μ in diameter at the middle ; they are thus extremely long and slender. They are gently curved, mainly in their distal portion, through about a quarter of a circle ; they are slightly recurved terminally, expanded and flattened, with a notch which forms three-quarters of a circle cut out of the tip. The width of the flattened portion is 14μ and the diameter of the notch 5μ . There is no ornamentation.

Remarks.—It will be seen that I have taken the tufted nephridia to be meganephridia, according to the views which I have expressed in my volume on "*Oligochaeta*", in "*The Fauna of British India*" (6), p. 184 ; the tufted nephridia are probably a stage on the path of evolution of micronephridia, but the essential character of micronephridia, the breaking up of one into a number of separate organs, has

not yet been brought about. If the tufted nephridia are considered to be micronephridia, the present species will become a *Megascolides*.

Genus **Megascolex** Templeton.

Megascolex konkanensis Fedarb.

Kavalai, Cochin Forest. Sept. 1914. A single specimen, sexually mature. (Madras Museum).

Megascolex mauritii (Kinb.).

Kandlamadagu, Chittoor Dist., ca. 2,500 ft. 17. ix. 1923. E. Barnes. A single specimen, in bad condition. (Madras Museum).

Megascolex triangularis, sp. nov.

(Plate III, figs. 7, 8.)

Kavalai, Cochin Forest. Sept. 1914. Six specimens, sexually mature. (Madras Museum).

External Characters.—Length 143-150 mm. ; diameter 3 mm. Segms. 218. Colour brownish (like other specimens in the same tube), with a slight reddish or purplish tinge ; no difference between dorsal and ventral surfaces ; clitellum a deeper purple. Anterior end truncated.

Prostomium small, epilobous $\frac{1}{2}$, open behind.

Dorsal pores from furrow 4/5.

The setae are in rings ; the dorsal break in the anterior part of the body is equal to $2yz$, while in the hinder part it is irregular, and may be little more than yz ; the ventral break is variable and irregular,—in front of the genital region 2-3 ab , in the middle of the body 4 or even 5 ab , and towards the hinder end 3-4 ab . The setae are on the whole set more closely ventrally than dorsally ; and setae a and b are throughout most of the body closer together than those outside them, so that they form a pretty definite couple on each side. The following numbers were counted :—42/v, 47/ix, 50/xii, 40/xix, and 33 in the middle of the body.

The clitellum extends over segms. xiv to $\frac{2}{3}$ xvii ($=3\frac{2}{3}$) ; it is purple in colour, dorsal pores are present, and setae and intersegmental furrows are also visible.

In the midventral line of segm. xviii, and on the anterior half of the segment, extending from furrow 17/18 to the setal zone, is a small triangular depression, with its apex directed backwards ; the depression is moderately deep, with clean-cut margins (fig. 7).

The male pores are somewhat elongated slits on the lateral sides of the triangle ; hence they converge posteriorly. The lips of the slits are slightly swollen. The pores are very close together, since the sides of the triangle hardly measure more than 0.5 mm.

The female pores are paired, and situated close together on a whitish transverse oval area in the setal zone of segm. xiv.

The spermathecal pores are two pairs, in furrows 7/8 and 8/9, close together, with rather prominent lips.

Internal Anatomy.—Septa 4/5, 5/6, and 6/7 are all thin; 7/8 is slightly thickened; 8/9-11/12 are somewhat strengthened, and 12/13 and 13/14 slightly thickened.

The gizzard, of moderate size, and shortly cylindrical, is in segm. v; septum 5/6 is very thin, and prolonged far backwards before reaching its attachment to the gut, so that it invests the gizzard closely; but it can be separated with a little care.

There are no calciferous glands. The intestine begins in xvi.

The last heart is in xiii. In xiv there is a large vessel on each side, crossing over the alimentary canal obliquely from the middle line in front, backwards and outwards.

Large tufted nephridia are present at the hinder angles of the pharyngeal mass, by the sides of the gizzard, and backwards as far as segm. ix. Behind the genital region the usual micronephridia form a transverse row in each segment.

Testes and funnels are free in segms. x and xi. Seminal vesicles are present in segms. xi and xii; they are of moderate size, those in xii being somewhat the larger; in form they are racemose, each being composed of a mass of small round lobules.

The prostates are confined to xviii, slightly bulging apart the septa in front and behind; each has the appearance of a compact mass, but is deeply divided into a large number of minute rounded closely adpressed lobules. The duct is relatively long, thin, shining, of the same diameter throughout, passing transversely inwards in a straight line.

There are no penial setae.

Ovaries and funnels are present in xiii. There are small ovisacs in xiv.

The spermathecae (fig. 8) are two pairs; the ampulla is an ovoid sac of moderate size, not sharply marked off from the duct, which is about equal to it in length and half as broad or less. There is a single diverticulum, club-shaped, with an elongated stalk, its length equal to that of the duct or rather more; it is attached at the extreme ectal end of the duct; both the stalk and the dilated terminal portion of the diverticulum shine with the included spermatozoa.

Remarks.—The present species appears to be related to *M. kavalaianus* and *pheretima*.

From *M. kavalaianus* it differs in length, diameter, and number of segments, in having paired female pores, in the form of the spermathecal diverticulum, and especially in the configuration of the male field. The last heart is in xiv in *M. kavalaianus*; it is possible however that what I described as a heart may really be the same vessel as that noted above in segment xiv of the present species,—but which does not seem to be comparable to the hearts in the preceding segments.

From *M. pheretima* the present species differs in the proportions of the body (*M. triangularis* being a long thin worm), and the number of segments; in the shape of the prostomium; and again in the configuration of the male field. There are also a number of slighter differences which it is scarcely necessary to enumerate.

Megascolex tripartitus, sp. nov.

(Plate III, figs. 9, 10.)

Tirumalai Hills, Chittoor Dist., Madras ; under stones near a stream. June, 1914.
A single specimen, sexually mature, in bad condition. (Madras Museum).

