

ON THE SIPUNCULOIDEA FROM INDIAN WATERS IN THE INDIAN MUSEUM, CALCUTTA.

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(Plate IX.)

The present paper deals with the Sipunculoidea belonging to the genera *Sipunculus* Linn. and *Siphonosoma* Spengel, represented in the collections of the Indian Museum, Calcutta. *Sipunculus nudus* Linn., *S. aequabilis* Sluiter, and *Siphonosoma australe* (Keferstein) are recorded from the Indian waters for the first time, while descriptive notes are added on *Sipunculus porrectus* Selenka and *S. robustus* Keferstein.

The specimens under report are mainly from the collections made by the Surgeon-Naturalists attached to the Marine Survey of India, and formed part of the material which was sent to the late Prof. J. W. Spengel of Giessen for his monographic revision of the group. A few specimens collected during the survey seasons 1924-1926, and a number of specimens collected by Dr. H. S. Rao in the Andamans during his investigations of the *Trochus* fisheries in the area are also dealt with in this paper. In addition, a series of specimens, of *Sipunculus robustus* Keferstein was received from Dr. R. Gopala Aiyar, Director of Zoological Laboratories, Madras University, Madras, for identification; the record of this species found floating in the coastal waters round Madras, is of special interest.

Sipunculus Linn.

1767. *Sipunculus*, Linné, *Systema Naturae* (XII ed.), p. 1078.
1865. *Sipunculus*, Keferstein, *Nachricht. Königl. Gesell. Wiss. Gottingen*, No. 7, p. 196.
1865. *Sipunculus*, Keferstein, *Zeitschr. Wiss. Zool.* XV, pp. 418, 419.
1883. *Sipunculus*, Selenka, de Man and Bülow, *Semper's Reisen im Archipel Philippinen*, II Tl., IV (i), p. 88.
1897. *Sipunculus*, Delage and Herouard, *Traité Zool. Conc.* V, p. 20.
1931. *Sipunculus*, Baltzer in *Kükenthal Handbuch Zool.* II (ii), p. 57 (9).

The earlier definitions of the genus by Keferstein, Selenka and his colleagues, and Delage and Herouard have to be modified in view of the restriction by Spengel¹ of the generic name *Sipunculus* to such species as do not bear any hooks on the introvert, and have short thick tentacles arranged in a circle round the mouth. The dorsal and ventral retractor series of muscles in this genus arise from the same level, and the integumental canals are longitudinally directed as opposed to the transversely directed canals in *Siphonosoma* Spengel (*vide infra*, p. 237.)

¹ Spengel, J. W.—*Verhandl. Deutsch. Zool. Gesell.* XXII, pp. 261-272 (1912).

Sipunculus nudus Linn.

(Plate IX, fig. 1.)

