1905

Holothuroids Collected by the Investigator in the Indian Ocean. I.
The Holothuroids of the Deep-Sea: A Translation of *Holothuries*
Recueillies par l'Investigator dans l'Océan Indien. I. Les
Holothuries de Mer Profonde

René Koehler

Clément Vaney

John M. Lawrence

University of South Florida, lawr@usf.edu

Follow this and additional works at: https://digitalcommons.usf.edu/bin_books

Recommended Citation

Koehler, R. & C. Vaney (2020). Holothuroids Collected by the Investigator in the Indian Ocean. I. The Holothuroids of the Deep-Sea: A Translation of *Holothuries Recueillies par l'Investigator dans l'Océan Indien. I. Les Holothuries de Mer Profonde* (J. M. Lawrence, Trans.). Herizos Press, Tampa.

This Book is brought to you for free and open access by the Integrative Biology at Digital Commons @ University of South Florida. It has been accepted for inclusion in Integrative Biology Books by an authorized administrator of Digital Commons @ University of South Florida. For more information, please contact digitalcommons@usf.edu.

ECHINODERMA OF THE INDIAN MUSEUM.
HOLOTHURIOIDEA.

AN ACCOUNT
OF THE
DEEP-SEA HOLOTHURIOIDEA

COLLECTED BY THE
ROYAL INDIAN MARINE SURVEY SHIP
INVESTIGATOR

BY
R. KÖHLER AND C. VANEY.

CALCUTTA:
PRINTED BY ORDER OF THE TRUSTEES OF THE INDIAN MUSEUM.

—
1903.

Price Sixteen Rupees.

HOLOTHURIES
RECUEILLIES PAR
L'INVESTIGATOR
DANS
L'Océan Indien

PAR
RENÉ KœHLER,
PROFESSEUR DE ZOOLOGIE À L'UNIVERSITÉ DE LYON

ET
CLÉMENT VANEY,
MAÎTRE DE CONFÉRENCES DE ZOOLOGIE À L'UNIVERSITÉ DE LYON.

I. LES HOLOTHURIES DE MER PROFONDE.

CALCUTTA.

1905.

HOLOTHUROIDS

COLLECTED BY

THE INVESTIGATOR

IN

THE INDIAN OCEAN

BY

RENÉ KÆHLER

PROFESSOR OF ZOOLOGY AT THE UNIVERSITY OF LYON

AND

CLÉMENT VANEY

MASTER OF CONFERENCES OF ZOOLOGY AT THE UNIVESITY OF LYON

1. THE HOLOTHUROIDS OF THE DEEP SEA

CALCUTTA.

1905.

Kœhler, R., Vaney, C. 1905. Holothuroids Collected by the Investigator in the Indian Ocean. I.
The Holothuroids of the Deep-Sea.

Translated by John M. Lawrence.

©John M. Lawrence. Herizos Press, Tampa.

Translator's note.

Classification of the holothuroids has changed greatly since Koehler and Vaney wrote this memoir. I have not changed their classification or format.

I thank Michel Jangoux for his help with some difficult translations, e.g., *corpuscules vineux*. Vineux refers to red wine. I translated this as red spicules.

Koehler

Jean Baptiste François René Koehler was born 7 March 1860 in Saint-Dié and died 19 April 1931 in Lyon. At the age of twenty-three, he defended his theses in medicine in Nancy and science in Paris, although he prepared the latter at the École des Hautes Etudes de Marseille.

He entered the faculty of sciences at Nancy as *préparateur* in zoology and then at Lyon in 1889. He was named to the chair of zoology at Lyon in 1894. Koehler participated in cruises of the *Princesse Alice* with Prince Albert of Monaco. Koehler was a specialist in echinoderms but also worked with isopods. He was president of the Zoological Society of France in 1911. He became an officer of the Legion of Honor in 1923. His extensive collection of echinoderms and his library are in the Collections de Zoologie, part of the Collections Patrimoniales Universitaires of the Université Claude Bernard (Lyon).

A brief biography is in Bull. Mens. Soc. Linn. Lyon, 2016, 85 (3-4), 83–92.

Clément Vaney was born in 1871 and died in 1955. He joined the University of Lyon in 1895 as *préparateur*. He received the Doctor of Sciences at Lyon in 1902. He was appointed to the faculty and was appointed Professor in 1927. Vaney was a student of Koehler. His publications on the holothuroids collected by the French Antarctic Expeditions appeared in 1907 and 1914. He received the Cuvier Prize from the Academy in 1923.

A brief biography is in the Bull. Mens. Soc. Linn. Lyon (1965).

EDITORIAL NOTE

The Holothurians described by Dr. Koehler in this Report were collected by the successive Surgeon Naturalists of the surveying vessel "Investigator" between the years 1887 and 1902.

A brief history of the ship, so far as her subordinate connexion with zoological research goes, is to be found in the *Account of the Deep-sea Madreporia collected by the Royal Indian Marine Survey Ship Investigator*, published by order of the Trustees of the Indian Museum in 1898.

With regards to Dr. Koehler's remarks upon the bad state of preservation of the material with which he has had to deal, I may, perhaps, be permitted to mention that deep-sea Holothurians are excessively difficult to preserve in any circumstances; but that in a tropical climate, where sea-things begin to suffer strange changes within an hour of their capture, a single amazed naturalist, with all the miscellaneous contents of the trawl demanding instant attention, has really no time to spare for a single rather exacting group: it is as much as he can do to get all his specimens, without favour, washed clear of mud, or cut away from the tangles, and transferred wholesale to some simple and safe preservative—such as strong spirits of wine—before they begin to decompose. Moreover, quite apart from any feasibility of choosing preservatives, it commonly happens that, owing to the rapidity with which the deep-sea-trawl is now-a-days dragged through the water by the artless wire-rope, delicate objects, like deep-sea Holothurians, are often badly damaged before they reach the surface.

For the care which Dr. Koehler has bestowed upon a collection so adversely affected by fortune, all those who are interested in the "Investigator" and the Indian Museum are greatly obliged to him.

A. Alcock, Major, I. M. S.

*Superintendent of the Indian Museum,
Natural History Section.*

Mr. Alcock has kindly charged us with the study of the holothuroids collected by the "Investigator" and we ask him to accept all our thanks. The work that we publish today concerns exclusively the forms from the deep-sea collected between 1997 and 102 fathoms. We propose to study the littoral forms in a memoir that will appear subsequently.

Among the species of the deep-sea that we have been sent, are found 5 species coming from relatively shallow depths. We shall study them in our second work.

The collection that we have been sent contains two lots: a lot of unidentified holothuroids and a second lot of species already studied by Walsh and that he described in 1891 in the Journal of the Asiatic Society, Bengal, Vol. LX, part II, pp. 197-204.

The complete collections of the deep-sea holothuroids collected by the "Investigator" contains in all seventy-five species or varieties. Among these species we shall consider fifty-nine as new. Among the sixteen forms that are in species already know, seven were studied by Mr. Walsh.

The species are separated into genera and families in the follow manner:¹

SYNALLACTIDÆ.

1. *Pseudostichopus occultatus* Marenz. var. *plicatus* nov. var.
2. *Mesothuria multipes* Ludwig.
3. *Mesothuria abbreviata* nov. sp.
4. *Mesothuria incerta* nov. sp.
5. *Mesothuria squamosa* nov. sp.
6. *Synallactes* Wood-Masoni (Walsh).
7. *Synallactes horridus* nov. sp.
8. *Synallactes rigidus* nov. sp.
9. *Synallactes* (?) *dubius* nov. sp.
10. *Synallactes* (?) *pellucidus* nov. sp.
11. *Bathyplores profunda* (Walsh).
12. *Bathyplores crenulata* nov. sp.
13. *Bathyplores assimilis* nov. sp.
14. *Bathyplores variabilis* nov. sp.
15. *Bathyplores papillosa* nov. sp.
16. *Pelopates gelatinosa* (Walsh).
17. *Pelopates verrucosa* nov. sp.
18. *Pelopates mollis* nov. sp.
19. *Pelopates ovalis* (Walsh).
20. *Pelopates modestus* nov. sp.
21. *Pelopates insignis* nov. sp.
22. *Pelopates mammillatus* nov. sp.
23. *Benthothuria cristatus* nov. sp.
24. *Benthothuria distortus* nov. sp.
25. *Dendrothuria similis* nov. sp.
26. *Pseudothuria duplex* nov. gen. nov. sp.
27. *Allopatides dendroides* nov. gen. nov. sp.
28. *Perizona magna* nov. gen. nov. sp.
29. *Bathyzona incerta* nov. gen. nov. sp.

¹ We use italics for new forms and ordinary characters for described species.

DEIMATIDÆ.

- 30. *Deima Blakei* Théel.
- 31. *Oneirophanta conservata* nov. sp.
- 32. *Amphideima Investigatoris* nov. gen. nov. sp.
- 33. *Ophnurgus glaber* (Walsh).
- 34. *Ophnurgus invalidus* nov. sp.
- 35. *Laetmogone violacea* Théel.
- 36. *Benthophyces fragilis* nov. gen. nov. sp.
- 37. *Apodogaster Alcocki* (Walsh).

ELPIDIIDÆ.

- 38. *Peniagone stabilis* nov. sp.
- 39. *Peniagone expansa* nov. sp.
- 40. *Peniagone* (?) *obscura* nov. sp.
- 41. *Euriplastes obscura* nov. gen. nov. sp.

PSYCHROPOTIDÆ.

- 42. *Benthodytes sanguinolenta* Théel.
- 43. *Benthodytes glutinosa* R, Perrier.
- 44. *Benthodytes superbus* nov. sp.
- 45. *Euphronides bifurcata* nov. sp.
- 46. *Psychropotes minutus* nov. sp.

GEPHYROTHURIDÆ.

- 47. *Gephyrothuria Alcocki* nov. gen. nov. sp.

INCERTÆ SEDIS.

- 48. *Filithuria elegans* nov. gen. nov. sp.

CUCUMARIDÆ (Psolidæ).

- 49. *Psolidium* (?) *rugosum* nov. sp.
- 50. *Psolidium* (?) *translucidum* nov. sp.
- 51. *Psolus membranaceus* nov. sp.
- 52. *Psolus levis* nov. sp.

RHOPALODINIDÆ.

- 53. *Ypsilothuria bitentaculata* (Ludwig).

MOLPADIIDÆ.

54. *Trochostoma albicans* Théel.
55. *Trochostoma granulatum* Ludwig.
56. *Trochostoma andamanense* (Walsh)/
57. *Trochostoma concolor* nov. sp.^r
58. *Trochostoma concolor* var. *caudatum* nov. var.
59. *Trochostoma elongatum* nov. sp.
60. *Trochostoma pauperum* nov. sp.
61. *Trochostoma ealcareum* nov. sp.
62. *Ankyroderma musculus* (Risso)²
63. *Ankyroderma musculus* var. *acutum* nov. var.
64. *Ankyroderma musculus* var. *undulatum* nov. var.
65. *Ankyroderma brevicaudatum* nov. sp.
66. *Ankyroderma contortum* nov. sp.
67. *Ankyroderma intermedium* nov. sp.
68. *Ankyroderma polymorphum* nov. sp.

SYNAPTIDÆ.

69. *Protankyra conferta* nov. sp.
70. *Protankyra denticulata* nov. sp.
71. *Protankyra errata* nov. sp.
72. *Protankyra inflexa* nov. sp.
73. *Protankyra timida* nov. sp.
74. *Protankyra tristis* nov. sp.
75. *Anapta* (?) *dubiosa* nov. sp.

A glance at this table suggests the two following remarks: it is first of all the large number of new species in relation to known species; next is the importance taken by the groups Synallactidés, Molpadiidés and Synapatidés.

As for the Synallactidés, it is necessary to remark that this family becomes richer and richer in species and individuals as submarine explorations succeed each other. It seems it is especially in the Indo-Pacific region that it acquires the greatest development. The dredges of the “Albatross” in the Pacific and those of the “Siboga” in the Indian Ocean have made known a large number of Synallactidés. The “Investigator” in its turn provides an important contingent to this family by the discovery of 28 new species that notably increases the number of Synallactidés known today. It is necessary perhaps to take account of another element. The Synallactidés have been separated from other holothuroids at a relatively recent date and several forms that have been reported to this family have otherwise been considered as true holothurians or true elasipods. Thus, to cite only the principal ones, *Stichopus Moseleyi* Théel, *Holothuria Murrayi* Théel, *Stichopus Tizardi* Théel, *Holothuria lactea* Théel, *Stichopus pallens* R. Koehler, *Holothuria Roulei*³ R. Koehler,

² We unite *Ankyroderm musculus* (Risso) with *A. Danielsseni* Théel and *A. spinosum* Ludwig.

³ *Holothuria Roulei* Koehler is a *Mesothuria*; as for *Stichopus pallens* Koehler, it must, in our opinion, be placed in the genus *Paroriza* Hérouard. This latter genus was created by Hérouard to classify a holothuroid of very large size

Benthodytes gelatinosa Walsh, *Benthodytes ovalis* Walsh, *Pannychia Wood-Masoni* Walsh, etc., placed either among the holothurians, the elasipods or the synallactids.

As for molpadiids, the collection of the “Investigator” includes 13 species in all and 8 varieties belonging to two genera, *Trochostoma* and *Ankyroderma*. The “Siboga” had collected in the Sunda seas 18 species separated into 4 genera. It seems thus that this group of holothuroids is more richly represented in the Indian Ocean than in other seas, with the exception of the cold oceans.

The known species collected by the “Investigator” are from either the Indian Ocean, the Pacific Ocean or the Atlantic Ocean. If we group these species according to their provenance, we find that:

Six have been found in the Indian Ocean. These are:

Mesothuria multipes Ludwig
Synallacates Wood-Masoni (Walsh)
Laetmogone violacea Théel
Ypsilothuria bitentaculata (Ludwig)
Trochostoma granulatatum Ludwig
Ankyroderma musculus (Risso);

five known in the Pacific:

Mesothuria multipes Ludwig
Benthodytes sanguinolenta Théel
Ypsilothuria bitentaculata Ludwig
Trochostoma granulatatum Ludwig
Ankyroderma musculus (Risso);

six found in the Atlantic:

Deima Blakei Théel
Laetmogone violacea Théel
Benthodytes glutinosa R. Perrier
Ypsilothuria bitentaculata (Ludwig)⁴
Trochostoma albicans Théel
Ankyroderma musculus (Risso).

The species known in the Indian Ocean and Pacific Ocean that the “Investigator” found in the Indian Ocean show nothing remarkable. As for the Atlantic species and those the “Investigator” has dredged in the Indian Ocean, three appear very cosmopolitan: *Ankyroderma musculus* (Risso),

characterized by a ventral radius lacking appendages, by the complete absence of calcareous spicules and by the presence of two bundles of gonadal tubes. These two latter characters are found in *Stichopus pallens*, but the medio-ventral radius is not one. The pedicels there are only rarer than in other regions of the body. This character is clearly indicated in the figure that shows the animal seen by the ventral surface (Koehler, Résultats Scient. Camp. Du “Caudan: Pl. I, figl. 1.

The description of the genus *Paroriza* given by Hérouard should thus be modified and it is necessary to say that the appendages of the medio-ventral radius can be completely lacking (*P. Prouhoi*) or be present only rarely (*P. pallens*).

