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XXV.—*Note on some Earthworms from India.* By FRANK E. BEDDARD, M.A. Oxon., F.R.S.E., Naturalist to the 'Challenger' Commission.

[Plate VIII.]

I AM indebted to the kindness of Professor M'Intosh for the opportunity of studying a number of earthworms, collected chiefly in the neighbourhood of Calcutta, which had been sent to him from the Indian Museum at Calcutta for identification. He requested me to report upon them; and the following description relates to these specimens.

The collection contained four recognizable species—*Megascolex affinis*, *Perichæta armata*, *Perionyx M'Intoshii*, and *Typhæus orientalis*, of which the last three are apparently new to science. There was also a bottle filled with a number of earthworms which were not sufficiently well preserved to enable me to determine the species; they were, however, evidently members of the genus *Megascolex* or *Perichæta*.

I received also a quantity of "castings," precisely similar to those figured and described by Mr. Darwin in his work on Earthworms, from beneath which all the specimens in the collection, with the exception of *Perionyx M'Intoshii*, had been gathered.

Megascolex affinis, E. P.

Perichæta affinis, E. Perrier, Arch. du Muséum, t. viii. p. 106.

I venture to alter Perrier's name into *Megascolex affinis*, since Dr. Horst * has recently called attention to the identity of Templeton's genus *Megascolex* † with that subsequently termed *Perichæta* by Schmarda ‡. The name *Perichæta* was apparently introduced by Schmarda owing to a misunderstanding of Templeton's definition of the genus *Megascolex*, for which he is indeed hardly to be blamed. The definition given by Templeton is very imperfect, and seems also to be inaccurate, since Baird §, who examined the type specimen of *Megascolex cæruleus*, was unable to find any difference between it and Schmarda's genus *Perichæta*. Judging from Templeton's description, *Megascolex* is very different indeed from *Perichæta*; he states, for example, that the generative organs are developed in segments 16, 17, and 18. Schmarda evidently considers that this description refers to the clitellum; but in any case the description is entirely unlike *Perichæta*, in which genus the testes are nearly always in segments 11 and 12; and the 18th segment, upon which the vasa deferentia open, *never* forms part of the clitellum.

However, since Baird has stated that *Megascolex* and *Perichæta* are identical, Horst is clearly right in wishing to retain the name *Megascolex*, which has a priority of fifteen years.

It might perhaps be advisable to limit the name *Megascolex* to those worms which are characterized by (1) the presence of a continuous ring of setæ upon the segments of the body, (2) the possession of a clitellum occupying segments 14–16 inclusive, (3) the position of the two male generative apertures behind the clitellum upon the 18th segment and of the single female aperture upon the 14th segment within the clitellum; while the name *Perichæta* might be applied to certain other forms which present a fundamental resemblance to the above-mentioned group, but differ in one or both of the following characters:—(1) in the ring of setæ upon each segment being discontinuous at one or more points; (2) in the clitellum occupying more or fewer segments of the body than three.

In this way several species recently described by Perrier ‖ from the Philippine Islands, such as, for example, *Perichæta*

* Horst, Notes from the Leyden Museum, vol. v. p. 183.
† Templeton, Proc. Zool. Soc. 1844.
‡ Schmarda, Neue wirbellose Thiere, 1861, Bd. 1. ii. p. 13.
§ Baird, Proc. Zool. Soc. 1869, p. 40.
‖ Perrier, Comptes Rendus, t. lxxxi. p. 1043.

luzonica (which has a clitellum of four segments and a ventral and two lateral areas deprived of setæ), together with some other forms described by Grube * and Horst † and a new species (*Perichæta armata*) may be conveniently included in the genus *Perichæta*.

Hutton ‡ has recently applied the generic name *Megascolex* to certain New-Zealand earthworms described by him; these species also, with the exception of *Megascolex antarctica*, Baird, ought, on the view advocated here, to be referred to the genus *Perichæta* §.

It is very possible, however, that when more is known about this group of earthworms it will be necessary again to subdivide into several other genera the species which I propose for the present to call *Perichæta*. It is true that the name *Perichæta* applied, for instance, to such a form as *P. luzonica*, which is distinguished by *not* possessing a continuous circle of setæ, is (etymologically considered) a misnomer; but this is no objection whatever to its use. The practice of changing names because they are "inapt," so largely indulged in by many naturalists, ought not to be encouraged, as it throws zoological nomenclature, already sufficiently complicated, into the most utter confusion.