1767. *Sipunculus nudus*, Linné, *Systema Naturae* (XII ed.), p. 1078.
 1861. *Sipunculus nudus*, Keferstein and Ehlers, *Zool. Beiträg.* pp. 32-52, pls. vi-viii.
 1865. *Sipunculus nudus*, Keferstein, *Nachricht. Königl. Gesell. Wiss. Gottin.gen.*, No. 7, p. 196.
 1865. *Sipunculus nudus*, Keferstein, *Zeitschr. Wiss. Zool.* p. 419.
 1868. *Sipunculus nudus*, Baird, *Proc. Zool. Soc. London*, p. 77.
 1870. *Sipunculus nudus*, Brandt, *Mém. Acad. Imp. St. Petersbourg*, XVI (7), pp. 1-46, pls. i, ii (anatomy).
 1881. *Sipunculus nudus*, Andreae, *Zeitschr. Wiss. Zool.* XXXVI, pp. 201-258, pls. xii, xiii (anatomy).
 1883. *Sipunculus nudus*, Selenka, de Man and Bülow, *Semper's Reisen im Archipel Philippinen*, II Tl., IV (i), pp. 92, 93.
 1891. *Sipunculus nudus*, Ward, *Bull. Mus. Comp. Zool. Harvard*, XXI, pp. 143-184, pls. i-iii (anatomy).
 1899. *Sipunculus nudus*, Shipley in *Willey's Zool. Results*, p. 158.
 1900. *Sipunculus nudus*, Metalnikoff, *Zeitschr. Wiss. Zool.* LXVIII, pp. 261-322, pls. xvii-xxii (anatomy).
 1902. *Sipunculus nudus*, Sluiter, "*Siboga*" *Exped.* XXV, p. 5.
 1903. *Sipunculus nudus*, Augener, *Archiv Naturgesch.* Jahrg. 69, Bd. I, p. 344.
 1904. *Sipunculus nudus*, Ikeda, *Journ. Coll. Sci. Imp. University, Tokyo*, XX, pp. 31, 32.
 1904. *Sipunculus nudus*, Hérubel, *Bull. Mus. d'Hist. Nat. Paris*, X, p. 563.
 1905. *Sipunculus nudus*, Ikeda, *Annot. Zool. Japon.* V, p. 169.
 1907. *Sipunculus nudus*, Hérubel, *Mém. Soc. Zool. France*, XX, pp. 224, 225.
 1913. *Sipunculus nudus*, Southern, *Sci. Inv. Ireland Fish. for 1912*, No. 3, p. 8.
 1913. *Sipunculus nudus*, Gerould, *Proc. U. S. Nat. Mus.* XLIV, p. 428.
 1914. *Sipunculus nudus*, Fischer, *Mitteil. Nat. Hist. Mus. Hamburg*, XXXI, p. 1.
 1922. *Sipunculus nudus*, Cuenot, *Faun. France Sipunculus, etc.*, IV, p. 14.
 1922. *Sipunculus nudus*, *Arkiv Zool.* XIV, No. 19, p. 5.
 1925. *Sipunculus nudus*, Fischer, *Tierwelt Nord-u. Ostsee*, I, 26 vi d.
 1925. *Sipunculus nudus*, Brocke, *Bijdr. Dierkund.* XXIII, p. 82.
 1930. *Sipunculus nudus*, Sato, *Sci. Rept. Tohoku Imp. Univ.* V (4), 17. 2-5, pl. i, fig. 1.
 1934. *Sipunculus nudus*, Sato, *ibid.* IX (4), pp. 1, 2, pl. i, fig. 1.
 1935. *Sipunculus nudus*, Sato, *ibid.* X (4), p. 300.

S. nudus, the earliest known representative of the Sipunculoidea, is a cosmopolitan species with an almost world-wide distribution.

In the Indian Museum collection the species is represented by the following specimens :—

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|---|---|
| 1. Andamans ; purchased from G. H. Booley, Esqr. | 1 specimen ($\frac{8445}{9}$). |
| 2. Andamans, Port Blair, north of Corbyn's Cove.
7.i.34 ; Dr. H. S. Rao | 1 specimen (ZEV $\frac{7506}{7}$). |
| 3. Andamans, Port Blair, Dr. H. S. Rao | 2 specimens (ZEV $\frac{7504}{7}$). |
| 4. Andamans ; without definite data | 1 young specimen
(ZEV $\frac{7503}{7}$). |
| 5. Nicobars ; between Jetty and Naval point (St. 621). Col. R. W. G. Hingston. 8.iii.25 | 3 specimens (ZEV $\frac{7502}{7}$). |

The above listed specimens agree with the detailed description of *S. nudus* by Selenka and his collaborators, and I have no doubt about their identification.

The young specimen from the Andamans (No. 4) is 42 mm. long, while the others from Port Blair (Nos. 1-3) vary from 90-170 mm. in length.