External Characters.—Length ca. 300 mm., but the specimen is much softened, and this probably does not represent the normal condition ; diameter towards the anterior end 8 mm., less elsewhere. Colour a fairly light brown. Segms. 293 ; segm. v biannulate, vi triannulate, vii quadriannulate, viii-xiii with five secondary annuli.

Prostomium small, zygotobous.

Dorsal pores from furrow 13/14.

The setae are in rings, small, and closer set ventrally. The dorsal and ventral breaks are in general ca. 4*ab* and 4*yz* ; towards the anterior and posterior ends the intervals may be less,—sometimes 3*ab* or 3*yz* in front ; in the hinder part of the body they are rather irregular. The following numbers were counted :—70/v, 90/ix, 83/xii, 105/xxiv, and 72 in the middle of the body.

The clitellum appeared to extend from xiv to xxi, but this is probably a mistake, as the specimen was in very bad condition in this region.

Over the midventral parts of furrows 17/18 and 18/19 are a couple of much elongated narrow transverse areas, somewhat depressed, flat, each surrounded by a lip (fig. 9). The rest of segm. xviii in the midventral region is thus somewhat ridgelike. The male pores appear to be on small papillae which touch each other in the middle line ; on the outer side of each pore is another small indefinite elevation.

The female pores are not visible.

The spermathecal apertures are close together, in furrows 7/8 and 8/9, each in a rugose fissured area, and apparently on small papillae which are scarcely distinguishable from the rugae of the general surface in this region.

Internal Anatomy.—Septa 4/5 and 5/6 are thin ; 6/7 is somewhat thickened, 7/8 moderately so, and 8/9-11/12 are much strengthened ; 12/13 and 13/14 are slightly thickened.

The gizzard is large and barrel-shaped, in segm. vi. There are no calciferous glands.

The last heart is in segm. xiii.

Tufted nephridia are present by the sides of the alimentary canal as far back as segm. xiii ; thenceforward ordinary micronephridia occur in two transverse rows per segment, one row in front of and one behind each septum.

The testes were not distinguishable. Funnel are present in segms. x and xi, I think free. Seminal vesicles are found in xii only, racemose, and of moderate size.

The prostates are rather small, in xviii, elongated transversely, and marked out into small lobules. The duct is narrow, straight and shining, passing transversely inwards to end near the midventral line. There are no penial setae.

The female organs were not recognized.

The spermathecae are characteristic ; each consists of three (in one case four) separate ovoid sacs, marked by slight annulations, joined below, with a very short stout common duct. The diverticula were 2, 3, 4 and 5 respectively in the four organs ; they are small ovoid shining sacs on the outer side of the duct, attached to the duct just below where the ampullae join, and are either set closely side by side or actually fused by their contiguous margins (fig. 10). In one case two contiguous ampullae were also inseparably united by their margins.

Megascolex sp.

Coonoor, Nilgiris, ca. 5,700-6,000 ft. 31. v. to 3. vi. 1921. A single specimen.
F. H. Gravely. (Madras Museum).

The specimen was not fully mature, and I therefore do not describe it. I mention it only because of an interesting peculiarity,—the dorsal vessel was double in each of the segments from viii to xxi inclusive ; the two portions were united at each successive septum, where the vessel passed from one segment to another. A similar condition has been described in *Megascolex caeruleus*, as well as in some species of other genera ; indeed the division of the vessel into two may be much more extensive and complete than it is here.

Genus **Pheretima** Kinb.

Pheretima hawayana (Rosa).

Kurseong, E. Himalayas, Sta. 13, 5,000 ft. ; under stones in thicket of trees.
9. iii. 1924. B. N. Chopra. Seven specimens, sexually mature.

Pheretima heterochaeta (Mich.).

Kurseong, E. Himalayas, Sta. 13, 5,000 ft. ; under stones in thicket of trees.
9. iii. 1924. B. N. Chopra. Nine specimens, sexually mature.

Pheretima harrietensis, sp. nov.

(Plate III, fig. 11.)

Mt. Harriet, S. Andaman Island ; ca. 900ft. ; in thick jungle below the summit, under a very large casting on the jungle floor. 4. xii. 1923. N. Annandale.
A single specimen, in two pieces.

External Characters.—Length 200 mm. ; maximum diameter, in pre-clitellar region, 11.5 mm., in posterior half of body 9 mm. Colour (preserved), dorsally a slaty purple, darker in the anterior half of the body, pale ventrally ; according to a note made by Dr. Annandale at the time of capture the colour in life was iridescent blue above, white below ; the pigment stained the spirit blackish. Segments 123 ; viii is biannular, the rest as far as a little way behind the male pores triangular (except the clitellar segms.).

Prostomium small, triangular with the point directed backwards and reaching nearly as far as furrow $1/2$; the apex of the triangle prolonged backwards as a groove to join the furrow.

Dorsal pores from 12/13, the first rudimentary.

Setae in rings, a little closer set ventrally ; no setae specially enlarged. The ventral break is small in the anterior part of the body,— $1\frac{1}{2}$ or $1\frac{1}{4}$ al,

still smaller or imperceptible posteriorly ; the dorsal break is also small, not more than $1\frac{1}{4}yz$, and it too is almost imperceptible in the hinder region. The following numbers were counted :—38/v, 75/ix, 90/xii, 91/xix, and 90 in the middle of the body.

The clitellum embraces xiv-xvi (=3). The intersegmental furrows are well marked, but the secondary annulation is lost (except that xiv is biannular). Dorsal pores are present ; and setae are seen on the ventral surface.

The male pores are on conical papillae on xviii, one-third of the circumference apart ; 28 setae intervene between the two.

The female pore or pores are indicated by a small transversely oval depression in the setal zone of xiv.

The spermathecal pores are three pairs, in furrows 6/7, 7/8, and 8/9, small and inconspicuous, one-third of the circumference apart.

