

## BULLETIN

DU

Musée royal d'Histoire  
naturelle de Belgique

Tome XIII, n° 36.

Bruxelles, août 1937.

## MEDEDEELINGEN

VAN HET

Koninklijk Natuurhistorisch  
Museum van België

Deel XIII, n° 36.

Brussel, Augustus 1937.

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### GEPHYREA,

by Elise WESENBERG-LUND (Copenhagen).

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The present material of Gephyreans worked out here which by the courtesy of the Director of the Musée royal d'Histoire naturelle de Belgique has been handed over to me contains only 5 species, one of them new to science.

The material originates partly from collections in the East Indies from which the following species derive :

- 1) *Siphonosoma vastum* (Sel. & de Man).
- 2) *Physcosoma pacificum* Keferst.
- 3) *Physcosoma scolops* Sel. & de Man.
- 4) *Aspidosiphon pachydermatus* n. sp.

and partly from the Antarctic Regions (Terra del Fuego) from where the 5th species dates :

- 5) *Phascolosoma margaritaceum* (M. Sars).

As regards the four hitherto known species *Siphonosoma vastum* is not previously known from the Malayan Archipelago ; whereas the three others are alle previously reported from localities in the neighbourhood of those stated here.

The accompanying figures are all made by the Danish scientific drawer Poul H. WINTHER.

*Siphonosoma vastum* (Selenka & de Man).

SYN. *Sipunculus vastus* Sel. & de Man 1883.

— *vastus* Augener 1903.

*Siphonosoma vastum* Spengel in Fischer 1926.

7 specimens are at hand varying rather much in size and appearance; the largest one measures abt. 250 mm., the smallest one abt. 50 mm. In all of them the introvert is partly withdrawn. In some of them the cuticle has loosened and hangs like a loose sac round the body as if the worm was going to moult. In these specimens the surface of the body looks as if covered with a white veil, otherwise the colour is a light yellowish brown. (The specimens are preserved in alcohol.) The body surface only shows a slight indication of rectangular areas, by far not so distinct as in the specimens of the genus *Sipunculus* sens. str. The skin is

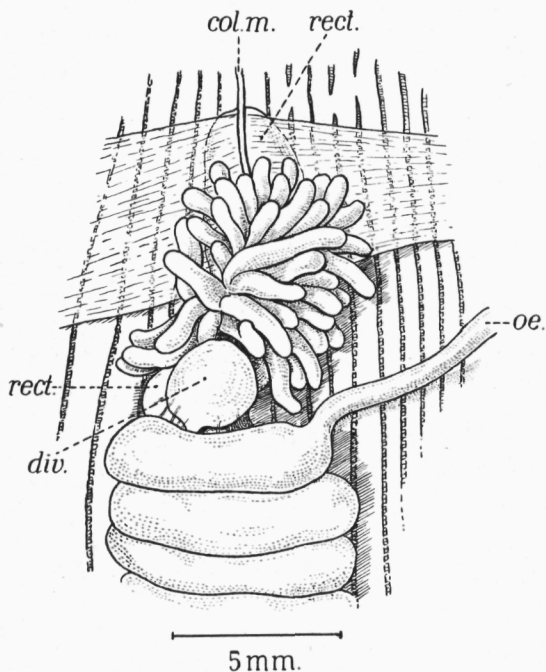


Fig. 1. — *Siphonosoma vastum* (Sel. & de Man).

col. m.: columellar muscle; rect.: rectum with cluster of blind sacs;  
oe.: oesophagus; div.: diverticle.



set with flat rounded papillæ, just visible to the naked eye. At the base of the introvert a 10 mm. broad girdle of densely set, rusty red, very big rounded papillæ is present, and in front of this an equally broad belt of similar papillæ of the usual yellowish trunk colour is found. The introvert carries some 60 rings of small acute, claw-like curved hooks; rows of hooks most regularly alternate with rows of white rounded papillæ. The arrangement and number of tentacles could not be stated but the shape of each tentacle is distinctly filamentous.

One of the specimens from Milles Illes was anatomically investigated (figs. 1 and 2). The length of the trunk amounted to 37 mm., the length of the introvert to 28 mm. The circular muscle layer is discontinuous. The longitudinal muscle layer is divided into 25 separated bands. In their analytical key SELENKA & DE MAN state the number of longitudinal muscles to be 31, but in their description the number is 27. AUGENER (1903) gives 27. They do not anastomose in any particular degree in the trunk, but on the level where the anus and the segmental organs open to the exterior they coalesce in pairs so that abt. half the number of muscles are found at the base of the introvert. At the hindmost tip of the trunk the muscles are perfectly separated. The ventral retractors arise at the base of the first third of the trunk from the 1st to the 6th longitudinal muscles, the dorsal pair some mms in front of the ventral pair from the 9th longitudinal muscle. The dorsal and ventral root of each side very soon coalesce.