They are of a creamy white to yellowish colour. The introvert in most specimens is retracted, but in one specimen (Plate IX, fig. 1) it is partially everted; its surface is covered with many rows of closely placed, leaf-like, inverted triangular papillae. The mouth opening is surrounded by a tentacular membrane which appears to be divided into a dorsal and a ventral lobe, each of which is cut into tentacular flaps; the flaps of the dorsal lobe are larger than those of the ventral.

The number of longitudinal muscles, which rarely anastomose, varies from 31-34 in the different specimens. The four retractor muscles arise at the same level, and are connected at their origin with 6-7 longitudinal muscles. Owing to the well developed circular muscles of the body wall its surface is cut up into deeply impressed quadratic areas; these are almost squarish in the anterior region, somewhat rectangular in the middle of the body, while near the posterior end some of them appear nearly triangular. The spindle-muscle arises somewhat in front of the anal opening, and is not connected posteriorly with the body wall.

The anal opening is situated dorsally about 15 mm. behind the origin of the introvert, and there are always at least 2 distinct longitudinal muscle bands bounding it both anteriorly and posteriorly.

The intestine consists of 10-12 double spirals; a large number of transverse muscular strands attach it to the body wall on either side. A rectal diverticulum was found in all the specimens, and "büschelförmige Analdrüsen" as described by Augener, were found attached to the mesenteries on the side of the anal opening.

The segmental organs are moderately long, extending posteriorly to the roots of the retractors or slightly beyond. They are only attached along the anterior one-fourth to one-third of their length. Their openings lie between the 4th and 5th longitudinal muscle bundles, about 10 mm. in front of the anal opening.

Distribution.—*S. nudus* is, as noted above, a cosmopolitan species. It has been recorded from the Atlantic Ocean, the North Sea, the Mediterranean, the Red Sea, the Indian and the Pacific Oceans. A detailed list of its distribution is given in Hérubel's paper (1907), while the localities from which it has been recorded since this date are listed by Fischer, Sato and others. It is recorded here from the Andaman and Nicobar waters in the Bay of Bengal for the first time.

***Sipunculus robustus* Keferstein.**

(Plate IX, fig. 2.)

1865. *Sipunculus robustus*, Keferstein, *Nachricht. Königl. Gesell. Wiss. Göttingen*, No. 7, p. 196.
 1865. *Sipunculus robustus*, Keferstein, *Zeitschr. Wiss. Zool.* XV, p. 421.
 1868. *Sipunculus robustus*, Baird, *Proc. Zool. Soc. London*, p. 80.
 1883. *Sipunculus robustus*, Selenka, de Man and Bülow, *Semper's Reisen im Archipel Philippinen*, II Tl., IV (i), pp. 97-99, pl. xii, fig. 170.
 1886. *Sipunculus robustus*, Sluiter, *Naturkund. Tijds. Neerland. Ind.* XLV, p. 482, pl. ii, figs. 8, 9.
 1887. *Sipunculus robustus*, Selenka, *Journ. Linn. Soc. London, Zool.* XXI, p. 221.
 1890. *Sipunculus robustus*, Sluiter, *Naturkund. Tijds. Neerland, Ind.* L, p. 122.
 1895. *Sipunculus robustus*, Fischer, *Abhandl. Gch. Naturwiss. Hamburg*, XIII, p. 7.
 1896. *Sipunculus robustus*, Fischer, *Denkschr. Med.-Nat. Ges. Jena*, VIII, p. 337.

1902. *Sipunculus robustus*, Sluiter, "Siboga" Exped. XXV, p. 4.
 1903. *Sipunculus robustus*, Augener, *Archiv Naturgesch.* Jahrg. 69, Bd. I, pp. 313-315, 345.
 1905. *Sipunculus robustus*, Lanchester, *Proc. Zool. Soc. London*, p. 27.
 1907. *Sipunculus robustus*, Hérubel, *Mém. Soc. Zool. France*, II, p. 225.
 1922. *Sipunculus robustus*, Fischer, *Arkiv Zool.* XIV, No. 19, p. 7.
 1925. *Sipunculus robustus*, Broeke, *Bijdrag. Dierkund.* XXIV, p. 2.
 1935. *Sipunculus robustus*, Sato, *Sci. Rept. Tohoku Imp. Univ.* X, p. 301, pl. ii, fig. 1, text-fig. 1.