There were several specimens in the collection apparently belonging to this species; in structure they agreed exactly with the description given by Perrier ‖, with the exception of the arrangement of the setæ upon the clitellum. On page 107 of his memoir is the following sentence:—"trois anneaux . . . . forment la ceinture. . . . . sur lesquels on distingue parfois nettement le cercle de soies caractéristique des *Perichæta*." In all the specimens that I examined setæ were invariably present upon the clitellum, but confined to the ventral portion of each of the three segments of which it is composed, and *not* continuous all round the body, as the above quotation, if I understand it rightly, seems to imply. This small difference, however, hardly warrants the introduction of a new specific name; and since the specimens which M. Perrier described came from Cochin

* Grube, Phil. Trans. vol. clxviii., and MB. Akad. Berlin, 1877, pp. 509–554.

† Horst, *loc. cit.*

‡ Hutton, Journ. of New-Zealand Inst. vols. ix. and xi.

§ One of the species described by Hutton (*Megascolex sylvestris*) ought perhaps to be removed altogether from the genus *Perichæta* (or *Megascolex*), since it differs by the presence of the male apertures upon the 19th segment instead of the 18th as is universally the case in both *Perichæta* and *Megascolex*.

‖ Perrier, Nouv. Arch. du Muséum, t. viii. (1872).

China, it may be regarded as merely a local variation. The stout mesenteries, the existence of which Perrier has mentioned in this species, are developed between segments 4–5, 5–6, 6–7, 7–8; they are connected with each other by tendinous cords, and thus form a very compact whole, which is no doubt of assistance to the animal in helping it to force its way through the earth.

Hab. Neighbourhood of Calcutta.

Perichæta armata, n. sp. (Pl. VIII. figs. 5–7.)

This new species I include within the genus *Perichæta* for the reasons just stated.

It is characterized by the setæ being absent from a narrow area upon the ventral median line and by the possession of a clitellum consisting of four segments, commencing with the 14th, but extending as far as the 17th segment; the male generative apertures are upon the first segment after the clitellum (18th segment of body).

The anterior portion of the body is slightly swollen, somewhat in the shape of an olive. There are about forty setæ to each segment, at any rate in those anterior to the clitellum; the posterior segments seem to have fewer setæ, twenty to thirty. Setæ are found upon the clitellum, and are distributed upon its segments just as they are over the rest of the body. One of the setæ is shown in fig. 5; the proximal end is rounded and somewhat swollen, the distal end sharply curved.

The alimentary canal entirely resembles that of other *Perichætæ*. There are found in this species the glandular tufts which Perrier* was the first to describe in *P. Houlleti* and other varieties as salivary glands; but subsequently † considered to be representative of the segmental organs of other earthworms ‡. In one specimen of *P. armata* which I dissected there were no less than nine pairs of these organs occupying segments 5–13.

There are eight pairs of contractile hearts occupying segments 6–13, of which the four posterior are the largest.

The three pairs of spermathecæ are situated in segments 7, 8, and 9, but open on to the boundary-line between each of these segments and the one in front. The spermathecæ are unusually large; each is provided (fig. 7) with two

* Perrier, Nouv. Arch. du Muséum, t. viii.

† Perrier, 'Comptes Rendus,' t. lxxviii. (1874) p. 814.

‡ Horst (Niederland. Archiv f. Zool. Bd. viii. 1879, and 'Notes from the Leyden Museum,' vol. v.) subsequently, but independently, arrived at a similar conclusion.

minute supplementary sacs, one on either side close to its external opening.

The prostate glands are large and very much lobulated; they are placed in segment 18; each is composed of two large lobes, which are again divided up into a number of lobules; the duct of the prostate gland unites with the vas deferens before its external opening on to the 18th segment.

In the furrow between each of the two large lobes of which the gland is formed is a thin-walled sac containing a number of specially modified setæ (fig. 6); the presence of this penial sac, found in the intraclitellian genus *Eudrilus* and the postclitellian genus *Acanthodrilus*, has never before been described in any *Perichæta* or *Megascolex*.

The testes are brownish in colour and not unlike the segmental tufts, and for this reason are somewhat difficult to make out; there appear to be only one pair, situated in the 12th segment.