In the region of the male pores two copulatory cushions are seen, flat, not raised above the general level of the surface, but marked by very numerous minute pits ; the cushions are thus of the same kind as those of *P. osmastonii*. The anterior cushion takes up the anterior part of segm. xviii and a narrow strip along the posterior margin of xvii ; the posterior cushion includes the hinder part of xviii and a narrow strip along the anterior margin of xix ; the two cushions are thus separated only by the narrow setal zone of xviii ; both extend outwards on each side to the level of the male pores.

Internal Anatomy.—Septum 4/5 is slightly thickened, 5/6, 6/7, and 7/8 are somewhat strengthened, and so too 10/11 and 13/14 ; 11/12 and 12/13 are fairly strongly thickened, and 8/9 and 9/10 are absent.

There is a large round firm gizzard between septa 7/8 and 10/11. The intestine widens out behind the prostates. The caeca originate in xxvii ; they have a swollen base, and in front of this are narrowly conical, twisted and constricted ; the anterior half may be turned backwards. Lymph glands are present dorsally on the intestine.

The last heart is in xiii.

The excretory system is micronephric.

Testis sacs are present in x and xi ; those of x are connected across the middle line, but I did not ascertain if the sacs were further connected with one another.

Vesiculae seminales are present in xi and xii ; they are of considerable size, and only slightly incised into lobes ; each is furnished with a long cylindrical appendage which arises from its inner surface and, stretching dorsalwards, reaches the middorsal line where it ends in a slight dilatation.

The prostates are each completely divided into two halves, an anterior and a posterior ; the anterior occupies segm. xvii and comes slightly into xviii, the posterior xx and xxi and (on one side) a little of segm. xix ; there is thus a wide interval between the two parts. Each part is deeply cut up into small elongated branching and often finger-like lobes. The ducts of each portion are soft and membranous ; they join in xviii, and receive the vas deferens at their junction ; the common duct is short, somewhat curved, shining, but not very firm, its ectal portion wider than the rest.

There are no accessory prostates of the kind found in *P. osmastoni*.

There are however very numerous accessory glands, corresponding to the pitted areas ; these are closely set, each with a rounded internal portion which is connected with the body-wall by a relatively narrow stalk.

The ovaries and funnels are small, in xiii ; there is a receptaculum ovarum of moderate size in xiv.

The spermathecae (fig. 11) are three pairs ; the ampulla is saclike, shortly ovoid in shape ; the duct is one-third to two-fifths as long as the ampulla, moderately stout, not shining. The diverticulum is attached to the ectal end of the duct ; it is very long and thin, and irregularly twisted,—three or four times as long as the ampulla if the twists are allowed for ; the ental end is slightly dilated. A noticeable feature of the spermathecae is a thin-walled swelling of the base of the duct, somewhat lobed at one part of its extent ; this goes all round the junction of the duct with the body-wall, though it is very small and narrow at one spot on the posterior side.

A large seta at the male pore must, as in *P. osmastoni*, be interpreted as a penial seta ; but it is unfortunate that here also, as in all specimens of *P. osmastoni* up to the present, the points were broken off.

Remarks.—There can be no doubt that the present species is closely related to *P. osmastoni*, described from the Andamans by Michaelsen. The general form of the spermathecae, the penial setae, and the peculiar character of the copulatory cushions sufficiently establish the connection.

The differences are however well marked. Thus the prostomium is triangular in the present species, while in *P. osmastoni* the hinder end is almost as broad as the front, and is open ; the male pores are here further apart ; the position of the copulatory cushions is not the same ; most important of all, perhaps, is the wide division of the prostate, and the absence of accessory prostates in the present species ; the swollen base of the spermathecal duct may also be mentioned.

***Pheretima lignicola* Steph.**

Wimberleyganj, Andamans. 8. xii. 1923. B. Prashad. A single specimen, in poor preservation, sexually mature.

***Pheretima osmastoni* Mich.**

Wimberleyganj, Andamans. 2. xii. 1923. B. Prashad. Two specimens, not quite sexually mature (wanting the clitellum).

Mt. Harriet, Andamans, ca. 900 ft. ; thick jungle below the summit. 4. xii. 1923. N. Annandale. A single specimen, also wanting the clitellum.

This interesting species was described previously from the Andamans by Michaelsen (3). The present specimens differ in a few details from the originals ; the copulatory papillae, present on segm. x, were in two of the specimens paired ; thus the single median papilla of Michaelsen's specimens is to be regarded as produced by the confluence of a pair, a process which is illustrated by the third of the specimens which I examined. As in *P. harrietensis*, I find on the inner side of each seminal vesicle a moderately long hollow cylindrical appendage, directed dorsal-wards and ending blindly.

In segm. xiv, on each side of the alimentary canal, and attached to the anterior septum of the segment by connective tissue, was a large

dark friable mass, looking like coagulated blood. When broken up and examined microscopically these were found to consist of a dark granular matter in which very numerous setae were embedded ; the setae were of all sizes,—very small miniatures as well as others of full size.

I can confirm the presence of penial setae ; but unfortunately, as in Michaelsen's specimens, the points were in every case broken off.

***Pheretima wimberleyana*, sp. nov.**

(Plate III, fig. 12.)

Wimberleyganj, Andamans. 8. xii. 1923. B. Prashad. Several specimens, sexually mature, in bad condition. (In same tube as the specimen of *P. lignicola*.)

External Characters.—Length 185-225 mm. ; diameter 4-5 mm. Colour a slaty purple dorsally, pale ventrally. Segms. 134.

Prostomium apparently epilobous $\frac{1}{3}$, broad, open behind ; but its characters are disguised by the eversion of the buccal cavity.

Dorsal pores begin from furrow 12/13.

The setae are disposed in rings ; those at the anterior end, especially in segms. v-xi, are enlarged, and also those in the hinder segments ; the setae are about the same distance apart dorsally and ventrally. The rings are almost closed ; the dorsal break is equal to $1\frac{1}{2}yz$ anteriorly, and to $1\frac{1}{4}yz$ further back ; the ventral break is about $1\frac{1}{4}ab$, or it may be quite imperceptible. The following numbers were counted :—25/v, 44/ix, 48/xii, 53/xix, and ca. 51 in the middle of the body.