This widely distributed species is represented in the collection before me from the following localities¹ :—

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| 1. Mergui Archipelago ; Dr. J. Anderson Coll. | 1 specimen ($\frac{8797}{6}$). |
| 2. Paye or Paway Island, Mergui Archipelago ;
Marine Survey Coll. (St. 593) ; March, 1914 | 1 specimen ($\text{ZEV} \frac{7501}{7}$). |
| 3. Nicobars, north side of Nancowry Harbour
amongst submerged coral reef ; Marine
Survey Coll. (St. 700) ; II.i.1926 | 1 specimen ($\text{ZEV} \frac{7500}{7}$). |
| 4. Andamans | 1 specimen ($\frac{8779}{6}$). |
| 5. Madras ; R. G. Aiyar ² Coll. ; 5.vii.1935 | 4 specimens ($\text{ZEV} \frac{7499}{7}$). |

The fresh specimens from the Madras coast preserved in formalin are of a purplish pink colour. The largest specimen, a photograph of which is reproduced on plate IX, is 128 mm. long excluding the introvert, and 12 mm. in maximum thickness. The partially everted introvert is 12 mm. long.

The number of longitudinal muscular bundles in the specimens examined varies from 24-31. The circular muscles are also well developed, and the surface of the comparatively thin body-wall appears cut up into well impressed quadratic areas. Selenka and his colleagues remarked that in all the specimens of the species there are two muscle bundles in front of and one posterior to the anal opening. Augener (*op. cit.*, p. 314) while confirming this statement remarked that this condition is also to be found in *S. nudus*. In all the Indian specimens of *S. robustus* examined by me I have always found 2 bundles in front of and 1 behind the anus, but none of the specimens of *S. nudus* examined by me showed this condition. Broeke also mentions this peculiarity in the specimens of *S. robustus* from the West Indies, but not in the case of *S. nudus* from the same area. The spindle-muscle, which arises somewhat in front of the anal opening, is not attached to the body-wall posteriorly.

The retractor muscles show a great deal of variation in regard to their origin. The ventral retractors were found to originate from the muscle bands 1-6, 2-5 or 2-6 in different specimens, while the dorsal retractors were connected with the muscles 7-11, 7-12 or 9-12. Such variation has also been observed by other authors.

¹ In addition to the specimens listed here there is a specimen from Hongkong in the collection of the Indian Museum which belongs to this species.

² Prof. R. G. Aiyar wrote as follows regarding these specimens : " They turned up in large numbers in the Madras coastal waters about the middle of June and also at the end of July, 1935. They were caught in the tounet as well as in the fishing nets of fishermen."

Two Polian canals were observed on the sides of the oesophagus. A rectal diverticulum and "büschelförmige Analdrüsen" were found in all specimens.

Distribution.—The species appears to be widely distributed in the Indo-Pacific and has also been recorded from the West Indies. Sluiter's remark (1902, p. 4) that the species "scheint aber nur an bestimmten Localitäten in grösseren Menge vorkommen" is confirmed by the large number of specimens which were found by Prof. R. G. Aiyar in the Madras coastal waters.

***Sipunculus porrectus* Selenka.**

1887. *Sipunculus porrectus*, Selenka, *Journ. Linn. Soc. London, Zool.* XXI, pp. 221, 222.

1907. *Sipunculus porrectus*, Hérubel, *Mém. Soc. Zool. France*, XX, p. 225.