The validity of the genus *Paroriza*, which has been discussed by R. Perrier, appears to us absolutely incontestable and it seems to us necessary to preserve it in order to place there the Synallactidés with two bundles of gonadal tubes, whose ventral median radius is naked or with very few appendages and whose integument completely lacks calcareous spicules.

⁴ We place *Y. attenuata* of R. Perrier in *Y. bitentaculata* (Ludwig).

to which we unite *A. Danielseni* Théel and *A. spinosum* Ludwig, is distributed into all the seas. It is a very polymorphic species. *Ypsilothuria bitentaculata* (Ludwig), from which *Y attenuata* E. and R. Perrier cannot be distinguished, has been found in Japan, the Pacific, the Sunda Archipelago and the Atlantic. *Laetmogone violacea* Théel is already known in the Atlantic and the Indian Ocean. The other species, *Deima Blakei* Théel, *Benthodytes glutinosa* R. Perrier and *Trochostoma albicans* Théel have not yet been found outside the Atlantic and the dredges of the “Investigator” notably extend their geographic range.

As a result of this comparison, the species already known and found by the “Investigator”, the Pacific and the Indian Ocean contain nearly the same number of species as the Atlantic Ocean. If in fact we set aside the obviously cosmopolitan forms such as *Laetmogone violacea* Théel, *Ypsilothuria bitentaculata* (Ludwig) and *Ankyroderma musculus* (Risso), we note that among the known species, two have been found both in the Indian Ocean and Pacific (*Mesothuria multipes* Ludwig and *Trochostoma granulatum* Ludwig), one has yet to be found in the Pacific (*Benthodytes sanguinolenta* Théel), one only in the Indian Ocean (*Synallactes Wood-Masoni* Walsh) and finally three known only in the Atlantic (*Deima Blakei* Théel, *Benthodytes glutinosa* R. Perrier and *Trochostoma albicans* Théel).

On the other hand, if we compare the deep forms of holothuroids dredged by the “Siboga” in the Sunda Archipelago, we see, setting aside the cosmopolitan forms such as *Laetmogone violacea* Théel, *Ypsilothuria bitentaculata* (Ludwig), *Ankyroderma Danielseni* Théel and *A. spinosum* Ludwig, both of which we combine with *A. musculus*), that the species collected by the “Investigator” in the Indian Ocean number only three. These are *Synallactes Wood-Masoni* (Walsh), *Mesothuria multipes* Ludwig and *Trochostoma granulatum* Ludwig.

The result of this comparison is that two very close territories in the same ocean, the Sunda Archipelago on one hand, the Gulf of Bengal and the Sea of Oman on the other hand, have two very different faunas of holothuroids and have only a very small number of common forms, if we consider only the species. But if we consider the distribution of genera and families, we reach a completely different conclusion and we can state, on the contrary, a greatly analogy between the fauna of holothuroids of the Indian Ocean and that of the Sunda Archipelago. We have already noted above that the collection of the “Investigator” is very rich in synallactids, molpadiids and synaptids. The same remark applies equally to the holothuroids collected by the “Siboga”. In the two collections we note that the genera *Mesothuria*, *Bathyploetes* and *Pelopatides* among the synallactids, *Ankyroderma* and *Trochostoma* among the molpadiids and *Protankyra* among the synaptids are each represented by several species. Also, in spite of a completely different specific composition, the faunas of these two regions have a marked resemblance.

A comparison of the holothuroids dredged by the “Albatross” in the eastern region of the Pacific with the collections of the “Investigator” and the “Siboga” shows that not only are the common species very few but that the distribution of genera is completely different.

The deep fauna of holothuroids of the Atlantic, that we know by several dredges, as well in the western regions as in the eastern regions of this ocean, differ as much from that of the Indian Ocean from the point of view of composition of species as in the distribution of genera.

The analogous peculiarities have been shown for the other groups and one of us already has had the occasion to develop analogous considerations in studying the abyssal ophiuroids of the Indian Ocean. The more submarine explorations increase, the more examples we find of similar locations in the abyssal faunas of which cosmopolitanism is far from being as absolute as we have previously believed.

We have used most of the specimens we were sent, but unfortunately the study of some of them was not as complete as we would have liked. The state of preservation of some specimens left much to be desired. The integument is in part lost, the body is flat and more or less damaged, and the tissues are macerated. In general, the internal organs are missing or are so altered that we can no longer recognize their form. Now some determinations can be made with certainty only if the internal organization is known. It is especially indispensable to know if the respiratory trees exist or not. In the absence of being able to establish in a certain manner this important character, it has been impossible for us to classify some of our specimens. Some descriptions thus have holes. Finally, we have had to completely set aside a very large number of individuals whose state of preservation was so defective that it was impossible to make the least description.

We have adopted the classification that R. Perrier has proposed in his beautiful work on the holothuroids of the “Travailleur” and the “Talisman” and that appears to us the most natural. As this author has discussed with much talent the characters of the orders, families and genera, we have thought that is useless to burden this descriptive memoir with diagnoses that the reader will find in the work of R. Perrier.

We shall begin with the aspidochiotes and we shall study successively the synallactids, deimatids elpidiids and psychropotids. The holothuriids and pelagothurids are not represented among the abyssal holothuroids dredged by the “Investigator”. To these families we add a new one, that of gephyrothurids, represented by only one genus, *Gephyrothuria*.

The dendrochiotes are represented by several psolids and a rhopalodin. We shall end our study with the molpadiids and the synaptids.

Having begun the description of the species, we must give all our thanks to Mr. Joubin, Professor of the Museum, for the kindness with which he placed at our disposition, in his laboratory, the specimens of the “Travailleur” and the “Talisman” that we desired to compare with those of the “Investigator”. Mr. Rémy Perrier has very obligingly aided in this study.

Professor Max Weber of Amsterdam kindly agreed to send us at Lyon some specimens of holothuroids of the “Siboga” identified by Sluiter and whose study has been very useful to us. We ask him to accept our great gratitude.

ASPIDOCHIROTA

1° Family. SYNALLACTIDAE

R. Perrier counts in the family of Synallactidés nine genera of which seven were known before him. These are the genera *Mesothuria*, *Pseudostichopus*, *Synallactes*, *Bathyploetes*, *Pelopatides*, *Bathyherpystikes*, and *Meseres*, to which he has added the genera *Benthothuria* and *Zygothuria*. To these nine genera, it is necessary to add the genus *Paroriza* created by Hérourard.

We have been led ourselves to create some new genera that, while being very close to the genera *Pelopatides* and *Benthothuria*, should however be distinguished. These five genera are the following:

PSEUDOSTICHOPUS Théel.

1. *Pseudostichopus occultatus* Marenzeller var. *plicatus* nov. var.

Plate III, fig. 8; Plate IX, fig. 1 to 3.

Pseudostichopus occultatus, Marenzeller 1893. Berichte der Comm. Für Erforsch. d. Ötl. Mittelmeeres. Zool. Ergebn.

I. Echinodermen. Denkach, K. Ak. Wiss. Wien Bd. LX. P.15, Taf. IV, fig. 9.

Pseudostichopus occultatus, Hérourard. 19902. Holothuries provenant des campagnes de la "Princesse Alice".

Résultats des Campagnes Scientif. du Prince de Monaco, p. 14, pl. XI, fig. 4 to 14.

Station III. — Lat. N. 12°50'. Long. E. 90°52'. — Depth 2644 fathoms. — 1 specimen.

This specimen, covered with shells of foraminiferans, has a large size. It measures 135 mm in length and 50 mm in width. It greatly resembles the individual of large size described by Hérourard, but the dorsal and posterior regions have some folds with some papillae. The lateral borders are also folded and have some very distinct appendages. It appears to be a beginning of a lateral border. The anus is surrounded by a small ring a millimeter in thickness.

The plates of the perianal region are a little differentiated from those that Marenzeller described and they even extend in all the body wall. They are formed (pl. IX, fig. 1a, 1b) by a network with a very clear mesh and with a very thick frame.

The pedicels, very difficult to see, enclose a large number of calcareous spicules in the form of rods (pl. IX, fig. 2a, 2b, 2c, 2d).

The spicules of the gonads (pl. IX, fig. 3a, 3b, 3c, 3d) are identical to those Marenzeller and Hérourard have described.

The calcareous ring has the structure of the *Ps. occultatus* type.

SIMILARITIES AND DIFFERENCES. — The type of *Pseudostichopus occultatus* described by Marenzeller was scarcely 40 mm in length and had calcareous spicules in the perianal region. Hérourard reported an example of the same species from the "Princesse Alice" that was 110 mm in length by 30 mm and that, from the point of view of size, is closer to ours. This author did not mention in his description of folds in the posterior region of the dorsal surface. The calcareous

spicules are missing in the integument of the body and are very scattered in the wall of the gonads. The specimen of the "Investigator" is distinguished from the two specimens above by the larger size, by the folds of the posterior region and by a greater abundance of calcareous spicules in the body wall. We do not believe that these differences are sufficient to make it necessary to create a new species and we consider this holothuroid as a simple variety of *Pseudostichopus occultatus*.

MESOTHURIA Ludwig.

1. *Mesothuria multipes* Ludwig.

Mesothuria multipes Ludwig 1894. — Reports on an exploration etc., by the U. S. Fish Commission Steamer "Albatross." XII. The Holothuriodea. Mem. Mus. Comp. Zoöl. Harvard College. Vol. XVII, No. 3, p.31, pl. IXx, fig. 30–27/

Mesothuria multipes Sluiter 1901. — Die Holothurien der Siboga-Expedition. Siboga-Expeditie XLIV. P. 24;

Station 250. — Lat. 6°54'30". Long. 79°34'30'. — Depth 480 fathoms. Two specimens.

Station 104. — Lat. 11°12'47', Long. 74°25'30". — Depth 1000 fathoms. — 1 specimen.

The specimen from 1000 fathoms, in bad state, measures 120 mm in length and its calcareous spicules correspond exactly to the description of Ludwig.

The specimens coming from 480 fathoms have a length respectively of 90 and 27 mm. They are in very bad condition. Their calcareous spicules greatly resemble those of *Mesothuria multipes*, but perhaps their stalks are more developed and have more spines. Their base also has numerous peripheral openings and is often built on type four. The stalk ordinarily has three rods but sometimes only two. The appearance of the binary symmetry in these specimens separates them from the type of *M. multipes*, but we must limit ourselves to mentioning this difference, the bad state of the specimens does not permit a complete description.

2. *Mesothuria abbreviata* nov. sp.

Plate XII, fig. 19 and 20.

Station 107. — Lat. N. 9°33'57". Long. E. 75°36'30". Depth 406 fathoms. 3 specimens.

The respective lengths of these three individuals are about 80 mm, 74 mm and 65 mm. Although the specimens are in a very bad state of preservation, they appear fusiform. The integument is whitish or white-greyish. They appear to have on their entire surface small appendages irregularly distributed and generally retracted. The mouth is subventral and the anus subdorsal.

The calcareous spicules are very numerous and of small size. They are only turriiform spicules (pl. XII, fig. 19 and 20). The base is circular and has a central opening, generally surrounded by six peripheral openings, three large and three small alternating with the preceding. The stalk is formed of three rods inclined at their base and becoming parallel in the terminal half. They are united with each other by two stages of transverse beams and end in four tips.

The calcareous ring has the general form of that of *Mesothuria multipes* Ludwig.

The single Polian vesicle is 18 mm in length. The gonads appear to be formed of a single tuft of very long and very branched tubes, but the bad state of the specimens does not permit recognizing the exact form.

SIMILARITIES AND DIFFERENCES. — *M. abbreviata* is very near *M. multipes* Ludwig. It differs especially by the form of turriiform spicules in which the stalk is shorter and stockier. The rods end in tips and never have the great extensions so characteristic of *M. multipes*.

3. *Mesothuria incerta* nov. sp.

Plate I, fig. 6; Plate IX, fig 4-9.

Station 229, — Lat. N. 9°29'34". Long. E. 75°38'. — Depth 360 fathoms. 1 specimen.

The body is flat and oval. It has a flat ventral surface and a convex dorsal surface. Its length is 58 mm and its width is 17 mm in the middle region. The color is uniformly whitish. The ventral sole has on its entire edge a rounded ledge, very marked on the sides where it reaches 2–5 mm in width.

The surface of the body has appendages its entire length. The marginal ring is covered with numerous conical appendages whose length reaches 3 to 4 mm. They are arranged in several rows and extend the entire length of the lateral radius. On the dorsal region, these appendages end in a tip and form papillae, although on the ventral surface, they often end in a sucker and constitute then the true pedicel.

The ventral surface has numerous small retractile papillae going insensibly to the lateral appendages and, moreover, some large retracted pedicels with a sucker 1 mm in diameter. The large pedicels are distributed without any order on the entire ventral sole both on the median radius as well as on the interradiial regions.

The dorsal surface has well developed papillae toward the lateral-ventral radius, but their length decreases progressively away from the lateral edges and are finally reduced to simple projections.

The integument is very thick and enclose turriiform spicules with ternary symmetry (pl. IX, fig. 5 and 6). The base is formed of a perforated disk generally with a central opening and six large peripheral openings alternating sometimes with the smaller marginals. At the center is a tripod placed on the central opening that supports three rods ending in numerous spines that are joined by transverse beams arranged in one or two stages.

The large pedicels have a reticulated terminal plate (pl. IX, fig. 9). They contain stalks (pl. IX, fig. 7 and 8) smaller than the preceding

The single Polian vesicle is 7 mm in length.

The calcareous ring (pl. IX, fig. 4) is composed of ten articulated pieces. The interradials have a median tip directed forward. The radials are quadrangular with two small anterior teeth. The ring greatly resembles that of *Holothuria Murrayi* Théel.

The tubes of the gonads form a single bundle opening into an ampoule.

SIMILARITIES AND DIFFERENCES. — *Mesothuria incerta* belongs to the group of *Mesothuria* whose later pedicels are more developed than those of other regions of the body and that includes *M. maroccana* R. Perrier and *oktaknenus* Sluiter. It differs from *M. oktaknemus* by the form of the calcareous spicules that here are built on type 3 while they belong to type 4 in *M. oktaknemus*. Our species approaches *M. maroccana* R. Perrier. The size is nearly identical and the appendages on the lateral side of the body have the same importance. But in our species, there is a ventral peripheral ring and large pedicels on the ventral surface that we do not find in *M. maroccana*.

Moreover, the calcareous spicules are very different although they are constructed on type 3 in both species. They especially differ in the termination of the three stems of the stalks.

4. *Mesothuria squamosa* nov. sp.

Plate VI, fig. 10; Plate IX, fig. 10 and 11.

Station 280. — Lat. N. 11°29'45". Long. E. 80°02'36". Depth 446 fathoms. 2 specimens.

One of the specimens is well preserved, the other is flat and slightly twisted. The body is rounded and fusiform. It is covered with numerous protuberances irregularly foliaceous whose central regions is more or less depressed. The length is 110 mm. The width is 25 mm in the middle region and only 15 mm at the ends. The general color is pinkish brown.

The mouth is subventral. The anus is subdorsal and wide open.

The lateral parts have very numerous appendages that extend onto the lateral radii and on the adjacent interradius. These appendages are arranged more or less regularly in longitudinal rows. They have various forms. Some, on the lateral radii, are 3 to 4 mm in length and end in a very large sucker. Others, nearer the median dorsal line, are simple conical papillae with pointed ends. Between the two kinds of appendages are moreover intermediate forms.