The oesophagus is accompanied by a Polian vessel from which a cluster of small tubules arises. The intestinal coil consists of abt. 20 circumvolutions all filled with sand, coral fragments, etc. The rectal diverticle is big and rounded, fixed to the last circumvolution by a narrow duct. In front of the diverticle a very large cluster of blind sacs arises from the rectum; each sac is 4-5 mm. long and unbranched. Strong wing-muscles passing over about 8 longitudinal muscles at each side of anus keep the rectum in situ. The columellar muscle or spindle muscle arises with two branches, one delicate portion just anteriorly to anus, and one more solid from the 9th longitudinal muscle to the right of the ventral nerve cord. It unites with the first branch just where the coil begins, close to the rectal diverticle. Another fixing muscle arises from the left side and unites with the last but one circumvolution. According to AUGENER still one fixing muscle is present; it could not be found in the specimen at hand, probably because of the molested condition of the foremost part of the

intestine. Posteriorly the spindle muscle forms a kind of circular membrane by which it is fixed to the body wall.

The segmental organs are long, slender sacs reaching abt. 1 mm. beyond the base of the ventral retractors. The distal end of each organ is rusty red, whereas the proximal part forms a white puffed up bladder. The nephrostome forms a dorso-ventrally flattened funnel with curly ridges. It is of a considerable size in the greatest specimens, and has the characteristic semilunar shape of the genus. The ventral rim of the funnel is closely connected with the body wall, whereas the dorsal lobe with its roundly indented rim freely juts out into the body cavity. The anterior half of the segmental organs is connected with the body wall by means of mesenteries. They open to the exterior on the same level as anus between the 3rd and 4th longitudinal muscle bands.

At both sides of the segmental organs exactly on the same level as their nephrostomes some small bodies are seen adhering to the inner surface of the longitudinal muscles. At each side of the

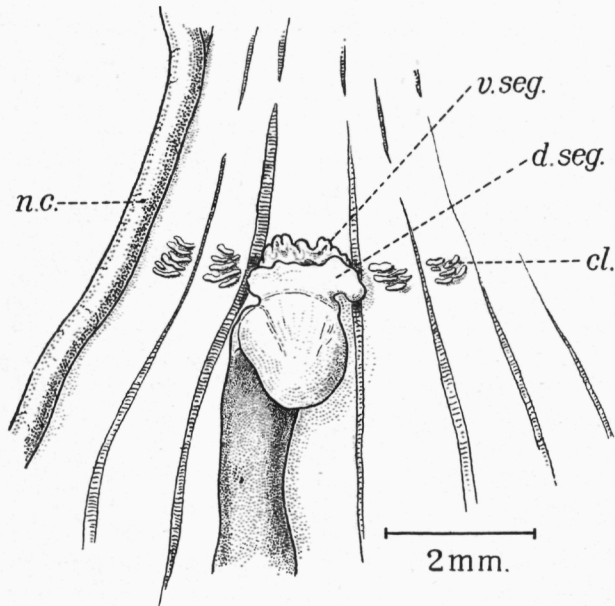


Fig. 2. — *Siphonosoma vastum* (Sel. & de Man).

n. c.: nerve cord; v. seg. and d. seg.: ventral and dorsal rim of the right segmental organ; cl.: « zottenförmige Organe » arising from the body wall.

ventral nerve cord 5 such bodies are found, arranged in the following way: Adhering to numbers 1 and 2 of the longitudinal muscles counted from the nerve cord a cluster of these bodies is found; the third muscle is formed by fusion of two bands; just above the place where they coalesce and above the orifice of the segmental organ the 3rd cluster of these bodies is found; the two last clusters adhere to the 4th and 5th muscle bands resp. On the drawing the 3rd cluster is not seen. It is situated below the ventral rim of the nephrostome. These organs were first described by SELENKA & DE MAN who established the species *Sipunculus vastus*; however, they confine themselves to the following remark: « Vor dem Beginn der Segmentalorgane und wenig seitwärts stehen auf der Körperwand feine Zotten. » Similar organs are described by AUGENER (1903, p. 53) in *Sipunculus (Siphonossoma) australis* Kef. in which species they are situated above the crescent-shaped nephrostomes. FISCHER (1926, p. 107) writes about them that: « sie ziehen hier (: *S. australis*) in ein bis zwei Reihen von den Segmentalorganen bis zum Afterband ». Furthermore FISCHER (l. c., p. 105) in his specific diagnosis of *Siphonossoma novæ-pomerania* states: « vor diesen (the nephrostomes) sieht man zottenartige Anhänge der Körperwand, die nach SPENGLER Charakteristika unserer Gattung ist » (1912, p. 272).— The function of these organs which are not to be identified with the *Kefersteinische Blasen* of AUGENER is still unknown.

The crescent shaped dissepiments characteristic of f. i. *S. cummanensis* (Kef.) and *S. hatai* Sâto are not present.

LOCALITY: Récif Polo Kalappa; Récif des Mille Iles.

DISTRIBUTION: The species especially belongs to the Oceania. It is reported from the Marshall group of Islands; Rotuma; Funafuti; Loyalty Islands; New Caledonia; New Britain and South West Australia (Shark Bay). Furthermore it is known from the Indian Ocean: The Laccadive an Maldivé Archipelagoes.