The clitellum includes segms. xiv-xvi (=3).

The male pores, on xviii, are rounded orifices of some size, in the setal zone, without prominent lips ; they are about one-third of the circumference apart, and are situated in line with the 8th-10th seta ; nine setae intervene between the two.

The female pore is single, and is indicated by a small pale circular area just in front of the setal zone of xiv.

The spermathecal apertures are three pairs, in furrows 6/7, 7/8, and 8/9, about $\frac{2}{7}$ of the circumference apart, situated where the dark colour of the dorsum merges into the lighter tint of the ventral surface. On the inner side of the pore are a few tiny papillae (0, 1, 2 or 3) in the furrow, representing the apertures of accessory glands.

Internal Anatomy.—Septum $\frac{3}{4}$ is distinguishable ; it and $\frac{4}{5}$ are thin ; $\frac{5}{6}$, $\frac{6}{7}$ and $\frac{7}{8}$ are somewhat strengthened ; 10/11-13/14 are slightly thickened ; 8/9 and 9/10 are absent.

The blood glands in segms. v and vi are particularly obvious ; they are also present in iv.

The gizzard, rounded, firm and of some size, is between septa $\frac{7}{8}$ and 10/11. The intestine begins about in xvii ; caeca are present, but this region seems to be much decomposed in all the specimens, and I can give no further details.

The last heart is in xiii.

The micronephridia are numerous and small.

Testis sacs are present in segms. x and xi ; those of the same side communicate, and also those of the same segment coalesce beneath the alimentary canal.

The seminal vesicles occupy segms. xi and xii ; they are of moderate size, and are cut up into larger lobes and smaller lobules.

The prostates occupy segms. xvi-xx ; they are deeply incised, many of the lobes being almost finger-shaped. The conspicuous vas deferens joins the prostatic duct outside the gland. The prostatic duct is shining, and moderately stout ; it has a horse-shoe curve ; the first part is narrow, and it narrows a little also towards the ectal end ; there is no copulatory pouch.

Accessory prostates are present as white lobular masses, sessile on the body-wall, one in front of and one behind the termination of each prostatic duct. They extend into the neighbouring segments xvii and xix respectively ; the anterior of each couple is the larger.

The ovaries and their funnels are situated in xiii. Small ovisacs are present in xiv.

The spermathecal ampullae (fig. 12) are somewhat elongated and pear-shaped, or sometimes almost circular in outline. The duct is moderately stout, about two-fifths as long as the ampulla, from which it is well marked off. There is a single diverticulum attached near the ectal end of the duct ; it consists of a dilated and twisted ental portion and an undulating tube, narrow and shining ; the whole length of the diverticulum is equal to about half that of the main pouch (ampulla plus duct). The diverticulum is somewhat reminiscent of that of *P. houlleti* in shape ; in the more ectal portion of the dilated region there was an appearance as of cylindrical spermatophores, but this was not confirmed on microscopical examination ; the blind end contained an opaque mass, presumably of spermatozoa.

There are a number of accessory glands, two to six, in the neighbourhood of each spermatheca ; these are small rounded bodies, with a narrow stalk several times as long as the rounded mass of the gland ; the total length is about equal to that of the spermathecal duct. One or two of each group join the spermathecal duct where it enters the body-wall ; the others are attached separately to the body-wall in the neighbourhood of the duct (fig. 12). The stalks are not patent tubes, and probably consist of prolongations of the gland cells.

Remarks.—The species with which the present seems to have most affinity are *P. houlleti* and *P. andamanensis*. From the first it is distinguished by the numbers of accessory spermathecal glands, and by the presence of accessory prostates ; from the second by the number of spermathecae, the presence of accessory spermathecal glands, and the presence of *two* accessory prostates on each side.

Genus **Diporochaeta** Bedd.

Diporochaeta pellucida (A. G. Bourne).

(Plate III, fig. 13.)

Ootacamund, Nilgiris ; ca. 6,700-8,000 ft. 20-30. v. 1921. F. H. Gravely. Two specimens, sexually mature. (Madras Museum.)

This interesting species, the only Indian representative of the genus, has not been seen since it was first described by Bourne thirty years

ago (1). Since the species is of some theoretical importance, and since the standards of description have altered considerably in the interval, I give a complete account of the present specimens.

External Characters.—Length 180 mm.; diameter 4 mm. Colour pale, no difference between dorsal and ventral surfaces. Segms. 268; secondary annulation in segms. v-xiii, which show 3 or 5 annuli.

Prostomium proepilobous.

Dorsal pores begin in furrow 9/10 or 10/11.

The setae are of moderate size, larger at the ends of the body, and set more closely on the ventral side, especially anteriorly. They are disposed in rings which are very incomplete both dorsally and ventrally. The dorsal break in front of the genital region is about equal to $8yz$, or one-fifth of the circumference; throughout the anterior part of the body behind this it is about equal to $5-6yz$; in the hinder half it becomes less, $3-4yz$, and ultimately $2yz$; the difference is partly due to the fact that the intersetal intervals in the hinder part are wider and irregular. The ventral break is equal to $4ab$ in the anterior part of the body, to $3ab$ and finally $2ab$ in the hinder part; here also the apparent diminution is partly due to the intersetal intervals being wider and irregular towards the posterior end. The following numbers were counted:—35/v, 34/ix, 36/xii, 36/xix, and 28 in the middle of the body.

There is a quite evident coupling of the setae, especially behind the genital region; the above figures for segms. xii and xix, and for the middle of the body, represent 9 and 7 couples on each side; the coupling is well marked in the setae on the lateral and dorsal surfaces, less well marked in those on the ventral side. At the hinder end coupling is visible to some extent, but the disposition is very irregular.

The clitellum perhaps includes segms. xiii-xvii (=5?).

On segm. xviii is a transverse depression, with slightly marked lips, and with a groove along the bottom. The male pores are represented by a deepening of the groove on each side, opposite the third seta, and hence fairly close together.