The length of these various appendages decreases towards the median plane of the individual. Near this plane, the appendages are no more than one mm in length and very separated from each other. It is moreover difficult to find them in the various folds of the integument. It seems that the ventral median radius and the dorsal interradius are completely lacking in appendages.

The integument is thick, supple and of spongy appearance. Its surface has numerous flat leafy folds of irregular form. It contains turritiform spicules (pl. IX, fig 10 and 11) constructed on type 3 or on type 4, but generally with three-fold symmetry. The base of the spicules (pl. IX, fig. 10, *a*, *b*) is formed of a circular disk with six to eight peripheral opening and a central opening. Its borders have three stems ending in some spines and connected to each at two points of their height.

The appendages enclose spicules of the same form but with smaller dimensions. The pedicels have a reticulated terminal plate.

The calcareous ring is composed, like that of *Holothuria Murrayi* Théel, of ten articulating pieces. The interradii have a median tip directed forward. The radials are rectangular and more massive than those of *HL. Murrayi*.

The single Polian vesicle is 20 mm in length.

The gonads, located to the left, are formed of a bunch of little branched filaments.

Toward the anal region, we find on the cloacal wall, two vesicles placed on either side of the rectal open and that perhaps correspond to the origin of the respiratory trees.

SIMILARITIES AND DIFFERENCES. — *M. squamosa* belongs to the group of *Mesothuria* with numerous lateral appendages and more developed than the others. It is separated from all the species of this group by the presence of these curious foliaceous folds that we find in no other *Mesothuria*.

SYNALLACTES, Ludwig.

1. — *Synallactes Wood-Masoni* (Walsh).

Plate IX, fig. 26 to 30.

Pannychia Wood-Masoni Walsh. 1891. Journ. Asiatic Soc. Bengal. Vol. LX, Part. II, p. 198.

Amphigymnas multipes Walsh. 1891. Journ. Asiatic Soc. Bengal. Vol. LX, Part. II, p. 199.

Synallactes reticulatus Sluiter. 1901. Die Holothurien der Siboga Expeditie, p. 46. Taf. III. Fig. 1, 2.

Andaman Islands. — Depth 188–220 fathoms. 1 specimen.

Andaman Islands. — Depth 271 fathoms. 2 specimens.

Andaman Islands. — Depth 400 fathoms. 1 specimen.

7 miles to the S.E. of Ross Island (Andaman). Depth 265 fathoms.

Station 118. — Lat. N. 13°20'. Long. E. 85°8'. — Depth 1803 fathoms. 1 specimen.

Station 222. — Lat. N. 13°27'. Long. E. 93°14'30". Depth 405 fathoms. 5 specimens.

Station 233. — Lat. N. 13°17'15'. Long. E. 93°10'. Depth 185 fathoms. 1 specimen.

The law of priority obliges us to apply to this holothuroid the specific name imposed on it in 1891 by Walsh. This author placed this species in the genus *Pannychia*. His description, although very brief, is however sufficient to characterize the species.

In 1901, Sluiter considered this species as new and placed it in the genus to which it actually belonged. He described it under the name *Synallactes reticulatus* and studied it in great detail. We can confirm his description in all points and we have only to add some remarks on the form of the spicules.

The single specimen of *Synallactes reticulatus* collected by the “Siboga” measures 330 mm in length. The specimens of the “Investigator” have different dimensions. The smallest must be that Walsh separated, wrongly, under the name *Amphigymnas multipes*, from his *Pannychia Wood-Masoni* and that is 80 mm in length and 22 mm in width, but it does not appear entire. Another specimen, coming from a depth of 265 fathoms, measures 120 mm in length and 12 to 15 mm in width. Among the five specimens from Station 222, two individuals are 380 to 400 mm in length and 30 mm in width. Most of the specimens came from depths varying between 188 and 490 fathoms. Only one was dredged at 1803 fathoms (station 118). The individual of the “Siboga” came from a depth of 310 m.

All the specimens in alcohol have a uniform yellowish-white color. Walsh indicated for *Amphigymnas multipes* a “pale purple” color. Sluiter said that, according to the label the color of the living *Synallactes reticulatus* collected by the “Siboga” was orange-red.

The calcareous spicules are like those of the two forms already described by Sluiter. They have disks (pl. IX, fig. 26, 27 and 28) with four large central meshes surround by some peripheral meshes of smaller diameter. These disks are first of all cruciform spicules, then the ends of the arms are considerably enlarged and are united. In the center of each of them are raised four short stems, generally isolated, but that are sometimes united by a stage of transverse beams, (pl. IX, fig. 27). In the dorsal wall of the body, we have found slightly elongated disks, (pl. IX, fig. 30) having in the central region, a series of eight large openings, placed in pairs one after the other and at the periphery of other openings to become smaller and smaller. The second form of spicules is that of flat, enlarged rods whose ends or even the sides can be extended in more or less numerous branches (pl. IX, fig. 29). These are sometimes united and then take the form of an elongated plate with irregular edges and numerous openings generally arranged in longitudinal series. The openings are larger in the central region than at the periphery.

Sluiter says that the respiratory trees have a rudimentary structure because they have very short expansions in culs de sac but no true arborescent branches. We found this arrangement in the majority of our individuals, but, in some specimens, the conical diverticula have laterally true secondary lobes and the arborescent form begins to appear.

We have placed, among the synonyms of *Synallactes Wood-Masoni* (Walsh), *Amphigymnas multipes* Walsh. This name was applied by Walsh to a single specimen which was even the type of a new genus. The principal character he invoked is the presence at the ends of the body of a process in the form of a tail (with narrow tail-like extremities). Now we have had under our eyes the original specimen of Walsh and we have easily convinced ourselves that it is a matter of an incomplete *Synallactes Wood-Masoni* and that the extensions in question are nothing other than parts more or less completely stripped of their appendages. There is thus no reason to preserve the genus and species established by Walsh.

2. *Synallactes horridus* nov. sp.

Plate XII, fig. 15–18.

Station 117. — Lat. N. 11°58'. Long. E. 88°52'17". Depth 1748 fathoms. 1 specimen.

The specimen is in bad condition. The external integument has been divided into large longitudinal shreds that are in part detached from the body. However, it has been possible for us to constitute its principal characters. The length is 90 mm. The color was, according to the indication taken of the living specimen, "transparent madder brown". The specimen in alcohol is yellowish.

The body appears sub-cylindrical. The mouth is ventral. The anus is dorsal and bordered with a large number of papillae. All the radii, with the exception of the ventral median radius, has all along their length large conical papillae 7 to 8 mm in diameter at their base and 6 to 7 mm in height and ending in a thin extension 4 to 5 mm in length. These papillae seem to be arranged either of one only or of two longitudinal rows. We counted 14 to 15 of these papillae on the latero-ventral radius. In this radius, the papillae of the middle region of the body are more developed than those of the anterior and posterior regions. The dorsal radius has only a dozen of these papillae. The latero-dorsal interradius has, in its strongly folded posterior region, only some very small papillae.

The dorsal and ventral median regions are a little folded and whitish. Seven mm behind the mouth and on the unpaired radius are two pairs of appendages.

We count only six to seven terminal tentacles per mamelonated disk.

The body wall is very thin and contains two kinds of calcareous spicules: numerous cruciform spicules and spicules with rods. In the first (pl. XII, fig. 15 to 17), the arms that generally number four, have a conspicuous terminal disk that is perforated with unequal openings. Sometimes they are united by lateral extensions from these disks (pl. XII, fig. 17). At the center of the spicule is raised a single stem, elongated, conical, ending in one or two tips and having on its terminal half some series of spines. The cruciform spicules of the papillae (pl. XII, fig. 16) have a longer and thinner stem than those of the spicules of the body wall. The rods (pl. XII, fig. 18) are slightly arced, ending in a tip and having some spines toward their terminal region.

What is especially striking, when we open the animal to study the internal organs, unfortunately in very bad condition, are the longitudinal muscles, simple, very large, reddish in color and that seem to cut out like a cookie cutter at the base of the large papillae.

The single Polian vesicle is 10 mm in length.

The gonads are formed of two bundles of tubes.

SIMILARITIES AND DIFFERENCES. — The characters of the calcareous spicules, cruciform and with a single stem and the presence of numerous papillae on the entire radius with the exception of the ventral median radius, permit placing our species in the genus *Synallactes*.

S. horridus is very close to *S. rigidus* nov. sp. It differs from it by the presence of some small appendages on the ventral median radius and in the posterior region of the latero-dorsal interradius and the muscles cut out at the beginning of the papillae.

R. Perrier has described a species of *Synallactes*, *S. crucifera*, whose ventral median radius has only a very small number of appendages; *S. horridus* has some pedicels only in the anterior region of this radius. It forms thus, with *S. crucifera*, a transition between the *Synallactes* where the ventral median radius lacks numerous appendages and the species that, like *S. rigidus*, complexly lack them.

3. *Synallactes rigidus* nov. sp.

Plate V, fig. 1; Plate IX, fig. 12–16.

Laetmogone spongiosa Théel. Walsh. 1891. Journ. Asiatic Society Bengal, Vol. LX, Part II, p. 300. Gulf of Bengal. Lat. N. 10°. Long. E. 91°7'. Depth 1924 fathoms. 1 specimen.

The ventral surface is flat and the dorsal surface is strongly convex. The length is 75 mm and the width is 25 mm. The general color is whitish.

The mouth is ventral and is surrounded by peripheral ring. The anus is sub-dorsal and has on its border some papillae, the lateral ones more developed than the others.

The ventral surface is limited laterally by a row of very long conical papillae. The lateral papillae are 4 to 5 mm in diameter at their base and 5 mm in height. They end in a slight projection. These marginal papillae, about forty in all, are distributed around the entire periphery of the body except in the posterior region.

We cannot distinguish any appendage on the ventral median radius and on all the ventral sole. Its surface is moreover strongly folded, which is very annoying for observation. We distinguish a little behind the mouth a small papilla located on the ventral median radius. Is it a rudiment of a pedicel?

The dorsal surface is strongly folded and has some papillae arranged in four to six longitudinal rows. There is a dozen papillae per row. In the middle region, these papillae are conical. They are 3 mm in diameter at the base and 2 to 3 mm in height. In the posterior region, they can reach up to 6 mm in height and have an extension 1 mm in diameter and 6 to 7 mm in length. In most of the dorsal papillae, these terminal extensions have been removed.

The fifteen to sixteen tentacles are short, massive and end in a disk with numerous mamelons.

The integument is rigid and rugose. They contain numerous cruciform spicules (pl. IX, fig. 12–14) and rods (pl. IX, fig. 16). The arms of the cruciform spicules generally number four and they expand the distal end into a disk perforated with openings of variable dimensions. In the center of the spicule is a conical stem that ends in two to three tips and having here and there spines on the upper half. Some spicules (pl. IX, fig. 14, *a, b*) have a larger number of arms. Their terminal disks are very expanded and touch each other.

We have also observed, but one time only, a spicule (pl. IX, fig. 15) whose base has the form of a wheel with eight rays meeting on an inner circle. The stems are broken.

The rods (pl. IX, fig. 16) are arced and their tips are bifid. They have some spines on their side.

The longitudinal muscles of the bivium are very developed and double. Those of the trivium are single. The gonad tubes are arranged in bundles 25 mm in length. The single Polian vesicle has a length of 220 mm. The rest of the viscera is missing.

SIMILARITIES AND DIFFERENCES. — It is mostly based on the form of the spicules that we place this species in the genus *Synallactes*, because the cruciform spicules of most of the species of this genus have only one central stem. However, in *S. Wood-Masoni* (Walsh), the spicules have four stems and, in contrast, the spicules of *Bathyplores monoculus* Sluiter have only one stem.

On the other hand, the absence of pedicels in the ventral median radius separates our holothuroid from the genus *Synallactes*. But it is necessary to note that in one species of *Synallactes*, *S. crucifera* R. Perrier, the pedicels of this radius are very sparse. Moreover, in our *S. horridus*, the pedicels are present only in the anterior region. It seems thus that there may be a regression of these appendages in the unpaired radius and that the principal stages of this regression are marked by *S. crucifera* and *S. horridus*.

R. Perrier, in reporting this regression, indicates that it makes a transition between the genus *Synallactes* whose unpaired radius has numerous appendages and the genus *Bathyplores* where the unpaired radius is completely naked.

We have mentioned in *S. rigidus*, the presence of a papilla that represents perhaps the last trace of this medio-ventral row. If the species that we describe below with the name *S. pellucidus* really belongs to the genus *Synallactes*, it offers us a new example of variations that the pedicels of the medio-ventral radius have in this genus.

4. *Synallactes* (?) *dubius* nov. sp.

Plate IX, fig. 17 to 21.

Station 250. — Lat. N. 6°54'30". Long. E. 79°34'30". — Depth 480 fathoms. 2 specimens.

The two specimens are in very bad condition and in large part skinned. One is 55 mm in length and about 20 mm in width. The other is 50 mm in length and 15 mm in width. It is the latter that we take as type in the description that follows.

The body is flat. The mouth is ventral and the anus terminal. On most of the radius, we find the strips of integument having appendages of 5 mm in length and connected to the body by a narrower portion. It is impossible for us to indicate the exact distribution of these appendages, but we think that they are arranged into two rows because we find on the internal surface of the integument two rows of ampullae. The integument of these appendages contains two kinds of very characteristic calcareous spicules: very peculiar turriform spicules and spicules with rods. The turriform spicules (pl. IX, fig. 17 to 19) consist of a generally elongated disk with an opening at each end. In the central region are one or several perforations. At the center of the disk are ordinarily two stems located in the same plane and that can reach a very great length. Sometimes these stems are isolated and elongate parallel to each other (pl. IX, fig. 17a), sometimes they unite at a small distance from each other by a transverse beam and then separate from each other (pl. IX, fig. 17c). In the spicules represented in pl. IX, fig. 17b, at first there are three stems that are united by a transverse beam leaving between them two openings. The ends of the beam share two divergent stems. In the other form (pl. IX, fig. 19), rare, the circular disk has six peripheral openings and one central opening. In its center are three more or less curved stems that are united at their top by a stage of beams. The free end of these stems has a row of spines.

The spicules of rods are especially abundant at the end of the appendages where they are supporting organs. They are always arched. Some (pl. IX, fig. 20c), slightly curved, end in a tip and are slightly swollen in the middle. The others (pl. IX, fig. 20a, b), very arched, have simply rounded

ends. Others, finally (pl. IX, fig. 20*d*), are flat and enlarged. They have a short branch in their middle.

The longitudinal muscles are single and little developed. They have from place to place on each side ambulacral ampullae that should correspond to a double row of appendages.

There is only one Polian vesicle. It has a calcareous ring (pl. IX, fig. 21), incompletely calcified. The radial parts are rectangular and have on their anterior border a median tip and two lateral swellings. The interradials have a little developed anterior tip.

In the small specimen, which is a female, the gonads form a bundle of tubes to the left of the dorsal mesentery. The other specimen has very developed testes.

SIMILARITIES AND DIFFERENCES. — Because of the very peculiar form of the calcareous spicules, we are led to believe these two holothuroids can be placed in a new genus, but the species are in too bad a condition for us to specify the characters of the genus. We provisionally place it in the genus *Synallactes* because of the presumed existence of a double row of appendages in each radius. The gonads, a bundle to the left of the dorsal mesentery, recalls the arrangement of those of *Mesothuria*.