In the 9th segment, upon the mesentery bounding it behind, are a pair of glands which closely resemble the testes in external appearance. The specimens were not sufficiently well preserved to admit of a proper microscopical examination; so far as could be made out, the minute structure was not unlike that of the testes; and it is probable, from their position, that they are an anterior pair of testes, since the ovaries are in all other earthworms without exception placed behind the testes.

Hab. Neighbourhood of Calcutta.

Perionyx M'Intoshii, n. sp. (Pl. VIII. figs. 3, 8.)

The genus *Perionyx* was instituted by Perrier* for the reception of an earthworm which, although very closely allied to *Megascolex*, differs from it in at least three important characters:—(1) in the position of the clitellum and the number of segments of which it is composed; (2) the presence of segmental organs like those found in other Oligochæta; and (3) in the arrangement of the male generative apertures. Only one species, *Perionyx excavatus*, is described by Perrier.

Perionyx M'Intoshii measures 15 inches in length and about one third of an inch in breadth, and consists of some 200 segments; its colour is violet, inclining to a reddish tint on segments 12–23; the clitellum was not developed.

The setæ are arranged in a continuous ring round each segment, as in *Megascolex*, upon a somewhat darker-coloured line.

* Perrier, Nouv. Arch. etc. *loc cit.*

The male generative apertures are upon the 18th segment, and closely approximated to each other; they are situated upon a yellow-coloured area which extends a short way into the 17th and 19th segments respectively; the anterior and posterior margins of the 18th segment are slightly bulged at the place occupied by the generative area (fig. 3). The position of the generative apertures is somewhat intermediate between the condition found in *Perionyx excavatus* and in the genus *Perichæta*. Perrier describes and figures the apertures in the former species as being very closely approximated to each other, indeed actually contiguous, and occupying a depressed area distinct from the rest of the segment. In *Perionyx M'Intoshii* they appear to be more widely separated from each other, and also show a transition towards the arrangement found in *Perichæta* in that the area upon which they are situated is not depressed below the rest of the segment and so distinctly marked off from it as in *Perionyx excavatus*.

The single female orifice is situated on the 14th segment. The situation of the male and female orifices with respect to the setæ is different. The female orifice is situated *in front of*, while the male orifices are *behind* the circle of setæ, which in this part of the segment is somewhat bulged out in front, following its anterior margin.

The two pairs of spermathecæ are situated in the 8th and 9th segments and open between the 7th and 8th and the 8th and 9th, as in *Perionyx excavatus*; they also agree in form with the spermathecæ of *P. excavatus*, and consist each (fig. 8) of a simple sac without any development of supplementary pouches, which are always present, and in such great variety, in *Perichæta* and *Megascolex*.

The segmental organs exist in all the segments of the body, and seem to be of a larger size in the first ten or eleven segments. They are of the ordinary form, resembling those of the common earthworm; their apertures are evidently in the anterior part of each segment close to the median ventral line, but I did not succeed in seeing them. The presence of these segmental organs at once distinguishes the genus *Perionyx* from *Megascolex*; in the latter genus, as Perrier and Horst have shown, the segmental organs when present are invariably represented by tufts of glandular tubes, differing entirely from the typical segmental organs of the other Oligochæta*.

* A possible exception to this is *Perichæta leucocycla*, Schm. Schmarda (*loc. cit.*) gives some account of the segmental tubes (Schleimdrüsen) of this species; and it seems likely from his description that they are similar to the segmental tubes of *Perionyx* and other Oligochæta. Schmarda's figure of *P. leucocycla*, moreover, is not at all unlike my *Perionyx M'Intoshii*; and though his description is rather different, it is not impossible that the two species will eventually prove to be identical.

The body-cavity is also in communication with the exterior by a series of dorsal pores.

Some of the anterior mesenteries, those forming the anterior boundaries of segments 6–9, form a continuous covering for the pharynx, each mesentery being prolonged backwards from its point of origin on the body-wall in a cup-like fashion, and fitting into the inside of the succeeding mesentery; each of these mesenteries is also closely fastened to the one in front by a series of tendinous cords which arise from its anterior margin, and are attached to about the middle of the mesentery in front. This arrangement is very like that described by Perrier in *Anteus*, but nothing of the kind is mentioned by him as existing in *Perionyx*.

The alimentary canal is of the ordinary form. A rectum is developed at the terminal part of the intestine, from which it is marked off by a strong fold; its length is about $\frac{2}{3}$ inch. Like Perrier, I was unable to find any lateral cæca to the intestine.