### *Physcosoma pacificum* Keferstein.

Two specimens are at hand; in the larger one which was subjected to investigation the trunk (from anus to hindmost end) measured 30 mm, the introvert which was partly withdrawn measured 56 mm. The colour is rusty red. The skin of the trunk and of the base of the introvert is closely set with big conspicuous brown triangular papillæ which give the whole surface a rough

aspect. The papillæ which are nearly equally sized all over the body measure abt. 0,3 mm. A great number of closed rings of hooks (abt. 100) are found at the distal end of the introvert. The hooks are very closely set especially in the rings just beneath the tentacular crown; distally the hooks become more scattered

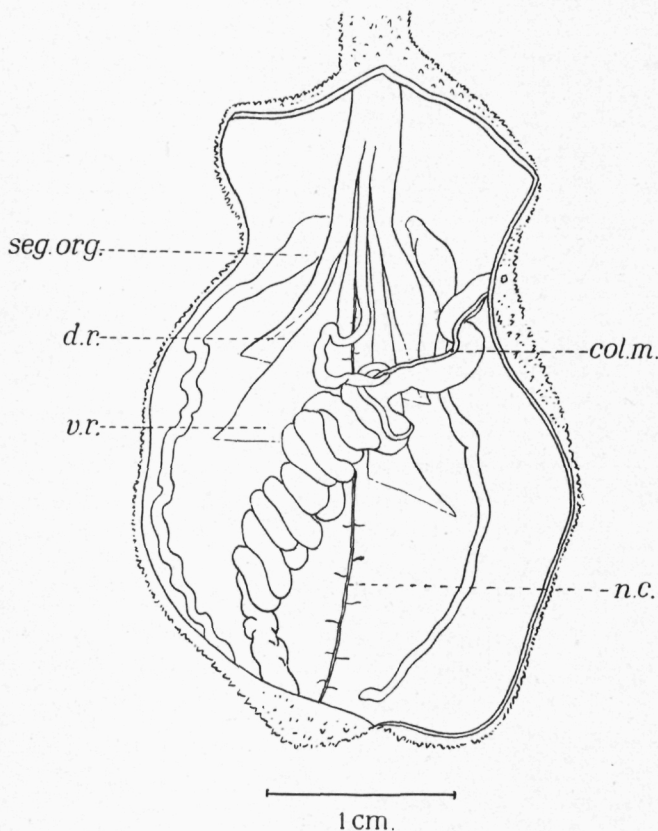


Fig. 3. — *Physcosoma pacificum* Keferst.

col. m.: columellar muscle; n. c.: nerve cord; seg. org.: left segmental organ; d. r. and v. r.: left dorsal and ventral retractor muscles.

and between them some big irregularly scattered papillæ (0,5 mm wide at base and 0,1 mm high) are found. The hooks are provided with a strongly curved and pointed apical tooth; height and breadth of each hook amount to 0,1 mm. No accessory tooth could be found. The subulate tentacles (abt. 40) form a semicircular ring dorsally to the mouth.



The longitudinal muscles are separated into bands which frequently anastomose, only in the hindmost tip of the trunk and in the distal fourth of the introvert they form a fairly continuous stratum. On the level where the ventral retractors arise, the number of muscle bands is 30. The ventral retractors arise from the 2nd to the 9th, the dorsal from the 4th to the 9th longitudinal muscles. The retractors very soon coalesce; between them the oesophagus is imbedded kept in situ by a broad fairly stout mesenterium. After loosing connection with the retractors, the oesophagus very soon passes over into the intestinal coil which consists of abt. 10 descending and 10 ascending circumvolutions. They are fastened to the columellar muscle by numerous delicate muscle fibres. The columellar muscle proper is fixed at the hindmost tip of the trunk just beneath the end of the ventral nerve cord. Rectum is short; the spindle muscle accompanies it and fixes to the body wall just in front of anus. Wing-muscles are attached to rectum close to anus. A rectal diverticle could not be found. The intestine is filled with foraminifers, fragments of spines of echinoids, sand grains, etc. The Polian vessel bears no tubules. The segmental organs are almost as long as the trunk proper; they are of a rusty red colour and shaped as long, slender sacs almost of the same width in their whole length. They are connected with the body wall by means of mesenteries from the nephrostome to the ontmost end. Their external apertures lie abt. 2-3 mm. in front of anus between the 3rd and the 4th longitudinal muscle.

LOCALITY: Récif de Polo Kalappa (Malayan Archipelago).

DISTRIBUTION : The species is widely distributed throughout the Indian and South Pacific Oceans, from Japan and the Philippine Islands to the Australian Archipelago. It has thus f.i. been reported from Banda, Macassar, Amboina, Yap, Palau, the Caroline Islands, Chagos, Ambon, Viti, Loyalty Islands, New Britain, New Guinea, Marquesas, Low Islands (Great Barriere Reef), Funafuti, Rotuma, the Red Sea, Madagascar, Mauritius, Maldive and Laccadive Archipelagoes.

### *Physcosoma scolops* (Selenka & de Man).

The two specimens at hand are only small; the length of the trunk is 9 and 10 mm. resp. The proboscis is perfectly withdrawn; it may be estimated at abt. half the length of the trunk.

The skin is thin and translucent, the longitudinal muscles thus being visible through it. The trunk is closely set with small dark, brown, conically pointed, papillæ, particularly large and elevated at the base of proboscis and the tip of the trunk; the papillæ are much smaller and more scattered in the middle part of the trunk. At the dorsal side of the proboscis an indication of dark bands is seen. At the anterior end of the proboscis abt. 10-12 rows of minute hooks are present, strongly curved apically; no accessory tooth could be seen. The hooks are almost as broad as high, only abt. 0.035 mm. It is of interest to compare the statements of SATÔ (1930, p. 11-12), TEN BROEKE (1933, p. 1) and the reports of the specimens at hand. The trunks of the individuals examined by SATÔ measure abt. 17-34 mm.; the number of rows of hooks is 15-25; and the height and width of each hook amounts to 0.07 mm. The corresponding figures given by TEN BROEKE, whose specimens have been of the same size as those examined by me, very closely coincide with my above mentioned figures, viz : body-length: 1 cm.; rows of hooks 14-17; width and height of a single hook 0.04 mm. Evidently the size of the hooks and the number of rows gradually increase.