Selenka based the description of this new species on two specimens collected in the Mergui Archipelago by the late Dr. J. Anderson during 1881-82. Only one of the specimens, the type of the species, is now available in the collections of the Indian Museum, Calcutta. It is the larger of the two specimens identified by Selenka, and is 32 cm. in length. The specimen was sent to the late Dr. J. W. Spengel of Giessen in connection with his revision of the Sipunculoidea, and bears a label "*Sipunculus edulis* Pallas—J. W. Spengel det. 1913."

The internal organs of this specimen are, as was also noted by Selenka, somewhat macerated, but I cannot agree with Spengel's view that it is a specimen of *S. edulis* Pallas.

The brief description of the external characters of *S. edulis* by Pallas¹ is quite insufficient for the identification of the worm. Later authors like Lamarck, Blainville and Cuvier did not add materially to this earlier account and the first detailed description of the species was published by Sluiter.² This description was included by Selenka, de Man and Bülow in their monograph. Spengel³ in his preliminary paper regarded Sluiter's *S. edulis* as distinct from Pallas' species of this name, and included it in his new genus *Siphonosoma*. As unfortunately Spengel's detailed work was never published, it is impossible to surmise his reasons either for considering the two as distinct species or for including *S. porrectus* Selenka in the synonymy of *S. edulis* (Pallas).

As noted above, the only available specimen of *S. porrectus* is in a poor state of preservation and it is not possible, therefore, to add to the earlier description of the species by Selenka. I have, however, examined this specimen carefully and am able to confirm Selenka's description. A comparison of the descriptions of *S. edulis* by Sluiter and of *S. porrectus* by Selenka leaves no doubt whatsoever that the two worms are distinct, and in the absence of any other information about Pallas' *S. edulis* it appears best to accept the species as defined by Sluiter.

¹ Pallas, P. S.—*Spicilegia Zoologica*, I, Fasc. 10, pp. 10-12 (1774).

² Sluiter, C. Ph.—*Naturkund. Tijds. Neerland. Ind.* XLI, pp. 148-150, pl. i, fig. 1, pl. ii, figs. 1-3, pl. iii, fig. 1 (1881), and *ibid.* XLV, pp. 484, 485 (1886).

³ Spengel, J. W.—*Verhandl. Deutsch. Zool. Gesell.* XXII, p. 263 (1912).

Sipunculus aequabilis Sluiter.

(Plate IX, fig. 3.)

1902. *Sipunculus aequabilis*, Sluiter, "Siboga" Exped. XXV, p. 7.1907. *Sipunculus aequabilis*, Hérubel, *Mém. Soc. Zool. France*, XX, p. 222.

This deep-sea species is represented in the collection before me from the following localities :—

1. Laccadive Sea, Lat. 12° 47' N., Long. 73° 44' 45" E.; 870-827 fathoms; Marine Survey of India Coll. 2 specimens ($ZEV\frac{5550-1}{7}$).
2. Laccadive Sea, Lat. 13° 47' 49" N., Long. 73° 7' E.; 637 fathoms; Marine Survey Coll. (St. 177); 5.v.1894 4 specimens ($ZEV\frac{5553}{7}$ & $\frac{5564-65}{7}$).
3. Bay of Bengal, Lat. 18° 18' N., Long. 93° 25' E.; 843 fathoms; Marine Survey Coll. (St. 325); 22.xii.1903 3 specimens ($ZEV\frac{2089}{7}$).
4. Bay of Bengal 2 specimens ($ZEV\frac{7505}{7}$).

All the specimens recorded above are more or less similar in form and are of a dirty whitish colour, with a somewhat translucent skin-covering. All of them, owing to direct preservation in alcohol, are greatly contracted. The largest specimen is about 80 mm. long and in all of them 21 fairly well marked longitudinal areas corresponding to the longitudinal muscle bundles can be distinguished; the outlines of the muscle bundles become less sharply marked in the anterior region, and, as noted by Sluiter, cannot be distinguished from the introvert. The circular muscle bands are not well impressed, and the surface of the body-wall is not distinctly cut up into quadratic areas, such as are present in *S. nudus*, *S. robustus* and most other species. In the posterior region of the body a transverse ring-shaped thickening of the body-wall, as described by Sluiter in the types of the species and as is present in the case of the deep-sea form *S. norvegicus* Dan. and Kor., marks off a conical region from the rest of the body. The introvert is retracted in most specimens, but on dissection it was possible to count ten tentacular processes or "Fühlerlappen"; two of these on the dorsal side are larger than the others.