5. *Synallactes* (?) *pellucidus* nov. sp.

Plate IV, fig. 4 and 5; Plate IX, fig. 22 to 25.

Station 163. Lat. N. 13°45'38". Long. E. 80°29'37", Depth 210 fathoms. 1 specimen.

The specimen is incomplete. The posterior region is missing and nearly all the internal organs are gone. Nevertheless, it has peculiarities so marked that it seems interesting to us to give a description incomplete as it is.

The preserved portion that seems to correspond to the major part of the body is 60 mm in length and about 10 mm in width. The integument is divided into two very distinct layers. The external layer is strongly folded and in areas is separated from the underlying layer.

The body is truncated vertically anteriorly so that it has a rectangular form when we look at it by the ventral surface. This surface appears flat while the dorsal surface is slightly convex. The mouth is ventral but nearly at the end.

The ventral sole is bordered on each side by a row of pedicels that are very distinct from each other. We count about fifty of them in all. These pedicels are cylindrical and have an average length of 3 to 4 mm. They extend up to the anterior end of the body and even beyond the mouth. Some millimeters before the point where the holothurian is broken, the two lateral rows appear to converge toward each other. In this region the ventral median radius has five pedicels of which the four anterior ones are arranged in pairs. Before this point it is completely naked.

The dorsal surface has, in each interradius, a row of papillae shorter than the pedicels and end in a tip. In some places these appendages are arranged in pairs. We count 18 dorsal papillae in each preserved portion of the radius.

The tentacles, ranging in number from 18 to 20, are short, massive, ended in a thin disk and with a mamelonated circumference,

The integument is very thin, transparent and rich in calcareous spicules. In the body wall, we find tables (pl. IX, fig. 22 and 23) whose base is constituted of a disk with a crenelated or indented circumference. It has eight peripheral openings that surround a central opening. In the center are four stems that are united by a stage of transverse beams, ended in a tip and having several spines in their terminal region.

The lateral pedicels have a terminal disk and spicules of two kinds: 1° stalks (pl. IX, fig. 24) like those of the wall, but sometimes built on type 3 instead of type 4; 2° flat rods (pl. IX, fig. 25), sometimes slightly curved and with more or less perforated lateral extensions. They greatly recall those of *S. Wood-Masoni* (Walsh).

The internal portion of the integument is detached from the external portion and tightly enclosing the internal organs. We distinguish there single, little developed longitudinal muscles. Between them are some transverse muscles.

The digestive tube wall is brownish. The gonads are formed of bundles of tubes divided at their free end and having very short swellings.

SIMILARITIES AND DIFFERENCES. — It is not without doubt that we place this holothuroid in the genus *Synallactes*. The pedicels of the ventral median radius, in fact, are seen only in the posterior region of the body and are completely lacking for most of this radius. As for the appendages of the four other radii, they are arranged in a single row. Finally, the turritiform spicules have peculiar characters, but the rods recall well those of *S. Wood-Masoni*.

We have already called attention to the variations that are shown by the pedicels of the ventral median radius in the genus *Synallactes*. These variations justify a relation with the latter genus, but the state of preservation of our specimen does not allow us to indicate its affinities more precisely.

BATHYPLOTES Ostergren.

1. *Bathyplores profundus* nov. sp.

Plate IV, fig. 1 and 2; Plate X, fig 19 and 20.

Station 111. — Lat. N. 12°50'. Long. E. 90°52'. Depth 1644 fathoms. 1 specimen.

The body is flat. The ventral surface is flat and the dorsal surface slightly convex. The length is 92 mm and the width is 30 mm. The general color is greyish. The mouth is ventral and next to the anterior border. The anus is terminal and bordered with papillae.

The ventral sole has a grainy surface and is surrounded on its entire periphery with a continuous border that reaches 3 mm in width. The border has very large festoons in the lateral regions and distinct papillae in the anterior and posterior regions. The entire border seems to be made by the fusion of short and very enlarged papillae with the base. We can count about sixty of these appendages on the complete extend of the border.

The ventral median radius is not completely naked. It has, at about twenty millimeters behind the mouth, two or three pairs of retracted pedicels, each placed on a small polygonal plate. We find similar pedicels in the posterior region, but the middle region completely lacks them. On the sides of the ventral sole and against the marginal border are some longitudinal bands of pedicels, each of which is placed in the center of a polygonal plate. These appear only a little behind the mouth.

The dorsal region has four longitudinal rows of papillae. The two median rows have sixteen to eighteen small papillae, 2 mm in length. The two lateral rows have a smaller number of these appendages, but they are relatively larger and they can reach 6 mm in length.

The 17 tentacles are short and have a very enlarged and mamelonated terminal disk.

The integument is a little rugose. It contains cruciform calcareous spicules whose center has a long stem (pl. X, fig. 19 and 20). The four or five arms of the cross spread out at their ends in a disk perforated with four openings. The central stem is more or less conical and often has spines of different lengths. Sometimes it is completely smooth.

The longitudinal muscles are single. Those of the bivium are much larger than those of the trivium. The gonads appear to be constituted of two bundles of tubes swollen at the terminal extremity.

The other internal organs are not preserved.

SIMILARITIES AND DIFFERENCES. — *Bathyplores profundus* is separated from most of the *Bathyplores* by the presence of appendages on the ventral median radius. It is necessary to note however that some species of *Bathyplores*, such as *B. fallax* Ostergren, also have them. It is also separated from other *Bathyplores* by the structure of the spicules that are rather reminiscent of most *Synallactes*.

B. profundus thus forms an interesting type, intermediate between the genera *Synallactes* and *Bathyplores*, but because of the marginal border, it is closer to the latter genus.

2. *Bathyplores crinulatus* nov. sp.

Plate X, fig. 4 to 8.

Station 222. Lat. N. 13°27'. Long. E. 93°14'30". Depth 405 fathoms. 1 specimen.

The specimen is strongly twisted on itself so that it does not permit recognizing the exact form. The body is flat, of whitish color, but it has at some points a greenish tint. It is 110 mm in length and 14 mm maximum width. The mouth is ventral and its center at 7 mm from the anterior border. The anus is dorsal. A little behind and above it is a slight depression.

The lateral borders of the ventral sole have the appearance of a soft jelly and are strongly swollen. This condition does not permit distinguishing with clearness the border that, however, appears to be present at some points. The central median radius has no pedicel. In the posterior region and 25 mm before the anus, it has a longitudinal gutter of greenish color. On each side of this radius, the ventral sole has retracted greenish pedicels, irregularly arranged in three or four rows. These pedicels are visible on the sides of the mouth that they even exceed but are arranged then in a single row.

The dorsal surface is more or less folded and has not the least trace of appendages.

The approximately seventeen tentacles are retracted. They are greenish in color.

The integument has three kinds of calcareous spicules: tables, C-shaped spicules and spiny rods. The base of the turritiform spicules (pl. X, fig. 4 and 5) has sometimes the form of a cross with four branches, sometimes that of a wheel with four or five rays. These two forms derive from each other because the branches of the cross spread out at their distal end into a perforated disk that often meet in a by a circular extension with a denticulated external surface. When all the terminal disks are thus connected with each other, the periphery of the disk forms a strongly toothed circle. But most of the spicules lack one or two sectors of the circle. In the center of the disk are four short stems connected by one or two stages of transverse beams. At the level of each stage, the column has numerous spines, some of which have a great development.

The C-shaped spicules (pl. X, fig. 7) are strongly curved and their ends are very pointed. One of them (pl. X, fig. 7b) has in its center a stem located in the plane of the spicule and thus takes the form of a tripod with two curved branches.

The rods (pl. X, fig. 6) end in a tip, their middle region is slightly swollen and has a transverse series of spines. Other small spines occur the length of the spine. Finally, some very rare spicules (pl. X fig 8) have the form of a net with very large meshes.

The longitudinal muscle bands are divided.

SIMILARITIES AND DIFFERENCES. — *B. crenulatus* is distinguished from all other described *Bathyplores* by the total absence of appendages in the dorsal region. The presence of a medio-ventral gutter, a lateral border and three or four rows of pedicels in each lateral radius brings this species close to *B. sulcatus* Sluiter and our *B. assimilis*. It is distinguished from them, not only by the absence of dorsal appendages but also by the presence of C-shaped spicules in the body wall and the form of tables.

3. *Bathyplores assimilis* nov. sp.

Plate III, fig. 3; Plate X, fig. 1 to 3.

Station 229. Lat. N. 9°29'34". Long. E. 75°38'. Depth 360 fathoms. 1 specimen.

The body is very flat. The length is 130 mm and the width is 45 mm. The color is whitish.

The ventral mouth is 10 mm from the anterior border. The anus is subdorsal and has some papillae on its borders.

The periphery of the body is festooned in an irregular fashion. This fact is due to a preserved state of contraction of the body. But, in certain places, we clearly recognized that the projecting parts of the marginal border are formed of slightly prominent papillae fused at the base.

A gutter extends from the mouth to the anus the entire length of the ventral mean radius. Between this gutter and the marginal border are scattered pedicels in a very irregular fashion. However, they appear to form on each side four rows with the most internal located 7 or 8 mm from the gutter. In the anterior regions, these pedicels are less numerous than in the middle region. They extend up to the mouth.

The dorsal surface is strongly folded and has large conical papillae 3 mm in diameter at their base and 4 mm in height, very near each other and ended in a small extension. These papillae are distributed on the entire dorsal surface of the body with the exception of a marginal band measuring approximately 10 mm in width that completely lacks them.

We have not recognized with certainty the number of tentacles, but it is certainly not greater than twelve or fourteen.

The integument is thin and flaccid. It contains cruciform spicules of different sizes (pl. X, fig. 1 and 2). The base of these spicules is formed by a cross with four branches that end in a perforated disk. At the center of the cross rise four stems more or less curved toward the axis of the tower. They are connected by two stages of transverse beams. They have on the internal side some often bifurcated spines at different places.

We find also, in the papillae, some rod shaped spicules (pl. X, fig. 3) with a slightly spinous surface.

The internal cavity of the body is little developed. While the total width of the body is 45 mm, the cavity has a width of only 25 mm. This fact confirms the presence of a border that we stated above.

The longitudinal muscles are divided into two. Those of the ventral medial radius are less developed and very separated.

There is a single Polian vesicle.

SIMILARITIES AND DIFFERENCES. — *B. assimilis* approaches *B. sulcatus* Sluiter by its lateral border, the medio-ventral gutter and the four rows of pedicels on each side of this gutter. But it differs from it by the dorsal surface that has only large papillae arranged without order, the number of tentacles that is from twelve to fourteen instead of eighteen and especially by the form of tables and the absence of C-shaped spicules, in the longitudinal muscles.

4. *Bathyplores variabilis* nov. sp.

Plate V, fig. 10; Plate X, fig. 9 to 18.

Station 282. Lat. N. 10°08'. Long. E. 80°49'30". Depth 498–726 fathoms. 1 specimen.

The specimen is in bad condition. It is skinned in some places. Moreover, the anterior region is strongly twisted, compressed and in part destroyed. The posterior end is also very damaged. However, some peculiarities that we notice are sufficient to establish this species.

The body is flat and the dorsal surface is slightly convex. It is 105 mm in length and 30 mm in width. The general color is yellow, slightly tinted green in places. The skinned part of whitish.

The ventral sole has a very deep median gutter that lacks pedicels. It very probably extends the entire length of the body. The lateral sides of this ventral sole has, in the intact parts, some conical marginal papillae, 2 to 3 mm in diameter at the base and ended in a more or less tapered tip. We suppose that these papillae, which are especially apparent in the middle region, continues more or less further toward the anterior and posterior ends. They seem to be distinct from each other and do not constitute a continuous border. On the ventral sole, each side of the median gutter and nearer it than the marginal papillae, we find small pedicels of 1 to 2 mm in length arranged in two rows, rarely three. These pedicels alternate more or less irregularly in two contiguous rows.

The dorsal surface has large papillae 3 mm in diameter at their base and 2 to 3 mm in height. The surface of these papillae bristles with the ends of the calcareous spicules that are visible with a magnifying glass. They end in a small whitish mamelon. These diverse dorsal papillae seem to be arranged in 5 to 6 longitudinal rows.

The calcareous spicules are of several kinds. In the dorsal body wall, we find C-shaped spicules (pl. X, fig. 11) and numerous cruciform spicules whose base is formed of four branches, each ending in a perforated disc (pl. X, fig. 9 to 10). The terminal disks generally have a large central opening with one or two small lateral openings. They are sometimes connected to each other in a way that the base then has the form of a circular disk slightly raised in its center and which has four large central openings alternating with smaller marginal openings. As the center of this base is a column formed of four stems slightly inclined toward the axis of the column and connected to each other by three or four more or less oblique transverse beams. The external surface of these stems bristles with more or less developed spines, sometimes very stout, distributed the entire length and on all their external surfaces.

In the dorsal papillae, we find C-shaped spicules accompanied by cruciform spicules (pl. X, fig. 12 and 13). Each of the four branches has a terminal disk, expanded and perforated. At the center is a stalk with four stems connected by transverse beams. The end has numerous spines (pl. X, fig. 13). The structure of these spicules approaches the stalks described previously. The most distributed form in the papillae is the rods (pl. X, fig. 14 and 15), of which some are elongated with a bristly surface of small tips ending either in a tip or an enlarged perforated disk (pl. X, fig. 15). Others (fig. 14 *a, b*), more numerous, are flat and very large. Their borders have, from place to place, single or double tips that can be bifurcated. In additions, these spicules can have,

particularly in their middle part, lateral branches that, sometimes, are fused with cavities between them. Finally, with these different forms, are added here and there other spicules consisting of a calcareous network (pl. X, fig. 16) with large, irregular meshes.

The ventral pedicels have in the wall, first of all, stalks with a cruciform base with smaller dimensions than the preceding (pl. X, fig. 17) but especially rods (pl. X, fig. 18). They have a terminal plate.

SIMILARITIES AND DIFFERENCES. — *B. variabilis* approaches *B. reptans* Perrier. It has like it a marginal border, a gutter in the ventral median radius and a double row of pedicels on each lateral radius. But it is distinguished by the size of the marginal papillae forming the border. Moreover, the depression of the unpaired radius is very pronounced and the rows of lateral papillae are very near the gutter. The dorsal surface of *B. variabilis* has very large papillae arranged in five or six rows, while in *B. reptans*, these papillae are more elongated and form four principal rows. The stalks are not identical in these two species and *B. variabilis* has flat rods that we do not find in *B. reptans*.

5. *Bathyplores papillosus* nov. sp.

Plate X, fig. 21 to 24.

Station 268. Lat. N. 7°36'. Long. E. 78°05'. Depth 595–556 fathoms. 1 specimen.

The specimen is in a very bad condition. The length is 130 mm and the width is 30 mm. It is extremely flat. The color is grayish yellow. The mouth is terminal or sub-ventral. The anus is dorsal or sub-dorsal and it has some papillae around its periphery.

The ventral surface has all along the median radius, a gutter where we cannot distinguish any appendage. On each side of this median gutter and 2 or 3 mm from it, are two rows of pedicels more or less exactly arranged in pairs.

The dorsal surface is covered with large depressed papillae, yellowish, 5 mm in diameter at their base and 5 to 7 mm in height and ending in a slight tip. These papillae seem to be distributed in an irregular way and are separated from each other by about 10 mm.