The number of tentacles could not be stated correctly; it seemed to be abt. 10.

The longitudinal muscle layer is formed by 19 and 20 separated muscle bands, which do not anastomose; where the introvert begins, they fuse into a perfectly continuous and smooth sheath, closely corresponding to the drawing given by SATÔ (1930, pl. II, fig. 10). Two pairs of retractor muscles are present, which arise close to each other; the ventral pair is the stronger. It arises from the 2nd to the 6th longitudinal muscle, whereas the narrower dorsal pair arises from the 5th to the 6th longitudinal muscle, abt. 1 mm. anteriorly to the ventral pair. According to SATÔ (l. c., p. 13) the base of these muscles is broader (2nd-7th, and 5th-9th); evidently the base of the retractors becomes broader during the growth of the worm. In one of the specimens the dorsal retractors have a pear-shaped bulb at the base, the rest is thread-like. The dorsal pair fuse with the stouter ventral pair abt. 2 mms behind the introvert base.

The intestinal coil consists of 11 descending and 11 ascending circumvolutions fastened by numerous delicate fibres to a fairly strong spindle muscle which is fixed to the posterior end of the trunk. Only one fixing muscle is present; it fastens to the body wall on the same level from which the dorsal retractors arise;



at its intestinal attachment it is distinctly bifurcated in the one specimen, just as shown by SATÔ. The one branch arises from the oesophagus just before it passes over into the intestinal coil, the other branch arises from rectum just where this latter leaves the intestinal coil. In the other specimen no trace of a similar bifurcation could be seen. A pair of delicate wing-muscles fastens rectum to the body-wall. The rectal diverticle is absent. The Polian tube (or contractile vessel) which accompanies oesophagus dorsally is provided with a few small, rounded Polian tubules. The globular body attached to the dorsal side of oesophagus which SATÔ reports from some specimens, and IKEDA (1904, p. 21) from some specimens of *Physcosoma japonicum* GRUBE could not be found, a fact which corroborates its presumed pathologic nature (loc. cit.).

The segmental organs open to the exterior exactly at the same level as anus; they extend as far backwards as to the base of the dorsal retractors; they are reddish-brown, distended in their proximal part and fastened to the body-wall by means of a mesenterium in the anterior half.

LOCALITY : South coasts of the Aru Islands (eastern Malayan Archipelago).

DISTRIBUTION : *Physcosoma scolops* has a wide distribution and is common in tropical waters. It is reported from Japan, Singapore, Java, Philippine, Palau, several localities in the Dutch East Indian Archipelago, Funafuti, Loyalty Islands, New Zealand, Tasmania, Laccadive Islands, Red Sea, Zanzibar, British East Africa, Port Natal and numerous other places in the Indian and Pacific Oceans. TEN BROEKE (1925, p. 86) reports it from the West-Indies (Curaçao). Like the greater part of the genus *Physcosoma* the species is found in shallow waters.

### *Aspidosiphon pachydermatus* n. sp.

The single specimen at hand which is preserved in alcohol is highly contracted. The introvert is totally withdrawn; the length of the trunk is abt. 10 cm. The colour is dark brown. The skin is very thick and tough, the cuticle being heavily developed and distinctly annularly furrowed. Each ring shows a slight longitudinal striation which has the effect that the structure of the cuticle shows a certain resemblance to that of the genus *Sipunculus*. The caudal or posterior shield which is situated exactly terminally is 13 mm. in diameter and radially furrowed; long

furrows alternate with short ones. The central part forms a little conical protrusion, otherwise the shield is flat (fig. 4 c, b). The anal or anterior shield has the shape of a muscle-shell, the furrows being most distinct on the dorsal side; here too long furrows alternate with short ones. The shield lies at an oblique angle to the trunk (fig. 4 a). As far as I can see both shields are composed of small chitinous bodies of the same deep brown colour as the body itself. Close to the ventral border of the anal

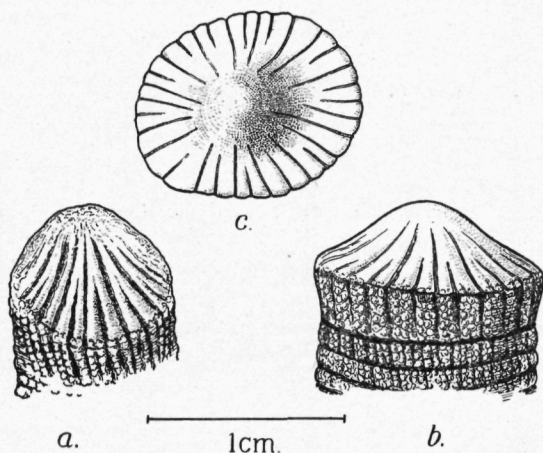


Fig. 4. — *Aspidosiphon pachydermatus* n. sp.  
a.: anal shield; b. and c.: caudal shield.

shield the aperture for the fairly short and slender introvert is seen, and opposite at the dorsal border anus is to be found.