The female pores are inconspicuous, in front of setae *a* of segm. xiv.

The spermathecal pores are also inconspicuous, in line with *c* or *bc* in furrows 7/8 and 8/9.

Internal Anatomy.—Septum 4/5 is thin, 5/6 slightly thickened, 6/7-9/10 moderately thickened, 10/11 less so, and 11/12 and 12/13 only slightly.

The gizzard, firm and cylindrical, of moderate size or rather small, is in segm. v.

There are large lobed calciferous glands in xiv, xv and xvi; these are dorso-laterally situated on the gut, well set off, kidney-shaped in form, and attached broadly by the hilus. The oesophagus is very vascular in xiii, but there are no glands.

The intestine begins in xviii.

The last heart is in xii.

The excretory system is meganephridial. The first well-marked nephridium is in segm. xiv, but smaller ones are visible in segms. xi, xii and xiii. In some of the anterior segments small coils are seen,—perhaps in all, as far forwards as v; microscopically I could not make

out any funnels on these small coils, but I could not say that they do not exist,—the whole organ is very small.

Testes and funnels are free in x and xi. Vesiculae seminales, of moderate size, racemose, and meeting dorsally, are present in xii; a second pair, also racemose, but smaller, are seen in xi.

The prostates are tubular, each consisting of a stout coil, which occupies xviii and extends into xix also. The duct is short, thinner than the glandular portion, shining; and looped, or with a bend in its course at its beginning.

Ovaries and funnels are present in xiii.

The spermathecal ampulla (fig. 13) is elongated and cylindrical in form; there is no duct, the ampulla joining the body-wall with only a slight narrowing. The single diverticulum, small, short, and cylindrical, is given off from the junction of ampulla and body-wall.

Remarks.—There appears to be a difference between the nephridia in the anterior part of the body of the present specimens and of Bourne's originals. Bourne mentions in segms. vii-xi the presence of complex nephridia consisting each of a nephridial tube with a bush-like group of tubules springing from one part; while in the above examples the nephridia of these segments were very small coils. For the rest the correspondence is such as to leave no doubt as to the specific identity.

On the relation of the present form to the genus *Perionyx* cf. Stephenson, 6, p. 318.

Genus *Perionyx*, E. Perr.

Perionyx crassiseptatus, sp. nov.

(Plate III, fig. 14; plate IV, fig. 15.)

Chalakudi, Cochin State. Sept. 1914. A single specimen, sexual but not fully mature. (Madras Museum).

External Characters.—Length 70 mm.; width 3.5 mm.; body much depressed. Segms. 127. Colour lightish brown, slightly darker dorsally and in the anterior part of the body, otherwise dorsal and ventral surfaces are much the same. A median dorsal groove in the anterior half of the body.

Prostomium epilobous $\frac{1}{2}$, tongue cut off behind.

Dorsal pores begin in furrow $\frac{4}{5}$ (? a small pore in $\frac{3}{4}$).

Setae disposed in rings; the setae are small, and set closer ventrally than dorsally. The dorsal break is very small,—ca. $1\frac{1}{4}yz$; there is no ventral break. The following numbers were counted:—57/v, 55/ix, 54/xii, 56/xix, and 52 in the middle of the body.

The nephridiopores are seen to alternate in position, as in *P. sansibaricus*, in successive segments; one series is one-fifth of the half circumference from the mid-dorsal line, the other two-fifths of the half circumference from the mid-ventral line. The alternation is however not perfectly regular.

The clitellum is not distinguishable; it perhaps includes xiv-xvii, which are slightly lighter in colour.

Midventrally on xviii is a rectangular depression, longer than broad, taking up the whole length of the segment and extending slightly into

xvii and xix. The male pores are very inconspicuous, in the setal zone, on the sides of the depression near its floor. The setae are continued across the floor of the depression between the pores.

The female pore is single, on the anterior part of segm. xiv near furrow 13/14.

The spermathecal pores were not visible externally; from internal examination they must be in 6/7, 7/8 and 8/9, close to the mid-ventral line.

Internal Anatomy.—Septum 5/6 is thin, and perhaps imperfect; 6/7 is somewhat thickened; 7/8 begins to have the peculiar development described below.

All through the anterior part of the body, but more markedly after segm. xv, the septa are replaced by soft, opaque white bodies lying at the sides of the alimentary canal (fig. 14). In antero-posterior extent each is almost the length of a segment, so that successive masses are in contact with each other or nearly so; at their dorsal ends they are somewhat pointed, and approach their fellows, so as almost to meet in the region of the dorsal vessel. The bodies cannot be separated from the sides of the alimentary canal, and there are no visible septa. In the hinder part of the body the masses are somewhat smaller, and do not touch their neighbours in front and behind; but they persist to the hinder end.

Microscopical examination shows that each of these structures represents a septum, increased to an enormous bulk by a great development of elongated pear-shaped peritoneal cells on each face.

The gizzard is cylindrical, moderately firm but very small, in segm. vi.

The oesophagus is very vascular in segms. ix-xii, and shows transverse striation due to the direction of the blood-channels; but there are no calciferous glands.

The last heart is in xii.

The excretory system is meganephridial. The alternation of the position of ending of the nephridia can be confirmed by observation of the end-sacs, which are of some size and elongated transversely. There were only two irregularities in the rule of alternation in the anterior part of the body, so far as opened up,—one on each side.

Testes and funnels are free in segms. x and xi; both are very small (the presence of funnels was concluded from the small iridescent masses of spermatozoa). The seminal vesicles are two pairs, in xi and xii; these were very small, the organs not being fully developed.

The prostates, also probably not fully developed, are small compact blocks, confined to xviii. The duct is very small and short, and leads off from the under surface of the gland.

The female organs were not identified.