The vascular system consists of the usual dorsal and ventral trunks connected by eight transverse arches occupying segments 6–13; of these the four posterior were considerably stouter than the others, and no doubt serve the purpose of contractile hearts. In the segments following, the dorsal vessel gives off two small trunks on either side.

The testes are two pairs of lobulate glands occupying the 11th and 12th segments; each testis is united with its fellow. As in *Perionyx excavatus*, the anterior pair is rather smaller than the posterior.

The prostate glands are large and well developed; each is composed of a number of small lobules, and differs therefore from the prostate of *Perionyx excavatus*, in which species the prostates are of circular form and exhibit hardly any traces of division into lobules. In this respect therefore *Perionyx M'Intoshii* approaches rather more nearly to the typical *Megascolex*.

Hab. Akhyab, Burmah.

Typhœus orientalis, nov. gen. et sp.
(Pl. VIII. figs. 1, 2, 4, 9–12.)

The anatomical characters of this earthworm appear to be quite different from those of any other genus as yet described; it belongs to the "Intraclitellian" group of Perrier.

External characters.—The largest of the three specimens which the collection contained measured 10 inches in length and about $\frac{1}{3}$ inch in breadth; the form of the body is cylindrical, and the anterior portion is not at all dilated. The setæ are arranged in four pairs, and are ventral in position; upon the segments which form the clitellum only

two pairs were visible, the outermost pair of each side being absent. The clitellum occupies four segments (14–17), but does not commence abruptly with the 14th segment. On the hinder part of segment 13 there is already a slight development of glandular matter.

Upon the 17th segment are the two male external generative apertures, which are situated upon a flattened area marked off from the rest of the body by a continuous raised margin; upon this area, and for a short distance in front of it, there is no development of glands; in front of the generative apertures, and corresponding to the lines of division between the segments, are three pairs of papillæ, and in the segment immediately following the generative apertures there is another pair; behind these again is a single papilla corresponding to the right-hand one of the other segments; and, finally, on the line of division between segments 12 and 13 there is a single papilla on the left side, which differs from the others in being of a rather smaller size and in having a central perforation. These papillæ were only present in a specimen which had a fully-developed clitellum. The papillæ (fig. 4) are oval in form, with the long diameter transverse to the axis of the body; in the centre of each, with the exception of the most anterior one, is an irregularly shaped depressed area. The position of the papillæ, situated as they are on the boundary-line of the segments, is unusual; in *Megascolex affinis* the two pairs of papillæ are situated in the middle of segments 17 and 19 respectively, and this position appears to be the same in other species of *Megascolex* which are provided with papillæ; but in *Pontodrilus* * the two large papillæ are situated on the boundary-line of segments 19–20, 20–21.

The enclosure of the generative orifices within an area distinct from the rest of the clitellum is not peculiar to the genus *Typhœus*; a similar condition has been described by Perrier† in two other Intraclitellian genera, *Anteus* and *Titanus*, and more recently by myself in a new genus, *Pleurochœta*‡. I may here remark that the pair of orifices on either side of the apertures of the prostate glands in this latter genus in all probability correspond to the genital papillæ just described, which in other species are frequently perforated and continuous with the ducts of small glands§.

In the anterior region of the body, between the 7th and

* Perrier, Arch. de Zool. Exp t. ix. 1881, pl. xiii. fig. 1, *vv*.
† Perrier, *loc. cit.* pp. 51, 58.
‡ F. E. Beddard, Trans. Roy. Soc. Edinb. vol. xxx. pt. 2, p. 481.
§ Perrier, *loc. cit.* p. 107.

8th segments, are the slit-like orifices of the spermathecæ. Dorsal pores exist in the segments behind the clitellum; they are, as in other earthworms, situated near the anterior margin of each segment.

Alimentary canal.—The mouth, which is precisely terminal in position and not ventral, leads into a small buccal cavity separated from the pharynx by a slight constriction. The latter is somewhat square in outline and broader behind than in front; it extends back as far as the 4th or 5th segment, and is attached to the body-wall by a number of muscles and tendinous bands, which collectively represent the mesenteries of this portion of the body. The upper surface of the pharynx is covered by a rich vascular network.