The internal structure agrees with the description given by Sluiter. The ventral retractors were found to originate from the 3rd, and the dorsal from the 8th and 9th longitudinal muscles. All the retractors originate at the same level. The two segmental organs are about 15 mm. long; they are free in the greater part of their length and do not extend quite up to the origin of the retractor muscles. The segmental organs open between the 4th and 5th longitudinal muscle bands about 10-11 mm. in front of the anus. No genital glands could be distinguished.

Distribution.—Sluiter's specimens of the species were collected by the "Siboga" Expedition from depths of 330-959 meters. The specimens recorded above are from the Laccadive Sea in the Arabian Sea and from the Bay of Bengal from a maximum depth of 870 fathoms.

Remarks.—The development of a ring-shaped thickening of the body-wall near the posterior end in the case of some of the deep-sea species of the genus *Sipunculus* is of interest. It is possible that this structure helps in anchoring the species in a vertical position, and is an adaptation to life on a muddy bottom. I¹ described a similar structure in the case of *Thalassema arkati* Prashad which was found at Sandheads, off the mouth of the River Hooghly.

Siphonosoma Spengel.

1912. *Siphonosoma*, Spengel, *Verhandl. Deutsch. Zool. Gesell.* XXII, p. 264.
 1913. *Siphonosoma*, Spengel, *ibid.* XXIII, pp. 71-77.
 1914. *Siphonosoma*, Fischer, *Beiträge Kennt. Meeresfauna Westafrikas*, I, pp. 59-61.
 1931. *Siphonosoma*, Baltzer, *Sipunculida in Kükenthal Handbuch Zool.* II (ii), p. 58 (9).

Spengel did not publish a detailed description of the genus *Siphonosoma*, but Fischer gave a generic diagnosis based on Spengel's observations. A short description with a key for its differentiation from *Sipunculus* Linn. is also included in Baltzer's work.

The main differences of *Siphonosoma* from *Sipunculus* Linn. consist in its longer tentacles arranged in groups round the mouth opening, the introvert bearing distinct hooks, the dorsal and ventral retractor muscles arising at different levels, and the presence of transverse canals in the skin.

Neither Spengel nor Fischer designated any genotype for the genus *Siphonosoma*, but *S. australe* (Keferstein), the first species in Spengel's list, may be taken as its type.

Siphonosoma australe (Keferstein).

(Plate IX, figs. 4-6.)

1865. *Phascolosoma australe*, Keferstein, *Nachricht. Königl. Gesell. Wiss. Göttingen*, No. 7, p. 197.
 1865. *Phascolosoma australe*, Keferstein, *Zeitschr. Wiss. Zool.* XV, p. 422, pl. xxxii, figs. 12, 13.
 1865. *Sipunculus (Phascolosomum) australis*, Quartrefages, *Hist. Nat. Annel. Marin. et d'eau douce*, II, p. 619.
 1883. *Sipunculus australis*, Selenka, de Man and Eulow, *Senyer's Reisen im Archipel Philippinen*, II, Tl. IV (i), pp. 90, 91, pl. xiii, figs. 180-182.
 1895. *Sipunculus australis*, Fischer, *Abhandl. Geb. Naturwiss. Hamburg*, XIII, p. 8.
 1899. *Sipunculus australis*, Shipley in *Willey's Zool. Results*, II, p. 156, pl. XVIII, figs. 4, 5.
 1902. *Sipunculus australis*, Sluiter, "*Siboga*" *Exped.* XXV, p. 5.
 1903. *Sipunculus australis*, Augener, *Archiv Naturgesch.* Jahrg. 69, Bd. I, p. 346.
 1905. *Sipunculus australis*, Ikeda, *Annot. Zool. Japon.* V, p. 169.
 1905. *Sipunculus australis*, Lanchester, *Proc. Zool. Soc. London*, I, p. 30.
 1907. *Sipunculus australis*, Hérubel, *Mém. Soc. Zool. France*, XX, p. 222.
 1912. *Siphonosoma australis*, Spengel, *Verhandl. Deutsch. Zool. Gesell.* XXII, p. 263.
 1922. *Siphonosoma australe*, Fischer, *Arkiv Zool.* XIV, No. 19, pp. 2-4.