The integument is thick and more or less soft. It is especially rugose on the ventral surface. It contains cruciform spicules (pl. X, fig. 24) whose base is formed of a cross with four arms. The end of the arms is expanded into a terminal disk perforated with a large number of openings of variable dimensions. At the center of the base are four short stems, connected by one or two transverse beams and ended by numerous tips, together forming a kind of club.

The dorsal papillae contain not only these stalks (pl. X, fig. 21, 22) but also slightly arched rods and with a slightly spinose surface (pl. X, fig. 23).

The longitudinal muscles are divided.

There is one Polian vesicle, 14 mm in length and two bundles of gonad tubes.

SIMILARITIES AND DIFFERENCES. — *B. papillosus* is near our *B. variabilis* by the presence of a gutter in the ventral median radius and a double row of pedicels on each side of it as well as by its dorsal surface covered with large papillae. But it is distinguished by the absence of a lateral border and also by the form of the calcareous spicules among which we do not find the flat rods so characteristic of *B. variabilis*.

The genus *Pelopatides* that, originally containing only two species, *P. confundens* Théel and *P. aspera* Théel, has been enriched in these past years by a very large number of species coming exclusively from the abyssal explorations and dredges of the “Blake”, “Albatross”, “Siboga” and “Travailleur”. Presently the number of species reported to the genus *Pelopatides* has reached 11. The collection of the “Investigator” is very rich in representatives of this genus or very near genera. Their study has led us to revise some species placed, often with doubt, in the genus *Pelopatides* and to create several genera very near to it. These genera are based either on a peculiar form of the tentacles and the pharynx (g. *Dendrothuria*) or on the presence of four rows of ventral pedicels (g. *Bathyzona*), or on the form of the marginal border and the presence of latero-ventral pedicels (g. *Perizona*) or even on the special form of calcareous spicules (g. *Allopatides*). R. Perrier has already separated from the genus *Pelopatides* the genus *Benthothuria* because of the presence of filiform appendages on the dorsal surface of the body and of pedicels placed in the posterior region of the ventral interradius.

Some species placed by Sluiter in the genus *Pelopatides* find their place better in these new genera. Thus, we place *P. megalopharynx* Sluiter in the genus *Dendrothuria* and *P. fusiformis* of the same author in the genus *Benthothuria*. It is very probable that a more complete study will lead to the separation of *P. purpuro-punctatus* Sluiter from the genus *Pelopatides* to make a separate genus.

The genus *Pelopataides*, thus relieved of species with peculiar characteristics, corresponds very exactly to the diagnosis of Théel modified by Ludwig. We must in our turn modify it in regard to the number of tentacles and accept that the number can vary from twelve to twenty. We shall describe below in fact one species of *Pelopatides* that has only twelve tentacles.

The species of the genus *Pelopatides* thus understood could provisionally be classed in three groups based on the distribution of the pedicels in the ventral median radius.

The first group contains the *Pelopatides* whose pedicels of the unpaired radius are localized in the posterior third or half of the body. The integument often has more or less spinose spicules. This group contains presently two species: *P. aspera* Théel and *P. illicitus* Sluiter. We shall add two species that we describe under the names *P. modestus* and *P. insignis*.

The second group contains all the species whose ventral median radius has pedicels on the posterior two thirds. It presently contains four species: *P. confundens* Théel, *P. appendiculata* Théel, *P. suspecta* Ludwig and *P. grisea* R. Perrier in accepting the synonymy proposed by Ludwig of *P. agassizi* and *P. confundens*. We add to this list the following five species: *P. gelatinosus*, *P. mollis*, *P. mammillatus*, *P. verrucosus* and *P. ovalis*.

Finally, the third group is characterized by the presence of three pairs of pedicels in the middle region of the body. It contains a single species, *P. atlantica* Hérouard. We have not encountered representatives of this group in the collections of the “Investigator”.

1. *Pelopatides gelatinosus* (Walsh).

Plate V, fig. 5; Plate X, fig. 27 to 30.

Benthodytes gelatinosa Walsh, 1891. Journ. Asiatic Soc, Bengal, Vol. LX, part II, p 200–202. Andaman Islands, 7 ½ miles east of Cinque Island., Depth 490 fathoms. 3 specimens. Station 115. Lat. N. 11° 31' 40". Long. E. 92° 46' 40". Depth 188–220 fathoms. 7 specimens. Station 222. Lat. N. 13° 27'. Long. E. 93° 14' 30'. Depth 405 fathoms. 4 specimens.

The largest individuals are 160 to 170 mm in length and 30 to 40 mm in width. The average individual is 120 mm in length and 30 to 25 mm in width. The smallest are 56 to 89 mm by 8 to 18 mm. These individuals have some differences, not only in their size but in their external form and especially in the development of the lateral papillae. We take as type of the species a specimen from Station 115 in good state of preservation.

The body is flat. The dorsal surface is more convex than the ventral surface. The mouth is prominent and ventral. The anus is dorsal and located at 3 or 4 mm from the anterior border. The general color of the specimen in alcohol is grayish with patches of deep violet at the end of some appendages.

The body is surrounded on all its periphery by a very marked continuous border formed of marginal papillae connected to each other by their basal part. In the anterior region, this border forms a peribuccal collar containing about twenty papillae that can reach 10 mm in length. Their base is very enlarged and their end, violet, is sometimes bifurcated. In the posterior region of the body, the papillae of the border are very flat and fused to each other for a large part of their length. The ensemble constitutes a sub-anal fan narrower in the median part and widened laterally. On the sides of the body, the papillae of the border, about forty in number, are flat and very large. They are united at their base, but their free part can reach 10 mm. The end is frequently violet.

The ventral median radius has in two thirds of its extent about forty pedicels that appear at 30 millimeters behind the mouth, extend a length of 70 mm and end 5 mm before the posterior border. In other specimens, 30 to 40 pedicels of the unpaired radius extend posteriorly to more than two thirds of the body. These pedicels are in the most part retracted. Their ends are a violet black and they are arranged in two rows alternating more or less irregularly with each other. Between these median rows and the border we sometimes find in the posterior region of the body some isolated pedicels identical to those of the median radius.

Each dorsal radius has a row of generally single papillae, but are double however at some points. We count about twenty of these papillae in each row.

The twenty tentacles are 8 mm in length and have three pairs of terminal mamelons. The inner mamelons are very small.

The integument is very thick. The most abundant calcareous spicules greatly resemble those of *Pelopates confundens* Théel. Some (pl. X, fig. 27) have rods more or less branched at the ends. Others (pl. X, fig. 28 and 29) are triradiate with the ends of the arms sometimes single, sometimes more or less dichotomous. Independently of these forms, we have encountered some cruciform spicules (pl. X, fig. 30) whose center has a single stem with spines from place to place. The end of the arms of these spicules are enlarged and perforated.

The internal organs in this specimen are poorly preserved. We have studied them in other individuals where they are in better condition.

The longitudinal muscles are divided into two. Those of the unpaired radius are smaller than the others. The right respiratory tree alone is preserved in most individuals. However in some, we find only the left respiratory tree. Both of these organs extend the entire length of the body and often they are strongly colored violet. Each organ is composed of a longitudinal canal having numerous lateral arborescent branches.

The two Polian vesicles are equal and 15 to 20 mm in length. The gonads have two bundles of very thin tubes.

SIMILARITIES AND DIFFERENCES. — This species has already been described by Walsh under the name *Benthodytes gelatinosa*. This author reported in his description some observations on the living animal taken by Dr. Giles. The fresh specimen had a yellowish color and was covered by a

thick layer of transparent jelly of a somber violet color, reaching 15 mm in thickness in the living animals and reduced to 5 mm after preservation in alcohol. This violet coloring material is dissolved in alcohol and has stained the labels. Giles reported the presence of lungs “very complex and arborescent”. This latter author has also described the calcareous spicules in the following way: a circular plate, having articulated to it a fan-shaped body so shaped that the whole apparatus is not unlike the badge of a grenadier’s cap.

Ludwig⁵ has already criticized the determination of Walsh in making note that a holothuroid having respiratory trees could not be classed among the elasipods. He placed the species of Walsh in the genus *Pelopatides* and states that it should form a distinct species that is characterized by its fifteen tentacles and by its calcareous spicules. Now in all the specimens of *P. gelatinosus* that we have had in hand, both those that were determined by Walsh as *Benthodytes gelatinosa*, and those that had not been determined by this author, we have always confirmed that the number of tentacles was twenty and not fifteen. On the other hand, as Ludwig said, the peculiar calcareous spicules of *P. gelatinosus* that characterized the species, he had without doubt seen the form of spicules reported by Giles, because Walsh indicated only “a few calcareous spicules and granules in the muscular substance of the body.”

We have not encountered spicules corresponding exactly to the description, moreover very obscure, of Giles. Perhaps they were the cruciform spicules that we have described above, Spicules analogous to the latter have not been reported in *P. confundens* and they could serve to characterize *P. gelatinosus*, but we cannot use the number of tentacles to separate these two species. For us, *P. gelatinosus* is distinguished especially from *P. confundens* by the existence of a very developed marginal border constituted of papillae that remain free for a large part of their length, instead of a weakly lobed border like that of *P. confundens*. Moreover, there are cruciform spicules in the integument.

2. *Pelopatides verrucosus* nov. sp.

Plate X, fig. 25 to 26.

Station 202. Lat. N. 7°4'40". Long. E. 82°2'45". Depth 695 fathoms. 1 specimen.

Station 234. Lat. N. 13°50'30". Long. E. 93°, 20'. Depth 498 fathoms. 1 specimen.

The body is subcylindrical. In one of the specimens, the ventral surface is more convex than the dorsal surface. The length is 130 to 140 mm and the width about 27 mm. The mouth is ventral but sub-terminal. The anus is dorsal and widely open.

It is very difficult to recognize a border on the sides of the body. We find only isolated large papillae, probably about twenty in number and more or less united by their enlarged base that can reach 5 mm in diameter. The conical appendages end in a filiform appendage. Their free part can be 5 mm in length. In the anterior region, the border is very marked and constitutes a peribiuccal collar. Likewise, under the anus, the papillae are very flat, united to each other for the majority of their length. The ensemble constitutes a kind of sub-anal collar whose later part are often more developed than in the middle region.

The ventral median radius has 33 or 34 pedicels of large size, 2 mm in diameter. These pedicels have a blackish end and are arranged in two longitudinal rows that extend a little more

⁵ Reports on an exploration by the U.S. Fish. Commission Steamer “Albatross”. XII. The Holothuriiden. Mem. Mus. Compo. Zoöl., Harvard College, Vol. XVII, No. 3, p. 16, 29 and 20.

than the posterior two thirds of the radius. Toward the posterior region, between the median rows and the marginal row, we see two or three pairs of interradial pedicels.

Each dorsal radius has a row of large conical papillae 5 to 8 mm in diameter at the base and 5 mm in height. We count about fifteen of these papillae in each radius.

The fifteen tentacles end in four whitish mamelons.

The integument is thick and more or less crevassed. It contains calcareous spicules difficult to isolate because of the thickness of the integument and recall those of *Pelopatides confundens* Théel. In the ventral median pedicels are rods (pl. X, fig 25) with bifurcated ends and one or two short extensions in the middle region. We also find triradiate spicules (pl. X, fig. 26) with more or less branched ends.

The longitudinal muscles are very wide except those of the ventral median radius. The right respiratory tree alone is preserved. It is formed of a longitudinal tube extending to the anterior end of the body and that laterally has numerous arborescent branches. The pharynx is little developed. The two Polian vesicles are unequal. The left is 40 mm in length and the right is 30 mm only.

SIMILARITIES AND DIFFERENCES. — *P. verrucosus* is classed among the *Pelopatides* having pedicels on the posterior two thirds of the ventral median radius. It is characterized by the presence of fifteen tentacles, its thick and warty integument, its subcylindrical body with an inconspicuous border and its large ventral pedicels accompanied, in the posterior region, by some interradial pedicels.

3. *Pelopatides mollis* nov. sp.

Station 116. Lat. N. 11°25'5". Long/ E. 92°47'6". Depth 405 fathoms. 1 specimen.

Adaman Islands. 7 mile to the southwest of Ross Island. Depth 265 fathoms. 1 specimen.

The body is a little flattened. Its length is from 110–120 mm and its width is from 20–25 mm. The mouth is ventral. The anus is dorsal and wide open. The color, noted in the living animal from Station 116, was “dark purple”. But the two individuals preserved in alcohol are uniformly grayish.

The ventral sole, slightly convex, is laterally bordered by a weak flange having a row of small appendages very distinct from each other and only 2 to 4 mm in length. We count about thirty marginal papillae on each side. In the anterior region, we find a very developed peribuccal collar of about twenty small papillae fused together by their basal half. In the posterior region, the marginal papillae are also united to form a sub-anal border continuous in one specimen and interrupted in the other in the medial plane.

The ventral median radius has, in its posterior two thirds, about forty pedicels with brownish ends arranged in two rows that correspond posteriorly but alternating anteriorly.

The twenty tentacles have six terminal mamelons.

The integument is very supple and very thick. We have not found any calcareous spicules.

The longitudinal muscles are very developed. The right respiratory tree alone is preserved. It is violet in color in one of the specimens. It is composed of a longitudinal canal that extends up to the anterior end of the body and has very numerous lateral branches. There are two Polian vesicles. They are equal and 12 mm in length.

SIMILARITIES AND DIFFERENCES. — *P. mollis* is very close to *P. gelatinosus* (Walsh). It is separated from it by the marginal border formed of small, thin papillae, very distinct from each other, and by the complete absence of calcareous spicules in the integument. We do not believe that the absence of these spicules is due to an accident circumstance so that they were dissolved in

an acid solution. Finally, the color of the living animal, which was noted in one of the specimens, is different from that of *P. geltatinosus*.

4. *Pelopatides ovalis* (Walsh).

Plate III, fig. 6 and 7; Plate XI, fig. 1 to 4.

Benthodytes ovalis Walsh, Journ. Asiatic Society, Bengal, Vol. LX, Part II, p. 200.
Adaman Islands. Depth 490 fathoms. 1 specimen.

The oval body is very flat and the dorsal surface slightly convex. The length is 60 mm and not 65 mm as Walsh indicated in his diagnosis. The total width is 35 mm.

Walsh said that the color is "deep purple". This designation should be applied to the living animal because the specimen was grayish when it was sent to us. The ventral median radius is blackish and the numerous skinned parts are whitish.

The body is completely surrounded by a very developed border, reaching a greatest width of 8 mm. On its periphery, this border is raised in some parts in small elevations that are especially apparent in the anterior and in some places in the lateral parts.

The slightly prominent mouth is ventral and its center is 5 mm from the anterior border. Walsh says that the anus is terminal, but we note that it dorsal and located 3 mm from the posterior border.

The ventral median radius has twenty two pedicels located in the posterior two thirds of the body in two rows that regularly alternated with each other. These pedicels are retracted and their ends are blackish.

On the dorsal surface, we distinguish on each side a marginal row of papillae. On the left, we count a half dozen and on the right three only. In addition to these small papillae, there is a pair of large longer and wider appendages inserting nearer the median line and that do not appear to belong to the marginal rows. It seems thus that each dorsal radius has two unequal rows of papillae.