The spermathecae are three pairs, and lie at the sides of the ventral nerve cord. They are in the present specimen very small, and perhaps not fully developed; yet the diverticulum of one of the organs is shining, as after copulation. The ampulla is horseshoe-shaped or irregularly lobed; in all, however, the disposition of the two principal lobes has somewhat the appearance of a horseshoe (fig. 15); there is no

distinguishable duct,—or possibly one of the projections on the under surface of the spermatheca illustrated in fig. 15 may be the duct. There is a single spherical diverticulum, given off from the under side of the ampulla.

There are no penial setae.

***Perionyx sansibaricus* Mich.**

Ootacamund, Nilgiris ; ca. 6,700-8,000 ft. 20-30. v. 1921. A number of specimens. F. H. Gravely. (Madras Museum.)

Dhoni Forest, S. Malabar ; ca. 1,500-4,000 ft. E. Barnes. 17-26. v. 1923. A single specimen. (Madras Museum.)

***Perionyx silvicola*, sp. nov.**

(Plate IV, figs. 16, 17.)

Dhoni Forest, S. Malabar ; ca. 1,500-4,000 ft. 17-26. v. 1923. E. Barnes. A single specimen, sexually mature, with the last. (Madras Museum.)

External Characters.—Length 25 mm. ; diameter 2 mm. Colour a light brownish purple dorsally, pale ventrally ; clitellum pale ; the anterior end rather deeper in colour. Segms. 110.

Prostomium epilobous $\frac{1}{2}$, open behind.

Dorsal pores from furrow 4/5.

The setae are disposed in rings ; the dorsal break is equal to about $2yz$, but is irregular ; the ventral is equal to $2-3ab$. The setae are closer set ventrally. The following numbers were counted :—ca. 31/v, ca. 34/ix, ca. 37/xii, 31/xix and 33 in the middle of the body. The setae are difficult to count in the anterior part of the body.

The clitellum includes almost all segm. xiii and succeeding segments as far as xvii (=nearly 5).

The male pores are on segm. xviii, on small papillae, about opposite the third seta on each side.

The female aperture was not visible.

The spermathecal apertures were only doubtfully visible ; from internal dissection they are situated in furrows 7/8 and 8/9, not very close together, about in line with the sixth seta on each side.

Internal Anatomy.—No septa are notably thickened.

There is no gizzard. The intestine begins in segm. xix.

The last heart is in xii.

The excretory system is meganephridial. There is no alteration in the position of the external pores.

Testes and funnels are free in segms. x and xi. Vesiculae seminales are present in xi and xii, those in xii being rather larger than the others ; both pairs are lobulated, and meet their fellows dorsally in the middle line.

The prostates are in segm. xviii ; they are rather small, and are cut up into a number of small lobules. The duct is slightly bent,—almost straight ; it is short, thin, and scarcely shining.

There are large ovaries in xiii.

The spermathecae (fig. 16) are two pairs, situated in segms. viii and ix, and opening in 7/8 and 8/9. The ampulla is a rather irregular sac ; the duct is as long as the ampulla, from which it is demarcated

by a constriction ; it widens below the constriction, and again narrows where it enters the body-wall ; at its widest part it is half as wide as the ampulla. There are two diverticula attached to the widest part of the duct ; each is small, spherical, and is joined to the duct by a very short stalk.

The species shows apparently the first beginnings of the formation of penial setae. I saw no distinct penial setal sacs, but nevertheless obtained from the neighbourhood of the end of the prostatic duct a seta (fig. 17) 0.24 mm. long and 12 μ thick, almost straight, without the curve of an ordinary seta ; the tip tapers, and has a slightly irregular truncated end,—just possibly the extreme end has been broken off. There is no nodulus. The proximal end was not well seen, being embedded in muscular fibres ; it may or may not have the curve which is seen in an ordinary seta. There is no ornamentation.

Sub-family *OCTOCHAETINAE*.

Genus *Octochaetus* Bedd.

Subgenus *Octochaetoides*, Mich.

Octochaetus (Octochaetoides) barnesi, sp. nov.

(Plate IV, figs. 18-20.)

Horsleykonda, Chittoor Dist. ; ca. 3,000-4,100 ft. 11-16. ix. 1923. E. Barnes.
Two specimens, sexually mature. (Madras Museum.)

External Characters.—Length 75 mm. ; diameter 3.5 mm. Colour an indefinite grey ; no difference between dorsal and ventral surfaces. Segms. 201 ; segms. vi-x with slightly marked secondary annulation (two to four annuli).

Prostomium epilobous $\frac{3}{4}$, sides parallel, open behind.

Dorsal pores from furrow 12/13.

Setae of rather large size, paired. In the middle of the body $ab = \frac{3}{7}aa = \frac{1}{2}bc = \frac{4}{5}cd$; behind the genital region $ab = \frac{1}{3}aa = \frac{1}{3}bc =$ just under $\frac{1}{2}cd$, and the ratios are approximately the same in front ; $dd =$ half the circumference in the middle of the body, and four-sevenths more anteriorly.

The clitellum includes xiii-xvii (=5) ; setae are visible but no inter-segmental grooves.

The prostatic pores are two pairs, on xvii and xix, in line with a ; the grooves connecting them are widely bowed outwards, as far as the line of b ; the male pores are presumably at the middle of the length of the grooves, and so will be in line with b . The posterior part of segm. xvii and the anterior part of xix, behind and in front of the level of the pores respectively, are somewhat depressed ; the midventral part of xviii forms a ridge.

The female pores are a pair of minute white spots, immediately in front of the setal zone, and a little internal to a .

The spermathecal pores are two pairs, in $\frac{7}{8}$ and $\frac{8}{9}$, on minute papillae in line with a . On segm. viii, around the setae ab , is an indefinite whitish swelling, which joins its fellow across the middle line.

Internal Anatomy.—Septum 4/5 is moderately thickened ; the next is 8/9,—this and the three following are slightly thickened, 9/10 and 10/11 most so ; 12/13 and 13/14 are also very slightly thickened.

The gizzard is probably morphologically in vii, since there are two pairs of vascular commissures behind it and in front of septum 8/9 ; it consists of a muscular ring, somewhat obliquely placed, so that there is a soft area of gut behind it on its dorsal surface.