As mentioned above, the introvert is totally withdrawn; its true length therefore cannot be stated, nor the number of the tentacles. Close behind the tentacular crown the proboscis car-

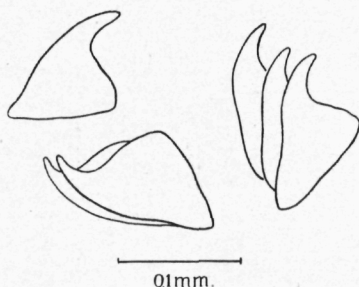


Fig. 5. — *Aspidosiphon pachydermatus* n. sp.  
Hooks from proboscis.

ries a great number abt. 100 of complete rings of hooks. The hooks are abt. 0,1 mm. high and end in a single curved, blunt tooth (fig. 5).

The structure of the dermal layers is remarkable. It is as usually composed of the cuticle, the hypodermis and the cutis. The cuticle (fig. 6) is as mentioned above, divided into a great number of rectangular areas by the deep annular furrows and the less deeper longitudinal striation. In each of these areas a few, 3-8 flat, thin-skinned papillæ are seen as light spots. The

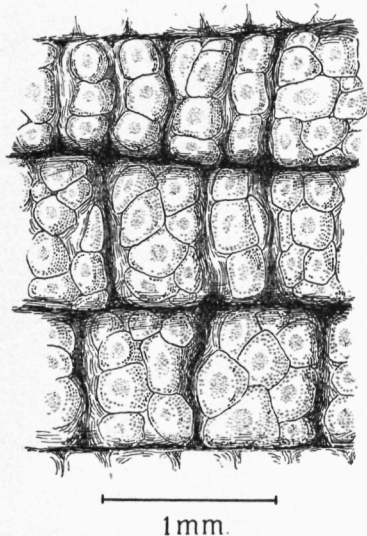


Fig. 6. — *Aspidosiphon pachydermatus* n. sp.  
Sample of skin from middle part of the trunk.

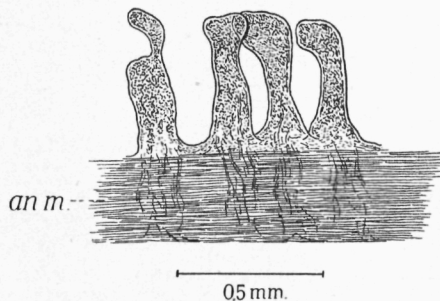


Fig. 7. — *Aspidosiphon pachydermatus* n. sp.  
Papillæ arising from the cutis; an. m.: anular muscle layer.

underlying hypodermis is milky white, almost as thick as the cuticle and closely united with this latter. These two layers are easily separated from the delicate cutis beneath. From the cutis a lot of fine papillæ arise (fig. 7) abt.  $1/2$  mm. long and just discernible to the naked eye. They differ slightly in shape, but they are all of them broadest at the free distal end; they resemble pins, mushrooms, puff-balls, etc. Each of these papillæ fits into a little pit in the hypodermis thus penetrating into this latter, so that the free end of it protrudes into the above mentioned thin-skinned, light spots in the cuticle and reaches very close to the exterior surface of the animal. The papillæ are hollow, their walls are composed of a few big cells with distinct nuclei. The light spots in the cuticle are in my opinion identical with those organs in Sipunculids usually called glandular bodies. In spite of a careful investigation I did not succeed in finding any excretory pore in these bodies, and I do not believe that they have anything to do with secretory organs. I am inclined to believe that *these thin-skinned spots with their underlying papillæ represent the respiratory organs of the worm*. It is true that it was impossible to detect any direct communications between the papillæ and the body cavity, but they must be present, because the same lymphocytes which float in the liquid of the body cavity were found in the lumen of the papillæ. I presume that the diffusion of dissolved gasses takes place through the « glandular bodies » of the skin and the underlying delicate papillæ which communicate with the body cavity.

Why have organs of allied nature never been described before? I am inclined to answer this question in the following way: in the first place it is only likely that these organs are found in species provided with thick dermal layers; they are probably not necessary in species with a thin skin; here the diffusion of gasses will take place direct through the skin and most likely through the so-called glandular bodies or the papillæ. On examining the skin of *Aspidosiphon steenstrupi* (Dies.) the surface of the cutis was actually found to be smooth and devoid of protruding papillæ. Secondly, it was by an accident that these papillæ were revealed to me. The skin of the specimen in question is apt to split between the layers. Moreover, the greater part of the skin investigations in Sipunculids are dealing with the shape, colour, number, distribution, etc. of the dermal organs without discussing their function.

The cutis is closely connected with the annular muscle layer



which is composed of a great number of salient keels. From the top of each keel the above mentioned respiratory (?) papillæ arise, arranged in small groups corresponding with the arrangement of the light spots in the cuticle. The ring muscles are of a much deeper colour than the longitudinal muscle layer. This latter is divided into separated bands, the number of which is 24 in the middle part of the trunk; they can easily be traced from introvert to apex; now and then they anastomose however, but not in any particular degree. In the interspaces between the longitudinal muscles the dark annular muscles are discernible.