The œsophagus is long, and occupies segments 5–8; it is supported (fig. 2) by two large and thick mesenteries which form the boundary-line between the 5th and 6th and the 6th and 7th segments. Behind the œsophagus is the gizzard, divided into two portions—an anterior small thin-walled compartment, and a large thick-walled portion, the gizzard proper; this last has a nacreous appearance on the outside, and is lined by a very thick chitinous layer. The gizzard occupies two segments which, as usual, are not separated from each other by a distinct mesentery, though two tendinous bands, by which the lower surface of the gizzard is attached to the body-wall, are probably the representatives of a mesentery; at the hinder extremity of the gizzard, from the upper surface, a pair of stronger tendinous bands are given off, which traverse the mesentery lying immediately behind it, and are fixed to the ventral wall of the body. The œsophagus (fig. 2) is in like manner fixed in its place by similar tendinous bands.

Behind the gizzard follows the rest of the œsophagus, which at about the 17th segment passes into the intestine; the latter is distinguished by its greater calibre and somewhat thinner walls.

On the dorsal surface of the intestine, rather before the end of the middle third of the body, is developed a glandular mass (fig. 2). This consists of five separate glandular bodies occupying as many segments and increasing slightly in size from before backwards. In one specimen (apparently a young one) the posterior two glands were bilobed; in the other specimen that I examined, which had a fully developed clitellum, and was therefore adult, all were bilobed. The whole glandular mass is yellowish white in colour, and from one fourth to one third of an inch in length. It is situated above the dorsal vessel, which here appears to be considerably

dilated, and indeed in the region behind the glands dwindles so much in size as to be almost invisible.

These glands I regard as homologous with the "kidney-shaped" glands recently described by me in *Pleurochæta**. These are the only two genera, so far as I am aware, in which any thing of the kind exists. They probably represent a specialized condition of the intestinal cæca of the Leech and certain Polychæta such as *Aphrodite*. In the latter genus†, moreover, the cæca are branched, and thus present a nearer approximation to the complex glands of *Pleurochæta* and *Typhœus*. The two cæca of *Megascolex*, first noticed by Vaillant ‡ in *Megascolex cingulata*, and subsequently described in several other species of the same genus by Perrier§, belong, no doubt, to the same category, and represent in a very rudimentary way these same glands.

The genus *Megascolex* itself, however, contains individuals which in this respect are more specialized; two species, *Megascolex Sieboldii* and *M. musicus*, possess no fewer than six pairs of these cæca ‖.

The *circulatory system* consists of a dorsal and a ventral vessel united by six transverse trunks or "hearts" in segments 9–14; of these the two posterior are slightly larger than the others.

The *nervous system* closely resembles that of other earthworms; the cerebral ganglia, hardly separated from each other, are placed on the line of division between the buccal cavity and the pharynx in the 2nd segment of the body. The ventral chain commences in the 3rd segment; the two or three anterior ganglia are considerably larger than the following ones and closer together; the ganglion occupying the 17th segment, and lying between the male generative apertures, is also, as usual, of larger size than the rest. From each ganglion two pairs of nerves appeared to take their origin—one at the anterior, and the other at the posterior extremity.

Segmental organs.—Instead of the ordinary simple tubes opening into the body-cavity by a ciliated funnel which are found in the common earthworm and the majority of the Oligochæta, there are in *Typhœus* a series of tufted glandular masses somewhat similar in appearance to the tufted glands which are almost universally found in the genus *Megascolex*, and re-

* F. E. Beddard, Trans. Roy. Soc. Edinb. vol. xxx. pt. 2, p. 493, pl. xxv. figs. 1, 11, 12, pl. xxvi. fig. 19.

† Gegenbaur, Man. d'Anat. compar. (trad. franç. par C. Vogt), p. 206, figs. 43, 44.

‡ Vaillant, Ann. des Sc. Nat. 5 sér. t. x. p. 233, pl. x. fig. 4 *g*.

§ Perrier, Nouv. Arch. du Muséum, p. 101, &c.

‖ Horst, Notes from the Leyden Museum, vol. v. pp. 192, 194.

garded by Perrier and Horst as the homologues of the segmental organs. In *Typhœus*, however, they are somewhat different in appearance and far less conspicuous; instead of being developed in close relation to the mesenteries, they are situated near the anterior margin of each segment on the ventral wall of the body. Their microscopic structure was hardly distinguishable, owing to the bad state of preservation of the specimens; but it evidently differed from the structure of the tufted glands in *Megascolex affinis* and *Perichæta armata*. Judging from the position of the organs, it seemed very likely that the external aperture was situated anteriorly to the inner pair of setæ. These glands appeared to be present only in the anterior segments of the body; behind the clitellum I was unable to detect any.