The calciferous glands are large, kidney-shaped, and situated in xv ; they take up the whole length of the segment, and surround the alimentary canal completely at each side, being attached by the hilus.

The intestine begins in xvii ; its anterior part shows a large typhlosole, which forms a double fold, beginning abruptly.

The last heart is in xiii.

The micronephridia are numerous, small, and irregularly scattered.

The testes had apparently disappeared ; funnels were seen free in segms. x and xi. Seminal vesicles were present in ix and xii, both pairs rather small ; the two anterior vesicles were each cut up into two almost unconnected portions, the posterior pair were slightly lobed.

There are two pairs of prostates,—coiled tubes of moderate size. The ducts are narrow and shining, of the same thickness throughout, and pass inwards with an almost straight course or with a few gentle undulations.

Ovaries and funnels are present in xiii. There are small ovisacs in xiv.

The spermathecal ampullae are ovoid sacs. There is a single large diverticulum, cylindrical in shape though sometimes with a rather irregular outline ; it is rather longer than the ampulla, half as wide or nearly so, and scarcely narrower at its attachment. There is a short duct,—merely the place just below the ampulla where the diverticulum is attached (fig. 18).

The penial setae (fig. 19) are 1.4 mm. long, and 25 μ thick at the middle. The shaft has a gentle curve from end to end, and becomes a little thinner towards the tip. The distal extremity is thinned and flattened, and slightly hollowed as seen from the side ; it is 29 wide. The terminal 0.4 mm. of the seta is ornamented with circles of very fine spines ; these extend distalwards on to the flattened tip ; towards the proximal limit of their extent the circles become irregular.

Copulatory setae are present in segm. viii, apparently two on each side. These are 0.8 mm. long, and 20 μ in thickness at their middle. The shaft is slightly curved ; the tip is pointed and slightly bulbous or clawshaped. The distal fourth is ornamented with semicircular depressions, convex backwards, each with a sharp margin (fig. 20).

***Octochaetus (Octochaetoides) excavatus*, sp. nov.**

(Plate IV, figs. 21-24.)

Horsleykonda, Chittoor Dist. ; ca. 3,000-4,100 ft. 11-16. ix. 1923. E. Barnes.
Three specimens, sexually mature. (Madras Museum.)

External Characters.—The size varies ; worms measuring 70 mm. in length and 3 mm. in thickness, and 46 mm. in length and 2 mm. in thickness, were both mature. Colour greyish,—a rather slaty grey,

the anterior end lighter; no difference between dorsal and ventral surfaces. Segms. 150; a slight secondary annulation in vii-x.

Prostomium epilobous $\frac{2}{3}$, open behind.

Dorsal pores from furrow 12/13.

The setae are paired. In the middle of the body $ab = \frac{2}{7}aa = \frac{3}{7}bc = \frac{3}{4}cd$; behind the genital region $ab = \frac{2}{5}aa = \frac{3}{7}bc = \frac{3}{4}cd$; in front of the clitellum $ab = \frac{2}{7}aa = \frac{2}{7}bc = \frac{2}{5}cd$; $dd = \frac{4}{7}$ of the circumference.

The clitellum embraces segms. xiii-xvii (=5); the surface is smooth; dorsal pores are visible.

The male field has the form of a circular or rather hexagonal depression with a well-marked lip; with the lip, it extends over segms. xvii to xix and includes half of xx also (fig. 21). The spermathecal grooves run for most of their extent in line with setae *b*, just within the lip of the depression; but they bend inwards at their ends, so that the prosthetic pores are in line with *a*. The portion of the floor of the depression which is included between the grooves is more deeply excavated than the region in which the grooves lie,—i.e., is at a lower level.

The female and spermathecal pores are as in *O. barnesi*, to which the present form is related. Setae *ab* of segm. viii are displaced, especially *a*, which is shifted backwards, near the spermathecal pore in 8/9.

Internal Anatomy.—Septum 4/5 is moderately thickened; 10/11 and 11/12 are fused at their periphery, and enclose segment xi between them; these and 12/13 are slightly thickened. There is no trace of any septum between 4/5 and 10/11.

There are three hearts between septum 10/11 and the gizzard, which is thus morphologically in viii,—the three hearts corresponding to segments x, ix, and viii. Calciferous glands occupy segms. xv and xvi, meeting dorsally above the oesophagus.

The last heart is in xiii.

The micronephridia are irregularly scattered.

Attached to the anterior face of septum 10/11 is a testis sac on each side, the two being continuous below the oesophagus; the sacs are slightly lobed, and extend upwards, tapering as they do so, by the sides of the alimentary canal. Testis sacs are also present in xi, attached to the posterior surface of septum 10/11; they are smaller than those in x, and rounded in form. When opened, the sacs were found to contain a mass of coagulum, but testes were not distinguishable within this mass; the presence of funnels was concluded from the iridescence of parts of the masses. There were no testes or funnels outside the sacs.

The seminal vesicles are a single pair, in segm. xii; each is elongated transversely, and dorsally it approaches its fellow, tapering upwards towards the dorsal middle line.

The two pairs of prostates are rather short convoluted tubes, of moderate size, confined to segments xvii and xix. The ducts are short, very narrow, shining, of the same diameter throughout, and pass transversely inwards.

Ovaries and funnels are present in xiii; there are small ovisacs in xiv.

The spermathecal ampullae (fig. 22) are rounded sacs. The duct is short, about a quarter the length of the ampulla. There is a single

diverticulum, short, stumpy, slightly curved, its length one-third that of the ampulla, its width equal to that of the duct; it arises from the base of the ampulla; indications of a few seminal chambers are seen as slight bulgings on its surface.

The penial setae (fig. 23) are 1.27 mm. in length and 18μ in diameter at the middle. The shaft is slightly bowed; the tip thin and flat, slightly broadened, and slightly bent back as seen in a side view (b). On the distalmost part of the shaft, proximal to the thinned and flattened tip, are about five irregular rings of small spines. The width of the tip is 17.5μ , and that of the shaft in the region of the spines 16μ .