There is only one long broad retractor muscle present issuing in the last fourth of the trunk with two broad flat roots which however very soon coalesce. Each of the roots extends over 5 muscle strands. Between the two roots are only 2 muscle

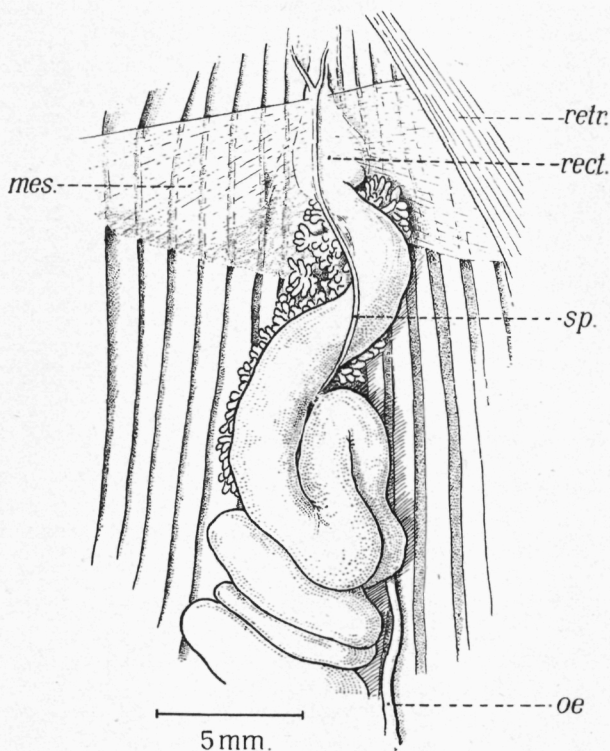


Fig. 8. — *Aspidosiphon pachydermatus* n. sp.

retr.: retractor muscle; rect.: rectum; sp.: thin portion of spindle or columellar muscle; oe.: oesophagus; mes.: rectal mesenterium.

strands; in the interspace between them the nerve cord is imbedded. The colour of the retractor is reddish brown, highly contrasting against the silky yellow-brown muscle layer. In its proximal part the retractor splits up into 5 more or less separated muscles arranged in such a way that there are 2 muscles ventrally at each side of oesophagus whereas on the dorsal side only one broad muscle is present. Where the hindmost end of the oesophageal mesenterium fastens they all 5 coalesce again.

The intestine can as usually be divided in oesophagus, the intestinal coil and a short rectum. The oesophagus is long and slender and imbedded between the muscles of the retractor, the contractile vessel which accompanies the oesophagus is provided with a great number of small rounded protrusions. A delicate mesenterium fastens oesophagus to the retractor at the place where it separates from this latter and passes over into the descending part of the intestinal coil. The intestine consists of abt. 25 descending and 25 ascending circumvolutions. It is filled with coral sand, foraminifers and minute Gastropod shells. Rectum opens to the exterior a little in front of the segmental organs. The last part of it is swollen and broad, separated from the rest by a deep constriction and filled with shells, etc. It is fastened to the body-wall by a sinewy mesenterium abt. 6 mm. long, which extends over no less than 16 longitudinal muscles. In its free distal part this mesenterium has a fairly peculiar aspect; numerous fine branches form a delicate net work which in the microscope shows a great resemblance to the description and drawings given by SLUTTER (1883) of one of the parts of the corresponding mesenterium of *Aspidosiphon gigas* Sluit. In close connection with the last part of the intestine or large cluster of small blind sacks is found. It is united with the intestine by a mesenteric band. A stem passes through it; from this numerous branches issue which carry secondary branches ending in small oblong blind sacs. The main stem opens into the intestine with a single duct — as far as I have been able to see — close to the place where the rectal mesenterium arises. This organ is in other words a highly complicated richly ramificated intestinal appendage (fig. 9).

A diverticle of the sort generally found in Sipunculids could not be detected.

A spindle or a columellar muscle is present. It is rather delicate at the distal end, where it arises almost in the centre of the shield. On its way forwards it gets stronger, and finally turns



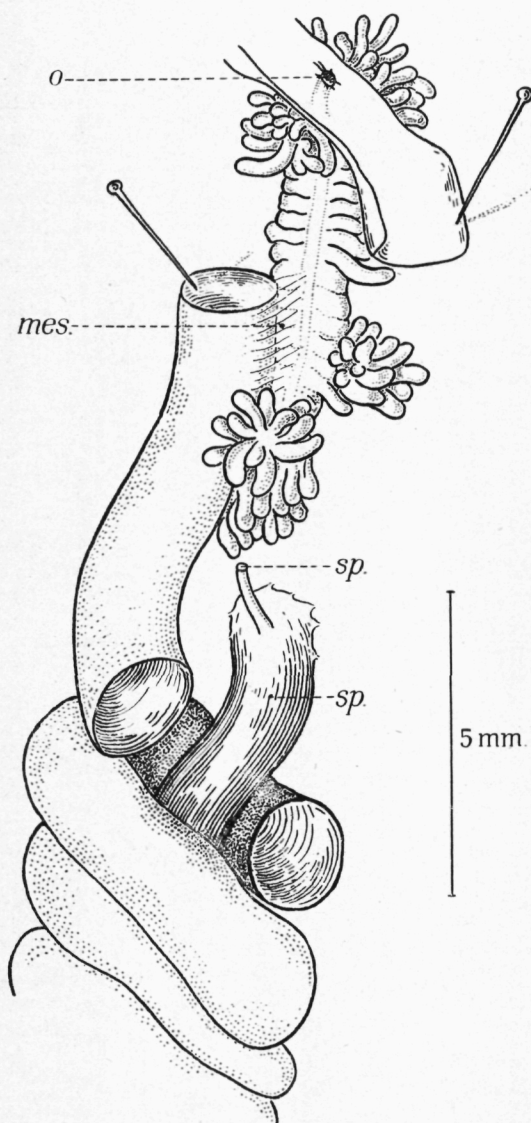


Fig. 9. — *Aspidosiphon pachydermatus* n. sp.