The integument is rugose because of the presence of numerous calcareous spicules. In the wall of the body these spicules have the form of tripods supporting in the center a short stem ended in three hooks (pl. XI, fig. 1 and 2). The branches of the tripods more or less dichotomize at their free end. Often these branches anastomose (pl. XI, fig. 1, *a*, *c*) and thus constitute a terminal perforated disk with a large central opening and some peripheral openings.

The dorsal papillae contain triradiate spicules (pl. XI, fig. 4) and straight or slightly arched rods, bifurcated at the ends (pl. XI, fig. 3), sometimes even having lateral branches.

The muscle bands are divided into two.

The right respiratory tree alone is preserved. It extends up to the anterior end of the body and is composed, like all the respiratory trees of *Pelopatides* of a canal having lateral branches in arborescent tufts.

The two Polian vesicles are equal and located on either side of the ventral median radius.

The gonads form a single tuft.

SIMILARITIES AND DIFFERENCES. — *P. ovalis* belongs to the group of *Pelopatides* with the medio-ventral radius having pedicels on the posterior two thirds. It is distinguished from all the species described previously by its oval form, the arrangement and form of the dorsal appendages and also by its calcareous spicules.

5. *Pelopatides modestus* nov. sp.

Plate II, fig. 2; Plate XI, fig. 24 to 26).

Station 224. Lat. N. 13°50'30". Long. E. 93°26'. Depth 498 fathoms. 1 specimen.

Station 114. Lat. N. 15°5'3". Long. E. 72°38'10". Depth 696 fathoms. 1 specimen.

The two specimens are of very large size. The first individual is 220 mm in length and 70 mm in width. The second is 250 mm in length and 70 to 75 mm in width.

The body is very flat and has a violet integument. The entire periphery is surrounded by a border constituted of papillae more or less separated and weekly united to each other at the base. The development of these papillae is very variable and pass insensibly from isolated very long papillae 15 mm in length to very low papillae that together has rather the form of a festoon. The base of the marginal papillae appears to be covered at several points by a ring formed at the expense of the latero-dorsal interradius. Hérouard has already observed a similar fact in his *Pelopatides atlantica*.

On the ventral sole and following the unpaired radius, we note a brownish violet band that, in the posterior third only, has strongly retracted pedicels with a brownish terminal disk. These pedicels, at first very spaced, become denser and more numerous toward the posterior end. There are twenty in all and form two alternating rows.

The ventral mouth is located some distance from the anterior border. It is surrounded by sixteen brownish, very distinct tentacles, whose terminal disk has three pairs of whitish tubercles.

The anus is dorsal. It is located in the posterior region of the body. Its periphery is whitish.

In the specimen from Station 224, the dorsal surface, which is in a good state of preservation, is completely naked. In the other specimen, we can recognize a papilla on each dorsal radius. Perhaps there had been others, but the specimen is in too poor a condition to permit any confirmation on this point.

The integument in the two individuals has a gelatinous consistency. The marginal papillae contain two kinds of calcareous spicules. Some (pl. XI, fig. 24) are strongly spinose. The others (pl. XI, fig. 25 and 26), more massive than the preceding, have some rare spines and are in the form of rods or triradiate spicules whose ends have numerous tips.

SIMILARITIES AND DIFFERENCES. — *P. modestus* belongs to the group of *Pelopaides* whose medio-ventral radius has pedicels on the posterior half. It is near *P. aspera* Théel by its flat body but it is distinguished from it by numerous characters: its border formed of very marked festoons and covered with a dorsal fold, the number of its tentacles that is sixteen instead of twenty in *P. aspera*, the form of its calcareous spicules and finally the absence of dorsal appendages.

6. *Pelopatides insignis* nov. sp.

Plate II, fig. 1; Plate XI, fig. 22 to 23.

Station 133. Lat. N. 15°43'30". Long. E. 81°19'30'. Depth 678 fathoms. 1 specimen.

This species reaches large dimensions. The body is oval and flat. It measures 280 mm in length and 62 mm in width. The color is uniformly violet grey. The mouth is ventral, prominent and located 15 mm from the anterior border. The anus is dorsal.

The periphery of the ventral sole is limited by a continuous border of marginal festoons, wide and short in the lateral regions of the body and passing insensibly to more or less elongated papillae in the anterior and posterior regions. This border is covered, on the dorsal side, by a lateral projection of the body that continues forward to above the peribuccal collar.

The ventral median radius has pedicels only in its posterior third and these are arranged in pairs. We count only four pairs of these appendages.

On the dorsal surface, the left radius has eleven short papillae, distributed in a row the entire length of the body except, however, in the middle region of the radius where the papillae are paired. The right dorsal radius is skinned in large part, but in the preserved regions we find papillae that correspond to those of the left radius.

The tentacles end in a disk with several mamelons. It has been impossible for us to count them.

The integument is very thick, rigid and it is this circumstance that the specimen must have preserved the general form. The lateral regions seem to have had the least resistance. They are cut and the specimen is divided into two a little above the lateral fold.

The marginal festoons of the integument has spicules in form of rods. Some are simple and strongly spinose like those of fig. 22, pl. XI. The others (pl. XI, fig. 23) have bifurcated ends with some tips.

The longitudinal muscles are very developed.

The two Polian vesicles are 25 mm in length. There is no trace of the other viscera.

SIMILARITIES AND DIFFERENCES. — This species recalls our *Pelopatides modestus* by its large size and its oval form, while the presence of a more or less festooned marginal border and in part covered by a lateral flange. Moreover the mouth and anus have the same position, the tentacles end in mamelons and the spicules of the integument are identical. The two species are thus very close, but *P. insignis* has a rigid integument and numerous dorsal papillae, while *P. modestus* has a more or less flaccid integument and has not the least indication of dorsal papillae. The exterior appearance of the two specimens is very different and we believe it is necessary to separate them specifically.

7. *Pelopatides mammillatus* nov. sp.

Plate I, fig. 7.

Station 287. Lat. N. 21°8'30". Long. E. 65°47'. Depth 1506 fathoms. 2 specimens.

We place under this name two specimens in very bad condition coming from the same station. The first is entire, but the dorsal surface is scraped. It measures 200 mm in length and 120 mm in width. The second lacks its anterior region. The preserved part is 120 mm in length and about 60 mm in width.

The dorsal and ventral surfaces are slightly convex. The entire body is surrounded by a very thick and wide border that can be 20 to 85 mm. This border is blackish or violet in color. The rest of the body is whitish and grayish. In the complete specimen, we see some blackish bands on the two surfaces. The ventral mouth is located 40 mm from the anterior border. The anus is dorsal.

The marginal border has on its edge a series of small conical papillae 2 to 4 mm in diameter at their base and 1 to 3 mm in length. Toward the anal region, these papillae are less distinct and the sub-anal collar appears to be formed of lobes.

The ventral median region has three or four pairs of pedicels. Perhaps there are more of them but in any case they are always localized in the completely posterior region of the radius.

The incomplete specimen has on the dorsal surface and in the posterior part a series of irregular mamelons, widened transversally, of which some are covered with a small papilla. Anteriorly, these mamelons become less distinct. The papillae tend to be arranged in four paired rows that doubtlessly extended the entire length of the body. In the entire specimen, we find again in the posterior region the indication of these mamelons, but as we have said, the dorsal surface is completely skinned has no appendages.

The tentacles are retracted and difficult to count. We can distinguish about a dozen.

The integument is thick and contains no calcareous spicules.

The entire specimen alone can furnish some information on the internal organization and again the viscera are in large part expelled. The longitudinal muscles are very developed and divided into two. The right respiratory tree alone is preserved. It is composed of a longitudinal trunk extending the length of the body and has from place to place arborescent branches.

The two Polian vesicles are unequal. The left vesicle is 16 mm in length and the right is only 10 mm. The pharynx is not very developed.

SIMILARITIES AND DIFFERENCES. — *P. mammillatus* is placed in the *Pelopatides* whose ventral median radius has pedicels only in its posterior third. It is characterized by dorsal mamelons surmounted by a papilla and by the more or less regular arrangement of these papillae in four rows.

BENTHOTHURIA Rémy Perrier.

The genus *Benthothuria* was established by R. Perrier according to some specimens collected by the “Travailleur” and the “Talisman”. The genus is close to *Pelopatides*. As in the latter, the ventral sole is clearly limited by a continuous row of papillae and the ventral median radius has a double row of pedicels that are present only on the posterior two thirds of the body. The most important differences between these two genera are the following:

Benthothuria has a cylindrical form and the marginal border is constituted of isolated small papillae, while *Pelopatides* has a flat ventral sole and a lateral very developed flange. In addition, *Benthothuria* has, on the dorsal surface, numerous papillae irregularly distributed over its entire extent. On a specimen of *B. funebris* R. Perrier that we have been able to examine, we note that the papillae exist not only on the dorsal surface but also on all the ventral surface. They are small and whitish.

In his description of *B. funebris*, R. Perrier says that the ventral median radius has two rows of large appendages, each containing a swollen base and a short, fine stem, ending in a kind of mamelon. We observe, moreover, that the base itself can have some mamelonated protruberances, that it can extend in the direction of the radius and fuse with neighboring bases. As a result, the unpaired radius often has two longitudinal ridges coming from the more or less complete union of the pedicels. This arrangement is very peculiar and we find it in the new *Benthothuria* that we shall study below. However it cannot be considered as characteristic of the genus and it is lacking in *Benthothuria fusiformis* (Sluiter), placed with doubt by Sluiter in the genus *Pelopatides* that we transfer to the genus *Benthothuria*. As for the doubling of the marginal pedicels on a more or less large part of the posterior region of the body and the formation of a row of appendages in the ventral radius that results, we think that these are simple specific characters. Thanks to the kindness of Mr. Max Weber, we have been able to study the type of *Pelopatides fusiformis* Sluiter. We can

confirm the description of Sluiter to which we shall the following remarks. The dorsal surface has numerous small tube feet, very thin, whitish, visible on the parts that are not skinned. In the posterior region of the body on the ventral surface, we find, toward the marginal border, a row of pedicels that are especially visible on the left side, where we count five. The end of these pedicels is blackish. By these characters, *P. fusiformis* Sluiter is near *Benthothuria funebris* R. Perrier.

To these two species that comprise up to the present the genus *Benthothuria*, we add two others discovered by the "Investigator" so that presently the genus *Benthothuria* contains in all four species:

Benthothuria funebris R. Perrier

Benthothuria fusiformis (Sluiter)

Benthothuria cristatus nov. sp.

Benthothuria distortus nov. sp.

After the comparative study we have made of these four species, we think it is appropriate to modify the diagnosis of the genus *Benthothuria* in the following fashion:

Twenty (?) tentacles; stone canal fused to the body wall. The body is more or less cylindrical, often having a slight constriction before the circle of tentacles. The mouth is ventral and terminal. The anus is subdorsal. The sole ventral, convex, is limited by a slightly projecting border constituted by a row of papillae. The ventral median radius has on its posterior two thirds some pedicels often modified and taking the appearance of ridges. The dorsal surface, and sometimes other regions of the body, is covered with very numerous and dense small appendages, especially visible on the sides of the marginal row.

1. *Benthothuria cristatus* nov. sp.

Plate I, fig. 4.

Station 255. Lat. N. 9°26'30". Long. E. 91°56'30". Depth 869–913 fathoms. 1 specimen.

The body is more or less curved and sub cylindrical, but the ventral region is flatter than the dorsal region. Its length is 60 mm and the width is 14 mm.

The general color is violet black. The dorsal surface, clearer, is a violet gray. The mouth is ventral and nearly terminal. The anus is terminal and wide open.

The ventral sole is limited by a row of large papillae with the end mamelonated and reduced, constituting a kind of ridge of violet black. It is continuous on all the periphery of the body in forming a peribuccal and sub-anal collar. On the posterior two thirds of the ventral median radius, we find a double row of pedicels, in general flattened laterally and also forming very ridges very irregular in form and dimensions. Some of these pedicels end in a simple mamelon. In the anterior region, these appendages are separated from each other, but behind they are often joined, fused, and constituting then very developed longitudinal ridges.

The tentacles, probably about twenty, also have mamelonated ends.

Between the large appendages of the marginal border, we distinguish fine whitish papillae, distributed on the latero-dorsal interradius and probably on all the dorsal surface. They appear to be missing on the ventral surface of the body.

There are no calcareous spicules, neither in the tentacles and the different appendages, nor in the body wall, nor in the gonads.

The right respiratory tree alone is preserved. It is formed of a longitudinal canal, colored whitish gray, that extends up to the anterior part of the body and that has numerous arborescent whitish branches.

The longitudinal muscles are very developed. The ventral muscles are wider than the others.

The two Polian vesicles are unequal. The left vesicle is 18 mm wide and the right 8 to 9. The stone canal is attached to the body wall.

The specimen collected by the "Investigator" is a female that has two bundles of whitish, bundles of gonadal tubes with branches.

SIMILARITIES AND DIFFERENCES. — *B. cristatus* greatly recalls *B. fusiformis* placed by Sluiter in the genus *Pelopatides*, but we have been able to compare our specimen with the type of the "Siboga" and can confirm that the two species are different. The two specimens have nearly identical size and appearance. The ventral sole is slightly flattened and violet in color. The dorsal surface is elevated and even skinned in both cases. The periphery of the body has a row of distinct papillae that is continuous, anteriorly, above the mouth and behind, below the anus. Finally, numerous small papillae occur on the lateral parts of the dorsal region. But in *B. cristatus*, the marginal papillae of the border are more developed than in *B. fusiformis* (Sluiter) and form true ridges. They are always arranged in a single row while in *B. fusiformis*, they make a double row in the posterior part of the body. Finally, in *B. cristatus*, the ventral median pedicels, very developed and in the form of ridges, extend onto the radius much more anteriorly than in the species of Sluiter.

2. *Benthothuria distortus* nov. sp.

Plate III, fig. 5.

Station 192. Lat. N. 15°11'. Long. E. 72°28'45". Depth 912–931 fathoms. 1 specimen.

The body is 50 mm in length and 7 to 8 mm in width. It is a little flattened laterally, but the dorsal and ventral surfaces are both convex. The general color is grayish white. The mouth is ventral, but the buccal region is slight raised and appears terminal. The anus is terminal and perhaps slightly dorsal.

The ventral surface is limited by a row of short, very distinct papillae. There are about thirty on each side. In the anterior region, there are about twenty of these papillae, some of which reach 3 to 4 mm in length, making a kind of peribuccal collar. Behind, we find in some places two papillae located on each side instead of one but the lateral rows do not seem to join under the anus.

What is particularly striking in this species is the presence, on the ventral median radius, of kinds of shields or thick plates, whitish, with irregular contours and mostly transversally elongated. Each plate has one or two pedicels. These pedicels number about twenty and are arranged in two longitudinal rows alternating more or less irregularly with each other. The shields extend about 37 mm and stop 5 mm before the anus.

The latero-dorsal interradius and the dorsal interradius are covered with a multitude of small whitish appendages that we find here and there on the ventral surface.

The eighteen (?) tentacles have, in general, a terminal disk formed of several mamalons. The dorsal tentacles nearly always have a digitated end.

Calcareous spicules are completely lacking.

The longitudinal muscles are double and wide. There is only the right respiratory tree.

The two Polian vesicles are unequal. The stone canal is attached to the dorsal body wall.