The copulatory setae (fig. 24) are 0.7 mm. in length, and 16μ thick at the middle; the shaft is slightly bowed, and the distal end rather bulbous, with a bluntly pointed tip. The terminal 0.2 mm. of the shaft is ornamented with short irregular rows of teeth forming incomplete circles,—rather an irregularity or fracture of the surface than a row of teeth, yet differing from the semicircular depressions of the previous species; the claw-like termination is also rather more elongated in the present species than in *O. barnesi*.

Remarks.—I had at first ranked this form as a variety of the previous species, with which it is doubtless closely related. But although the relationship cannot be mistaken, the present specimens show so many distinctive features that I think there is no escape from the necessity of erecting a separate species for them. Thus the external configuration of the male field, the absence of so many septa, the testis sacs, and the form of the spermathecae, are important distinguishing characters; while there are minor differences in the penial and copulatory setae, and in the occurrence of only one pair of seminal vesicles.

Octochaetus (Octochaetoides) thurstoni Mich.

(Plate IV, fig. 25.)

Madras. Oct. 1922. F. H. Gravely. Two specimens, sexually mature. (Madras Museum.)

The present species has only been subjected to examination once before, by Michaelsen. I therefore give a few particulars of the specimens now before me.

External Characters.—Length 235-242 mm.; diameter 5-6 mm. Segms. 214. Colour yellowish grey, somewhat darker dorsally, especially at the anterior end, where the dorsal surface is slaty; a narrow dark stripe mid-dorsally.

Prostomium almost (in one) or quite (in the other) tanylobous; the tongue crossed by a transverse furrow nearer its anterior than its posterior end.

Dorsal pores beginning in furrow 12/13.

The setal intervals vary; in one specimen, in front of the genital region $ab = \frac{1}{3}aa = \frac{1}{3}bc = \frac{2}{3}cd$; behind the genital region $ab = \frac{1}{4} - \frac{2}{7}aa = \frac{1}{3}bc = cd$ or less than cd ; in the middle of the body $ab = \frac{2}{6} - \frac{1}{2}aa = \frac{4}{7}bc = cd$ or rather less; in another specimen, in the middle of the body the ratios were:— $ab = \frac{1}{3}aa = \frac{1}{2}bc = \frac{3}{4}cd$. The interval dd is $\frac{5}{9}$ of the circumference in the middle of the body, rather more towards the anterior end.

The number of copulatory cushions was rather greater than in Michaelsen's specimens. In one of mine they were present on xxi-xxiv, and in addition there was a smaller one on xx, and one on xvi; in the other they were on xxiii-xxv, on the left side only in xxii, over furrow 16/17, on the hinder part of xvii and on the middle of xviii; the latter two were small and in the middle line, and rather indefinite.

Internal Anatomy.—Testes and funnels were found free in segms. x and xi. The seminal vesicles in xi were small, those in xii of moderate size, with slightly lobed margins.

The prostatic duct was slightly narrower than the glandular part, shiny, of considerable length, with a general transverse direction but with many undulations.

The spermathecal ampullae were irregular sacs, with irregularly lobed margins. The duct was merely a narrowing of the sac, short and thin, not distinctly demarcated. There was a single diverticulum, small, somewhat flattened, with a number of small lobules, the seminal chambers; the whole rather cauliflower-like, and attached by a short stalk to the ectal end of the duct.

Michaelsen did not find any penial setae. They are however present in the specimens before me (fig. 25). They are 1 mm. in length, and 10 μ thick at the middle; the shaft has a slight curve, more marked distally; the point tapers simply, and is fairly sharp; there is an ornamentation of irregular rings, twelve to sixteen in number, of very small spines, which occupy the distal part of the shaft but not the region of the tip.

Genus **Eutyphoeus** Mich.

Eutyphoeus gammiei (Bedd.).

(Plate IV, fig. 26.)

Jaulah Lake, Amingaon, Assam; in damp earth on an island in the lake
13. iii. 1924. S. L. Hora. A single specimen, sexually mature.

A small village near Jaulah Lake, Amingaon, Assam. 14. iii. 1924. S. L. Hora.
A number of specimens, sexually mature.

The species is a variable one; cf. my discussion in the "Fauna of British India" volume (6), pp. 426-428.

The copulatory areas presented themselves here rather as elevations than as depressions. In addition to those usually described, there were a number of small circular papillae, quite irregularly distributed over segms. xi and xii, some even dorsal, with two ventrally in furrow 10/11 and a very few on segms. ix and x.

I now think that the female pores are each, when visible, situated in a whitish not specially defined area just in front of seta *a*. The areas which are shown in the fig. in the "Fauna of British India" are probably the depressions which frequently occur in the course of furrow 13/14.

The young penial setae (fig. 26) have in some cases a double series of oblique markings near the tip, arranged in chevron fashion; the tip is, as often, softened and variously bent.

Subfamily *DIPLOCARDINAE*.Genus **Dichogaster** Bedd.**Dichogaster bolau** (Mich).

Bangalore, Mysore ; ca. 3,000 ft. 6. xii. 1921. F. H. Gravely. A single specimen, sexually mature. (Madras Museum).

Family LUMBRICIDAE.

Subfamily *GLOSSOSCOLECINAE*.Genus **Pontoscolex** Schmarda.**Pontoscolex corethrurus** (Fr. Müll.).

Kankanaddy, Mangalore, S. India. 30. vii. 1923. J. A. M. A single specimen. (From the Government Entomologist, Coimbatore.)
Aberdeen, S. Andamans ; under stones with cocoons. N. Annandale. Two specimens, sexually mature.

Subfamily *LUMBRICINAE*.Genus **Allolobophora** Eisen.Subgenus **Eisenia** Malm.**Allolobophora (Eisenia) foetida** (Sav.).

Kurseong, E. Himalayas ; 5,000 ft. ; under stones near edge of water, Sta. 11. 7. iii. 1924. B. N. Chopra. A single specimen, sexually mature.

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