o.: aperture of the ramified blind sac into the rectum; mes.: mesenterial filaments fastening the blind sac to the rectum; sp.: spindle muscle fastening beneath the intestinal coil; from here the thin offspring of the spindle muscle arises (see fig. 8). — One of the rectal coils and oesophagus removed.

into a solid band almost as strong as one of the longitudinal muscles. Its proximal end is fastened to the body wall close to the place where oesophagus passes over into the intestinal coil: abt. 15 mm. behind anus. A delicate muscle here issues and extends forwards alongside rectum fastened to it by a mesentery and inserting to the body wall with two fastenings just in front of anus (fig. 5). From the columellar muscle a number of delicate fibres split off, fastening to the circumvolutions of the intestine thus keeping them in situ. The coil itself is not fastened to the body wall.

The segmental organs are rusty red, long, slender, reaching as far backwards as a little behind the middle of the trunk. They are floating freely in the body cavity. Their external openings are a little behind anus between the third and fourth longitudinal muscles, counted from the nerve cord. Their internal orifices are close to the place, where they dive down between the muscle bands. The nephrostome is short and wide; its rim is thin and flappy, forming a funnel with curly walls.

The genus *Aspidosiphon* may be divided into two groups, the one with a continuous longitudinal muscle layer, the second with the longitudinal muscles separated into bands. SATÔ (1935, p. 320) has given a key to the species of part of the first group; here is given a key to the species of the second group. From this it will be seen how the species described here is distinguished from its congeners. It may however be mentioned that the new species shows a great resemblance to *A. gigas* SLUITER. The shape, size, colour, macroscopic structure of the skin are much like the drawing in SLUITER's paper (1883, Table II, fig. 1). It differs from *A. gigas* in the first place by the presence of hooks on proboscis, and in the second place in the anatomical features connected with rectum and the columellar muscle, the generative organs, etc.

LOCALITY : Récif Polo Kalappa (in the Malayan Archipelago).

KEY TO THE SPECIES OF *ASPIDOSIPHON*.

KEY TO THE SPECIES OF *ASPIDOSIPHON*  
Longitudinal muscle layer of the body-wall separated into bundles.

18

E. WESENBERG-LUND. — GEPHYREA

1 1 Retractor.

- 2 Genital organs at rectum; hooks absent ... .. *A. gigas* Sluit. 1883.
- 2' Genital organs at the base of retractor; hooks present.
  - 3 46 longitudinal muscles; no rectal appendages; a transverse septum across coelom in front of anus; large oval diverticle ... .. *A. speciosus* Ger. 1913.
  - 3' less than 46 longitudinal muscles (22-38); rectal appendages present.
    - 4 longitudinal muscles forming salient keels anteriorly... .. *A. cumingi* Baird 1868.
    - 4' longitudinal muscles not forming salient keels anteriorly.
      - 5 small sized (3 cm); c. 38 longitudinal muscles; columellar muscle inserted in front of anus ... .. *A. klunzingeri* Sel. & Bül. 1883.
      - 5' large sized (10 cm); c. 22 longitudinal muscles; main portion of columellar muscle inserted behind anus ... .. *A. n. sp.*

1' 2 retractors.

- 6 retractors attached to the caudal shield.
  - 7 longitudinal muscles reticularly arranged in anterior third part of trunk; otherwise continuous... .. *A. schneehageni* Fischer 1913.
  - 7' longitudinal muscles reticularly arranged in the anterior third part; separated beneath the anal shield ... .. *A. truncatus* (Kef.) 1867.
- 6' retractors inserted in front of the caudal shield.
  - 8 caudal shield is absent or faintly developed.
    - 9 anal shield tall helmet like, obliquely truncated at the



- basal border; numerous rows of hooks with one tooth.  
 9' anal shield cylinder shaped; few rows of hooks with  
 two teeth ... .. *A. cristatus* Sluiter 1907.  
 9' caudal shield is present.  
 10 introvert twice the length of the trunk; anal shield  
 flat, without furrows ... .. *A. fisheri* ten Broeke 1925.  
 10' introvert equal to or shorter than the trunk.  
 11 anal shield : an obliquely conical main part, and  
 a short cylindrical basal part; caudal shield :  
 two cones juxtaposed at base ... .. *A. angulatus* Ikeda 1904.  
 11' shields not particularly shaped.  
 12 rectum with horse-shoe shaped appendages;  
 anal shield black ... .. *A. fuscus* Sluiter 1882.  
 12' no horse-shoe shaped appendages.  
 13 longitudinal muscles distinctly separated,  
 at any rate posteriorly ... .. *A. levis* Sluit. 1886.  
 13' longitudinal muscles highly anastomosing. *A. speculator* Sel. 1885.  
 14 hooks with two teeth... .. *A. steenstrupi* Dies. 1859.  
 14' hooks acute, small, arranged in few  
 rings, each with one teeth ... .. *A. tenuis* Sluiter 1886.  
 1'' 4 retractors.  
 15 dorsal retractors issue from 6.-9. longitudinal muscles; ventral retrac-  
 tors from 3.-6. ... .. *A. semperi* ten Br. 1925.  
 15' dorsal retractors issue from 5.-6. longitudinal muscles; ventral retrac-  
 tors from 2.-6.... .. *A. insularis* Lank. 1905.