The specimen (ZEV $\frac{7507}{7}$) on which the present record is based was collected at Krusadai Island in the Gulf of Manaar by Dr. F. H. Gravely, Superintendent of the Madras Museum. I identified the specimen as

¹ Prashad, B.—*Rec. Ind. Mus.* XXXVII, pp. 41, 42, pl. i, figs. 1, 4 (1935).

Sipunculus australis, and it was recorded under this name by Gravelly.¹ He reported that only one or two specimens of it were found "in mud exposed at low water on the west side of the Porites Bay"

The specimen is of a dirty yellowish brown colour, about 230 mm. long, and with a maximum thickness of 9-10 mm.; the introvert, which is almost fully everted, is about 35-36 mm. in length.

In this specimen I counted 18-19 longitudinal muscle bundles near the anal opening and 19 bundles near the region of attachment of the ventral retractor muscles. According to Selenka and his collaborators (*op. cit.*, p. 91) there are 15-20 bundles, while Fischer (*op. cit.*, p. 4) found 19 just above the "Wurzeln der ventralen Retraktoren", 17-18 close to the anus and 14 near the end of the body. Keferstein recorded about 15 bundles only. The differences in the numbers of the bundles is due to frequent anastomoses between the adjacent bundles.

The retractor muscles originate at very different levels. The dorsal retractors originate about 9-10 mm. behind the anal opening, while the origin of the ventral retractors is about 30 mm. posteriorly.

The spindle-muscle originates about 7 mm. in front of the anal opening; in Fischer's specimen this was found to be 20 mm. in front of the anus, while Keferstein stated its origin to be behind the anus. This muscle with two other muscular connectives of the intestine, which originate near the region of attachment of the dorsal retractors, are, as had been described by Fischer, connected with the intestinal windings just near the intestinal diverticulum.

The two segmental organs are very long, about 55 mm., and of a deep purplish brown colour. Their openings are situated about 6 mm. in front of the anus. They hang free posteriorly about the greater part of their length.

The introvert (Plate IX, fig. 5) bears 56-60 rows of hooks. Shipley (*op. cit.*, p. 156) was of the opinion that it was incorrect to describe these structures as hooks, and he figured what he described as "a roll of paper so folded as to form a half cylinder rather rounded at both ends" from his specimens from Lifu. Fischer confirming the views of Selenka and Augener described them as "schwach gekrümmten Rüsselhaken", resembling those of *Phascolosoma*, and figured an elongated, slightly curved, spine-like structure. I figure four of these hooks from two different rows (Plate IX, fig. 6). Two of these almost resemble Fischer's figure, but the other two which are not so long, have a much broader base, and a much more curved hook-like appearance.

Distribution.—The species was originally described from Sydney, Australia. It has since been recorded from the Philippines; Fiji Islands; Lifu, Loyalty Islands; Amboina; and Zanzibar. The present record from the Gulf of Manaar confirms the wide distribution of the species in the Indo-Pacific Region.

¹ *Bull. Madras Govt. Museum (N. S.), Nat. Hist. Sec. I (i), p. 87 (1927).*