In the most anterior part of the body, and occupying segments 3 and 4, is a large gland on either side composed of a number of these glandular tufts aggregated together (fig. 2). Eisig has recently shown in the Capitellidæ that there may be more than a single segmental tube to each segment; and, assuming that the glandular tufts of *Typhœus* are really the homologues of the segmental organs of other worms, which seems very probable, this genus presents another example of the same phenomenon. It is possible that this structure corresponds to the "glande à mucosité" described by Perrier as coexisting in *Urochæta* with segmental tubes of the normal type.

Generative system.—I was unable to find the ovaries or any trace of an oviduct or its external opening, which is so conspicuous in *Megascolex*.

The male organs consist of a large pair of testes, which extend through the 13th, 14th, and 15th segments. The vasa deferentia are two extremely fine tubes which open upon the 17th segment; each unites with the duct of the prostate gland of its own side shortly before its external opening. The "prostates" are two large coiled glandular tubes situated, one on either side of the body, in the 18th segment. In the specimen with a fully-developed clitellum the prostate was divisible into two parts—(1) the gland itself, a thick coiled bright-orange-coloured tube; (2) the duct, which differed in being of a smaller diameter and white colour. A thin muscular sac containing a number of specially modified penial setæ (fig. 11) is present, and is rendered extremely conspicuous by its nacreous glitter.

A single pair of spermathecæ occupy the 8th, and open between the 7th and 8th segments; each is provided with a short muscular efferent duct, at the junction of which with

the body of the spermatheca is a small appendage on either side; this appendage is formed of three short sacs uniting before their opening into the duct of the spermatheca; in colour they are very different from the spermatheca itself, being of a chalk-white, owing apparently to the thinness of the walls and to the presence of spermatozoa within; the main part of the spermatheca is reniform in shape, the efferent duct arising from the "hilus," and of a yellowish colour. The whole of this portion of the organ is covered by abundant blood-capillaries. Fig. 9 shows one of the spermathecæ, viewed laterally, with its trifid appendage and the "segmental tufts" of the segments on either side of it. The only other Intraclitellian genera in which prostate glands (so commonly found in the Postclitellian forms) exist are apparently *Eudrilus* and *Pleurochæta*; in the former genus Perrier* has described and figured two long sacs, which appear to represent prostates, and in *Pleurochæta*† they are well developed. In having the form of a simple coiled tube the prostate glands of *Typhœus* are of a more primitive character than those of *Perichæta*, which are complex lobulated glands; in *Pontodrilus*‡, however, the prostate has the same rudimentary structure.

Hab. Neighbourhood of Calcutta.

EXPLANATION OF PLATE VIII.

Fig. 1. *Typhœus orientalis*, from beneath. *cl*, clitellum; *a*, male generative apertures; *b*, genital papillæ; *sp*, apertures of spermathecæ. Natural size.

Fig. 2. *Typhœus orientalis*, dissected. *a*, aggregate of segmental tufts; *b*, specially thickened mesenteries; *c*, pharynx, between which and the buccal cavity lie the cerebral ganglia; *d*, œsophagus; *e*, gizzard; *f*, intestine; *g*, testis; *h*, prostate gland; *i*, penial sac; *sp*, spermathecæ; *v*, dorsal vessel, giving off six lateral hearts. Twice the natural size.

Fig. 3. *Perionyx M'Intoshii*. *m*, male aperture; *f*, female aperture; *sp*, orifice of spermatheca. Natural size.

Fig. 4. Genital papilla of *Typhœus*. × 4.

Fig. 5. Seta of *Perichæta armata*. × 300.

Fig. 6. Penial seta of the same, terminal portion. × 300.

Fig. 7. Spermatheca of the same. × 2.

Fig. 8. Spermatheca of *Perionyx M'Intoshii*. Natural size.

Fig. 9. Spermatheca and neighbouring segmental tufts of *Typhœus*. × 4.

Fig. 10. Seta of the same. × 300.

Figs. 11 *a* and *b*. Penial setæ of the same, terminal portion. × 300.

Fig. 12. Intestinal glands of the same. × 4.

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* Perrier, Nouv. Arch. du Muséum, t. viii. p. 74, pl. ii. fig. 26 *vs*.

† Beddard, *loc. cit.* p. 501.

‡ Perrier, Arch. de Zool. Exp. t. ix. 1881, pl. xiv. fig. 17.