*Phascolosoma margaritaceum* M. Sars  
var. *antarcticum* Michaelsen.

SYN.: *Phascolosoma antarcticum* Michaelsen.

*Ph. fuscum* Mich.

*Ph. georgianum* Mich.

*Ph. socium* Lanchester.

4 individuals are at hand. The biggest one measures in fully expanded condition 90 mm. The colour is dark-grey or pearl-grey, the posterior pointed end as well as the base of proboscis is considerably darker. The skin is almost opaque and rather tough. On the exterior surface anus and the two external orifices of the segmental organs are distinctly seen as oblong slits situated exactly on the same level. The skin reveals under high magnifying powers the typical delicate reticulate structure formed by a double set of crossing lines which divide the skin into a number of small square or elliptic fields. In the centre of each field is found a circular or elliptic glandular body accentuated by the presence of a minute pore and surrounded by small thickenings in the skin (« Hautplättchen »); especially at the posterior extremity the pore now and then is seen situated at the top of a little protrusion. In the investigated specimen the glandular bodies are more crowded at the posterior end than anteriorly. The papillæ are irregularly scattered all over the trunk, constantly longer than broad, almost pear- or club-shaped, and much resemble the drawing given by W. FISCHER, 1928, pl. 6, fig. 15. On account of the shape of these papillæ I do not hesitate to transfer the examined specimens to the variety *antarcticus* Mich., such as it is established and defined by W. FISCHER (l. c., p. 481). This author considers the variety as a « lokale Abweichung » from the typical species; the only character of systematical value by which the variety is distinguished from the type-species is according to FISCHER the shape of the papillæ. In *Phascolosoma margaritaceum* Sars the papillæ are rounded and equally broad in their whole length; in the var. *antarcticum* Mich. they are much narrower at their base. As to the arrangement of the tentacles and the ciliated pads the variety — in casu the specimens dealt with here — does not differ from the arrangement in *Ph. margaritaceum*, so splendidly figured and described by THÉEL 1905.



As regards the internal anatomy (fig. 10) a delicate spindle muscle is present; it is not attached to the posterior extremity of the trunk. Broad wing-muscles, which in the specimen here figured were highly contracted, fasten the last portion of rectum to the body wall; furthermore a number of delicate muscle fibres fasten the numerous circumvolutions of the intestinal coil to each other. In fig. 10 three fixing muscles are showed which moreover fasten the anterior coils and rectum to the body wall. At the outspring of the ciliated furrow (hypobranchial furrow) a diver-

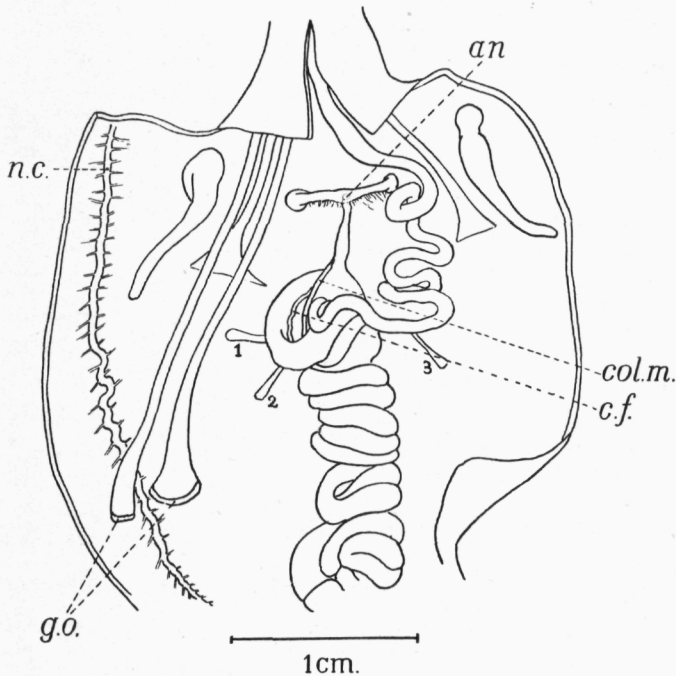


Fig. 10. — *Phascolosoma margaritaceum* (M. Sars).  
var. *antarcticum* Mich.

an.: anus; n. c. ventral nerve cord; g. o.: genital organs; 1, 2, 3 fixing muscles; col. m.: columellar muscle; c. f.: ciliated furrow.

ticle is found hidden by the last coils of the intestine. The furrow proper is easily traced a fairly long distance into the spira. The segmental organs of the specimen subjected to the anatomical investigation are long with puffed up nephrostomes. The genital festoons are ripe, and the body cavity and segmental organs filled with mature eggs.

LOCALITY : Lapataña, « Belgica » N° 65 and Harberton, Canal du Beagle, « Belgica » N° 177. The species is previously known from this region.

DISTRIBUTION : South Georgia, South Victoria Land, several stations between and round the Falkland Islands, Graham Land and Terra del Fuego.

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June 1937.

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