SIMILARITIES AND DIFFERENCES. — *B. distortus* must be placed in the genus *Benthothuria* as we have defined it. It approaches *B. fusiformis* (Sluiter) and our *B. cristatus*, but it differs from them by the appendages of the unpaired radius that are supported on the very curious shields. The characters of the marginal papillae and especially the peribuccal collar again separates *B. distortus* from the other species of the genus.

DENDROTHURIA nov. gen.

We separate from the genus *Pelopatides* in order to make the type of the genus *Dendrothuria*, a holothuroid whose tentacles, about twenty, resemble those of dendrochirotes and whose pharynx has a remarkable development to the point of occupying at least the anterior fourth of the body.

The body is sub-cylindrical. The mouth is sub-ventral and the anus terminal. The sides of the ventral surface are limited by long and distinct papillae arranged in a longitudinal row. In the anterior region, these papillae are united at their base in a kind of collar. A little before the mouth, the papillae are very developed and their ends are slightly swollen. The tentacles, about twenty, recall those of dendrochirotes. The ventral median radius has some pedicles that, in our single specimen, are seen in the posterior third. Moreover, we distinguish small filiform and very dense appendages that are distributed either between the large marginal papillae or on the other radii or interradius.

The genus *Dendrothuri*, as we understand it, is thus especially characterized by the form of the tentacles and the enormous development of the pharynx. Perhaps also it is necessary to consider, as a generic character of *Dendrothuria*, the presence of large marginal papillae and of pedicels on the medio-ventral. Now, among the *Pelopatides* of the "Siboga," *P. megalopharynx* Sluiter has these two first characters. We shall even note that the resemblance of the tentacles to those of a dendrochirote is even closer than in our specimen, as we have been able to verify ourselves in the original specimen of Sluiter. But in spite of all our investigations, it has been impossible for us to find an indication of the filiform appendages that we report above. Perhaps the absence of these appendages is the result of inadequate preservation. Whatever it is, we are inclined to think that *Pelopatides megalopharynx* should be placed in our genus *Dendrothuria* because of the development of its pharynx and the form of the tentacles. These two characters appear very important to us and justify the creation of a new genus. As for the small filiform appendages that we observe in the specimen of the "Investigator" and that we do not find in *P. megalopharynx*, we cannot introduce it into the diagnosis of the genus *Dendrothuria* while their existence cannot be confirmed in other species.

1. *Dendrothuria similis* nov. sp.

Plate III, fig. 2; Plate XI, fig. 8 to 12.

Station 104. Lat. N. 11°12'47". Long. E. 74°24'30". Depth 1000 fathoms. 1 specimen.

The body is sub-cylindrical. The length is 110 mm by 20 to 80 mm in width. The color is violet gray. The mouth is terminal but ventral. The anus is sub-dorsal and wide open.

The ventral surface is slightly flat. It is surrounded on the sides by a row of twelve to fourteen very distinct papillae. On the posterior two thirds of the body, they can reach 10 mm in length.

Their base is relatively little enlarged. Toward the anterior third, some marginal papillae have a very great development. They widen, their ends are sometimes swollen into a club and they are connected to each other by their basal part, making thus a deep violet border that continues toward the anterior region but whose end is represented only by debris. At the posterior end, we recognize a very small sub-anal blade, having some lobes.

The ventral median radius is skinned on part of its length. It has, in the posterior region, six pedicels. The anterior four are arranged in pairs and located respectively at 18 mm and 24 mm in front of the anus. On the entire length of the body, the integument has a warty aspect. A grayish yellow filamentous material more or less hides the different details of the surface. This material very probably comes from the maceration of the integument. However, in the anterior region, we clearly distinguish, between the large marginal papillae, small whitish filiform appendages that can reach 5 to 6 mm in length, more or less twisted on themselves and lying against the integument. They are distributed on the latero-ventral radius and they also appear on the ventral and dorsal interradii.

The tentacles, probably 18 to 20 in number, greatly recall those of dendrochirotes. They are composed, in fact, of a long principal stem having at its end some lateral branches. These form a palm-shaped disk having small round spicules on its internal surface.

The integument, as well as the wall of the gonads, contains spiny spicules. Some (pl. XI, fig. 10) are simple spiny rods of very different sizes but can become very long. Others (pl. XI, fig. 8, 11, 12) have two or three and sometimes even four branches with bifurcated ends and having small spines all along their length. Still others (fig. 12c) have a central rod with lateral branches at different places. Finally, some spicules (pl. XI, fig. 9)) are much rarer than the others. They have the form of a cross with four more or less curved branches and that end in a more or less expanded perforated disk. These disks have a central opening surrounded by two smaller openings. The center of the cruciform spicule has a club ending in numerous tips.

The longitudinal muscles are single. Those of the bivium are wider than those of the trivium and among these the muscle of the unpaired radius is more developed. The pharynx takes an enormous development. It has the form of a smooth conical tube 25 mm in diameter at its base and gradually connecting to the rest of the digestive tube.

The two Polian vesicles are 18 to 20 mm in length.

Only the right respiratory tree is preserved. It is constituted by a longitudinal trunk with numerous arborescent branches.

SIMILARITIES AND DIFFERENCES. — We have indicated above the reasons why we place *Pelopatides megalopharynx* Sluiter into the genus *Dendrothuria*. *D. similis* is near the latter species. It differs from it especially by the presence in the integument of calcareous spicules that, according to Sluiter, are lacking in *P. megalopharynx*. We have also said that the numerous small filiform appendages that cover part of the surface of the body of *P. similis* do not appear to exist in the species of the “Siboga”. Sluiter says that *P. megalopharynx* has a completely naked central ventral median radius. It seems he has made a mistake. We have examined the types of *P. megalopharynx* and we have confirmed in this region four pedicels of which two are arranged in a pair and two others, located at different places, are wider than the preceding. These appendages are very developed. It is certain that it would not escape an observer as conscientious as Sluiter and we suppose that this author had taken for them shreds of the integument. But the form of these appendages and especially the deep color that they have at the end leaves no doubt about their true nature.

PSEUDOTHURIA nov. gen.

We have believed necessary to establish this new group to include a holothuroid with multiple affinities that recall at the same time the genera *Pelopatides*, *Dendrothuria* and *Benthothuria*, without however being able to be classified in any of them.

The body is cylindrical as in *Dendrothuria* and *Benthothuria*. The ventral sole is limited by large, very distinct papillae on the sides of the body and constituting anteriorly a peribuccal collar and posteriorly a sub-anal blade.

As in *Dendrothuria*, the tentacles also have the character of a dendrochirote but much less marked than in this latter genus. The body surface has numerous small thin and elongated filamentous appendages, as in *Dendrothuria similis* and *Benthothuria*. The pharynx does not have the remarkable development that we confirm in *Dendrothuria*. The pedicels of the ventral median radius are more numerous than in *Dendrothuria*. They extend onto the posterior half of the radius and recall by their form those of *Dendrothuria megalopoharynx* (Sluiter) and especially those of *Benthothuria*.

None of these characters is particularly special to the genus *Pseudothuria*, but the combination constitutes a very clear ensemble to characterize it in a sufficient manner.

1. *Pseudothuria duplex* nov. sp.

Plate IV, fig. 3.

Station 272. Lat. N. 12°41'45". Long E. 73°40'30". Depth 902 fathoms. 1 specimen.

The body is sub-cylindrical with the ventral surface slightly flat. The length is 160 mm and the greatest width 40 mm.

The specimen is a little twisted and skinned in part. Its general color is reddish brown. The mouth is nearly terminal. The anus is slight dorsal and wide open.

The ventral sole is limited laterally by large papillae, slightly conical, with an enlarged base. Some are 14 mm in length and 6 mm in diameter at the base. In the anterior region, we note that the papillae are connected at the base and constitute a rudiment of the peribuccal collar. We also recognize under the anus a slight transverse border with slight marked lobes.

The ventral median radius has about twenty pedicels that extend 60 mm in front of the posterior region, i.e., on nearly the posterior third. These pedicels are unequally distributed in two rows. Some are in part strongly pigmented in black and others are elongated, flat in the distal region and even bifurcated.

Around the large marginal papillae are arranged small appendages, thin, whitish and very numerous. We find them in different regions that are still intact and they seem to extend over a large part of the body. But it is impossible for us to indicate their distribution exactly. Perhaps they leave free the ventral and dorsal regions.

The dorsal region has, on each radius, large papillae arranged in a single row. The bad condition of the specimen does not permit exact counting of these dorsal papillae. In any case, they are less numerous than the marginal papillae.

The twelve tentacles have a strongly cut terminal, supported by a very long stem. Those that are not retracted recall a little the tentacles of dendrochirotes because of the prominence of one of the lobes over the others. We have found no calcareous spicules in the integument.

The longitudinal muscles are wide and divided.

The right respiratory tree along is preserved. It reaches the anterior end of the body and is constituted of a wide, whitish longitudinal canal having on its sides yellowish arborescent branches.

The two Polian vesicles are equal, 32 mm in length. In the internal tentacular circle, we distinguish numerous small spherical grains whose contents is whitish and opaque.

The pharynx has a thick wall. It measures 15 mm in length and then passes insensibly to the digestive tube whose diameter is very small and does not exceed 3 mm. At 75 mm from the buccal end, there is a caecum 25 mm in length and 10 mm in diameter whose wall is constituted by obliquely crisscrossed fibers.

The gonads are formed of a mass of very long tubes, sometimes anastomosing.

ALLOPATIDES nov. gen.

We separate from the genus *Pelopatides*, in order to make the type of a new genus, a holothuroid represented by a unique specimen that is distinguished by the following characters:

The body has a ventral sole limited on the sides by a row of isolated papillae, anteriorly by a peribuccal collar and posteriorly by a sub-anal collar.

The ventral median radius has no pedicel, while the posterior region of the body has a small number of interradial pedicels.

The calcareous spicules are very peculiar. They have in fact a dendroid form (pl. XI, fig. 20) and are composed of a central rod more or less extended whose ends dichotomize a large number of times. The dichotomy is not always very regular and the spicules as a result have very variable forms. Similar calcareous spicules have not been recognized in *Pelopatides* and this character, along with other differences mentioned below, appears to us to justify the creation of a new genus.

1. *Allopatides dendroides* nov. sp.

Plate III, fig 1; Plate XI, fig. 20.

Station 254. Lat. N. 11°16'30". Long. E. 92°58'. Depth 669 fathoms. 1 specimen.

The single specimen in the collection of the "Investigator" has a length of 140 mm and a width of 40 mm. It has a uniformly grayish color. It has a flat, very distinct ventral sole and a more or less cylindrical dorsal region. The mouth is ventral and slightly prominent. The anus is dorsal and placed at the posterior end of the body. It is wide open.

The ventral sole has on its entire width a median swollen part 14 mm in width and with slightly set back lateral borders. The entire periphery is garnished with isolated marginal papillae. There are about thirty on each side and whose length varies between 4 and 8 mm. Anteriorly these papillae pass above the mouth and posteriorly they go under the anus. In the anterior region, the papillae are thinner and can reach 10 mm in length. They are also denser. We count seventeen in the region that surrounds the mouth. At their base, these papillae are connected by a membrane that, all together, makes at the anterior end, a kind of continuous collar, violet in color. In the posterior region, the papillae widen and end by fusing into a sub-anal collar. In the lateral parts, the papillae are very separated from each other. However, their basal regions are enlarged and seem sometimes connected by an inconspicuous membrane. It is possible that in the living animal,

there is a continuous border going all around the body and attenuating on the lateral parts. But the state of preservation of our specimen does not allow us to say categorically on this point.

It is very difficult to distinguish the pedicels on the ventral surface because the skin is in small shreds that look like appendages. In spite of all our investigations, we have not been able to confirm with certainty pedicels on the ventral median radius and we are inclined to think that appendages there are lacking. However, in the posterior region, we have observed three pairs of isolated pedicels. But it is necessary to note that these are not located on the ventral median radius. They are located on the sides of the swollen region of the ventral sole and thus seem to belong to the latero-ventral interradius.

Each radius of the dorsal surface has a single row of small papillae, 17 to 19 for each radius. In the middle region, these papillae are sometimes arranged in two rows.

The integument is very thick and supple. It contains, especially in the marginal papillae, very characteristic calcareous spicules (pl. XI, fig. 20), whose form we have indicated in the diagnosis of the genus *Allopatides*.

We can give only few details on the internal organization, our specimen having expelled most of its viscera. The longitudinal muscles, especially those of the ventral radii are very developed. The right respiratory tree is alone preserved. It is violet in color and extends up to the buccal region. It is constituted of a very wide longitudinal canal with laterally two series of branches more or less arborescent.

The two Polian vesicles are unequal. The right vesicle is 10 mm in length and the left 15 mm. The pharynx is little developed. The digestive tube that follows is 5 mm in diameter and has a yellowish color. On the portion that is preserved and whose length is 9 centimeters, we have found no lateral diverticula.

PERIZONA nov. gen.

The flat body is surrounded by a very developed lateral border, formed of marginal papillae that are wide, connected to each other for a large part of their length and whose free end is very developed. The ventral median radius has on the posterior third some pedicels arranged in two rows. The lateral radii have on the ventral surface and toward the insertion of marginal papillae, a row of pedicels the entire length of the radius. There are ten to twelve tentacles. The calcareous spicules are formed of rods more or less branched and spinose.

The genus *Perizona* differs from the genus *Pelopatides* by the considerable development of the lateral border and the presence on the ventral surface of the body of a row of pedicels the entire length of the latero-ventral radius.

1. *Perizona magna* nov. sp.

Plate I, fig. 1; Plate V, fig. 4; Plate XI, fig. 21.

Laccadive Islands (75 miles to the west of the coast of Goa). Depth 740 fathoms. 2 specimens.

The two specimens have some differences and we describe them successively.

The best preserved specimen has the appearance of parchment, as if it had been first dried and then placed in alcohol. Its body is very flat and violet in color. Its length is 210 mm. It is completely surrounded by a very developed border but that is torn off on the left side. Assuming

that the border on this side had the same width as the other, the total width of the body would be 60 to 70 mm, the border having 18 to 20 mm on each side.

The mouth is central and its center is located 15 mm from the anterior region. It is slightly prominent and its periphery is grayish white. The anus is clearly dorsal and is located 10 mm in front of the posterior border, on a slightly convex part.

The border is constituted of conical papillae, free at their distal end but united to each other by their wide bases. There are about thirty of these papillae on each side of the body. Anteriorly and posteriorly, the papillae are shorter and less distinct, and their ends are rounded. The ensemble constitutes then a simply festooned border.

On the ventral median radius, we find some pedicels but in the posterior region of the body only. We count four pedicels to the right and five to the left that are more or less exactly arranged in pairs. All are contracted. Perhaps there are other pedicels in the completely posterior region of the ventral sole but, because of the condition of preservation of our specimen, we can say nothing about this.

On the sides of the ventral sole, between the base of the marginal papillae and the median radius, we find from place to place in the posterior region five elongated pedicels, violet in color. Despite the most attentive investigations, it has been impossible for us to find on the left side any semblance of pedicels. This is why we have shown them only on the right side of our figure. These pedicels must correspond to the ventral series of the lateral radii and of the trivium, the marginal papillae of the border constituting the dorsal series of these same radii.

On the dorsal side, we find only two papillae located on the right radius. One is 70 mm from the posterior border, the other is 145 mm.

The tentacles, strongly retracted into the interior of the buccal cavity, number 10 to 12.

The integument is thin and like parchment. It contains, especially in the border, spinose calcareous spicules (pl. XI, fig. 21) and more or less branched.

The animal has completely expelled its viscera. The right respiratory tree alone is preserved. It is constituted of a longitudinal canal that extends up to the anterior region of the body and has numerous arborescent branches. The longitudinal muscles are unequally developed. Those of the unpaired radius are much wider than those of the lateral radii.

The second individual is more poorly preserved than the other. The dorsal surface of the body is skinned and the border is missing in several places. Its length is 190 mm and its total width is about 50 mm. The width of the border can be estimated as 12 mm on each side.

The ventral mouth is slightly prominent and surrounded by a whitish border. In its interior we find twelve retracted tentacles. The anus is obviously dorsal and wider open than in the preceding individual.

The border is composed of marginal papillae, widened at their base and united with them for a large part of their length. As in the preceding example, the border is simply festooned in the anterior and posterior regions of the body. The ventral median region has, in its posterior third, seven to eight pairs of pedicels. These are thus more numerous than in the other individual. In contrast, we cannot find in the lateral radii the elongated pedicels that we have reported in the other specimen. This is not surprising because of the poor state of preservation of the specimens.

The calcareous spicules are identical in the two individuals.

The jar that contained these two specimens were labeled *Apodogaster magna*. This is a manifest error not only because Walsh has not described in his preliminary note *Apodogaster magna*, but there is nothing in common between these two holothuroids and the genus *Apodogaster* as it was defined by Walsh and whose type is *A. Alcocki* Walsh.

BATHYZONA nov. gen.

The exterior form is the same as in the genus *Pelopatides*, i.e., the body has a distinct, flat ventral sole, surrounded by a very developed marginal border.

The pedicels of the ventral surface are localized in the posterior region, but instead of being limited to the median radius, they form four distinct rows, two median and two lateral that are very close to the border. The tentacles are few in number. We count nine in our type specimen, but it is probable that it is missing some.

The dorsal surface, very convex, has projecting tuberosities scattered on all its expanse. The calcareous spicules recall those of some *Pelopatides*. They are formed of a tripod at the center of which is a vertical stem

1. *Bathyzona incerta* nov. sp.

Pl. I, fig. 2 and 3; Pl. XI, fig. 5 to 7.

Station 121. Lat. N. 14°35'15". Long. E. 72°2'37". Depth 1140 fathoms. 1 specimen.

The specimen is in very bad condition. A large part of the dorsal surface is torn off. The peribuccal region is altered and the internal organs are missing. In spite of these bad conditions, this individual has however characters so peculiar that we have not hesitated to make it type of a new genus.

The ventral sole is grayish, a little concave and surrounded on all its periphery by a wide continuous border. What remains of the dorsal surface shows that it was strongly convex and blackish.

The length of the specimen is 75 mm and the width 37 mm. The ventral mouth is located 12 mm from the anterior border. The dorsal anus is about 7 mm from the posterior border. It is located on a sub-truncated region.

The border has a width greater than 10 mm and its free flange is festooned. The festoons have sensibly the same development their entire periphery except perhaps in the posterior region where they are a little less projecting. Each festoon is about 1 mm in height and 1 ½ mm in width at the base. The top is slightly rounded. We count about forty of these festoons in each half of the border.

The ventral surface of the body appears granulose, principally toward the border. We note, on the posterior region of the ventral median radius, protuberances, irregularly arranged whose center has a retracted pedicel. It is very difficult to distinguish these protuberances from other granulations of the integument. They seem to be arranged in four rows.

The dorsal surface also has some conical tuberosities 1.5 mm in diameter at the base and 1 mm in height. The tip is slightly rounded and grayish. These non-retractile papillae are arranged very irregularly. We find them both in the anterior part and near the anus. In some locations they seem arranged in four longitudinal rows.

We count only nine tentacles, but their number is certainly more because the region that surrounds the mouth is in bad condition and some tentacles must be missing.

The integument has a certain rigidity. In the dorsal region, it contains some calcareous spicules in the form of tripods supporting a central stem (Pl. XI, fig. 5 to 6). The ends of the

branches of the spicule are simply ended in a tip (Pl. XI, fig. 5*a* and 5*c*) or they are they bifurcate and then have numerous tips (Pl. XI, fig. 5*b*). Sometimes the spicule has only three branches (Pl. XI, fig. 7), two located in the extension of each other and the third fixed perpendicular to it in a nodal region. The free end of the two opposite branches has numerous spines.

We can give little information on the internal organization. The longitudinal muscles appear very developed but they are for the most part in a bad state of preservation.

The pharynx has a funnel form very wide toward the buccal region. We find no trace of respiratory trees.

2° Family DEIMATIDAE.

DEIMA Théel.

1. *Deima Blakei* Théel.

Pl. XI, fig. 13 to 15.

Deima Blakei Théel 1886. Reports on the Results of Dredging...by the U.S. Coast. Survey Steamer "Blake". Part XXX. — Report on the Holothurioidea. Bull. Mus. Comp. Zoöl. Vol. XIII, 1886. Pt. 1-2, PL I. fig. 1, 2.

Deima validum Théel. — Walsh. 1891. Journ. Asiatic Soc. Bengal, Vol. LX, Part II, p. 198.

Deima fastosum Théel. — Walsh 1891. Journ. Asiatic Soc. Bengal, Vol. LX, Part II, p. 198.

Laccadive Islands. Depth 880 fathoms. 2 specimens. Gulf of Bengal. Depth 1840 fathoms. 1 specimen.

Station 104. Lat. N. 11°12'47". Long. E. 74°25'30'. Depth 1000 fathoms. 2 specimens.

Station 117. Lat. N. 11°58'. Long. E. 88°52'17". Depth 1746 fathoms.⁶ 1 specimen.

Station 118. Lat. N. 12°20'. Long. E. 85°8'. Depth 1803 fathoms. 2 specimens.

Station 216. Lat. N. 6°55'18". Long. E. 72°51'30'. Depth 767–950 fathoms. 1 specimen.

Station 254. Lat. N. 11°16'30'. Long. E. 92°58'. Depth 669 fathoms. 1 specimen.

Station 257. Lat. N. 21°8'30'. Long. E. 65°47'. Depth 1506 fathoms. 1 specimen.

We unite, under the same specific name, all the specimens collected by the "Investigator" in spite of the numerous variations that they have and attach them to *Deima Blakei* Théel.

Théel had already observed some differences among the specimens collected by the "Blake." It is thus that he recognized, in some specimens, a pair of small pedicels placed before the anus in the ventral median radius. In other individuals, these pedicels are reduced to one or two rudimentary projections and sometimes even they could completely disappear. We have observed ourselves analogous variations for the pedicels of the ventral median radius placed before the anus. The two lateral borders of the ventral sole have a row of pedicels, more or less curved toward the exterior, with rounded and yellowish ends and whose length can vary from 8 to 25 mm. The number of these appendages has some very important variations. Three specimens have ten pedicels on each side, five specimens have eleven pedicels on each side. One other of them has eleven on the right and ten on the left. The last, of very great size, has thirteen on the right and twelve on the left.

⁶ This specimen was figured, seen ventrally, by Alcock. A Naturalist in Indian Seas, 1902. Fig. 90.

The number of large lateral papillae (Frankenpapillen) varies equally. Five individuals have four of them on each side. Another has five of them, another six and finally one individual of very large size has nine of these papillae on the left side and seven on the right side.

Finally, the papillae of each dorsal radius varies from six to nine and are not always arranged in pairs.

All these variations have nothing to do with the size of the individual.

The specimens of the “Investigator” have very different sizes. The smallest specimens include an individual in bad condition 80 mm in length and two individuals in which we have found the curious parasitic gastropod that we have described under the name of *Entosiphon deimatis*⁷ that is 50 to 60 mm in length and 24 mm in width. The middle-size individuals are 90 to 100 mm in length and 40 to 50 mm in width. Finally the two largest specimens measure 120 to 140 mm in length and 55 to 50 mm in width. One of these individuals of large size is greatly convex and the height of its body is about 55 mm although all the other individuals are more or less flattened. In the other large specimen, we count at the center of the disk five peribuccal tentacles whose disk has eight digitations.

The calcareous spicules of the body wall also have very numerous variations. There are three very large ones that can reach up to 5 to 6 mm in diameter. The smallest are only 2 to 3 mm.

These plates are more or less imbricated and fused to each other and, following the arrangement they take, the integument of the individuals is smooth, rugose or even scaly.

In some plates (Pl. XI, fig. 14), the network is simple, but still in these plates, we see on several nodes of the network, rise small stems whose end has extensions in a plane parallel to the plane of the first network. When the number of these new branches increases and when their branches anastomose like we see in other spicules (Pl. XI, fig. 15), the plates then make a double network. Often a third network is produced by the same process and is superposed with the preceding double network. We can, in the same individual, find plates with a single and a double network. This complication is not related to size. E.g., the individual of 140 mm has only a few plates with a single network while smaller specimens have plates with two or even three superposed networks.

The gonads contain calcareous spicules constituted of branched rods (Pl. XI, fig. 18) whose branches can be fused and surround cavities (fig. 18a, 13d, 13f). The edge of these spicules is sinuous and sometimes has spines.

Our observations, added to those of Théel, thus show that *Deima Blackei* is susceptible to variation with very broad limits. We will point out on this subject that some species of *Deima* have been based on characters taken from the form of the spicules or of the number of appendages. We ask ourselves if their distinction is really justified. A revision of these species is necessary.

ONEIROPHANTA Théel.

1. *Oneirophanta conservata* nov. sp.

Pl. VI, fig. 3; Pl. XI, fig. 16 to 19.

Station 150. Lat. N 7°5'45". Long. E. 75°4'. Depth 719 fathoms. 1 specimen.

⁷ Revue Suisse de Zoologie, T. 11, Fasc. 1, 1903, p. 2-41; pl. 2. We realized too late that the name *Entosiphon* had already been applied by Stein to a flagellate; we propose to replace it by the word *Gasterosiphon*.

The body is a little flattened. The ventral surface is flat and the dorsal surface slightly convex. The length is 90 mm by 80 mm in width. The mouth is ventral and located 5 millimeters from the anterior border. The anus is terminal and wide open. The integument is whitish and very rich in calcareous spicules that make the animal very brittle.

The ventral median radius has a dozen rudimentary pedicels 1.5 to 2 mm in length and scattered the length of the radius. They are sometimes arranged in pair. While the anterior pedicel is 5 mm behind the mouth, the two last ones are 10 mm before the anus. On the sides of the ventral surface, each latero-ventral radius has a double row of pedicels 3 to 5 mm in length and clearly arranged in pairs. They are thick and appear contracted. We count 33 to 34 of these pedicels in each radius.

The lateral edge of the dorsal surface has large papillae whose end is generally broken. They can reach 15 mm in length and 4 to 5 mm in diameter at their base. They become a little shorter toward the ends of the body. We count thirteen of these papillae on each side. On each latero-dorsal radius, we find two rows of papillae that are bent and broken but must be very long. They continue up to the anterior end of the body. We count on each dorsal radius about thirteen of these papillae arranged more or less regularly in pairs.

We find only eight tentacles. The others have been lost because there are twenty tentacles in all described *Oneirophata*. Moreover, this buccal region is in very bad condition. The tentacles are short, massive and end in a yellowish disk having a dozen peripheral lobes.

The calcareous spicules of the integument are extremely abundant. They have the form of circular plates (pl. XI, fig. 16 to 17) formed of a calcareous network with very wide meshes in the central part and which become very small toward the periphery. We show (pl. XI, fig. 17) one of these plates in the process of formation. We recognize very clearly the four principal rays that, by the anastomosis of their successive branches circumscribe the different meshes of the network.

The latero-ventral pedicels contain straight or slightly curved rods (pl. XI, fig 18 and 19) with a slightly spinose surface and ends that are pointed and sometimes bifid.

The digestive tube has a very flared rectum next to the anus.

The single Polian vesicle is 5 mm in length. The stone canal is attached to the body wall.

There are two bundles of gonads located to the right and left of the dorsal mesentery.

SIMILARITIES AND DIFFERENCES. — *O. conservata* is near *O. affinis* Ludwig because it has like it a double row of papillae on each latero-dorsal radius. It differs from it, first of all, by the form of the calcareous spicules, then by the number and arrangement of the ventral pedicels. In *O. conservata*, we find in the medio-ventral radius, twelve pedicels scattered the entire length of this radius and the posterior ones 10 mm from the anus. *O. affinis* has only eight or ten pedicels in each radius and the four poster ones are near the anus. *O. conservata* has, on each latero-ventral radius, thirty three pedicels arranged in two rows, the posterior ones are as developed as the others and are located a little before the anus. *O. affinis* has only eighteen to nineteen pedicels in each of these radii. The last ones are much smaller and located behind the anus. Finally, the marginal papillae (Flankenpapillen) number thirteen on each side in *O. conservata*, while *O. affinis* has only seven to eleven.

O. conservata is separated much more from *O. mutabilis* Théel and *O. alternata* R. Perrier that have only a single row of papillae on each dorsal radius and cannot be confused with them.

O. conservata was dredged at a shallower depth than the other species of the genus that all came from depths greater than 2000 meters.

AMPHIDEIMA nov. gen.

The body is oboval and flat. The mouth is ventral and the anus terminal. The ventral median radius is completely naked. Each lateral radius has a double row of pedicels laid back to front on the sides of the ventral surface. There are eighteen tentacles. The calcareous spicules, very numerous, are rods with flat ends that are perforated with a large number of openings.

The genus *Amphideima* recalls the genus *Scotodeima* Ludwig by the double row of pedicels on the ventral surface and by the double rows of dorsal papillae. Its rod-shaped spicules resemble some forms found in *Scotodeima*. It is distinguished from it by the absence of true lateral papillae (Flankenpapillen) and by its completely naked ventral median radius. The same characters and the form of the elongated spicules separate the genus *Amphideima* from the genus *Oneirophanta*.

1. *Amphideima investigatoris* nov. sp.

Plate IV, Fig. 6; Plate XII, fig. 8.

Oneirophanta mutabilis Théel. — Walsh. Journ. Asiatic Soc. Bengal, Vol. LX, Pat II, No. 2, 1801, p. 197.
Andaman Islands. Depth 250 fathoms. 1 specimen.

This species has been referred by Walsh to the genus *Oneirophanta* Théel. Its characters separate it both from this genus as well as from the genus *Scotodeima*, as we have noted above.

The body is oboval and flat. Its ventral surface is flat and the dorsal surface slightly convex. It has a length of 60 mm. In the anterior region the width is 20 mm and it is only 8 mm in the posterior region. The mouth is ventral. Its center is 3 mm from the anterior border; the anus is terminal. The integument is whitish, brittle and very rich in calcareous spicules that form by their interlocking a very dense network, visible with the magnifying glass.

The ventral surface has laterally and on each side, two rows of very developed pedicels with rounded ends and laid back to front on all the marginal border. We count twenty one to twenty two pedicels on each latero-ventral radius. They are generally arranged in pairs, the externals a little longer than the internals. In the middle region of the body, these pedicels are 6 to 7 mm in length and 2 mm in diameter. They are more reduced in the anterior and posterior regions. The ventral median radius is completely naked.

The dorsal surface has on each dorsal radius some very long pointed papillae arranged in one or two rows. In the left internal row we count seventeen papillae extending the entire length of the radius. In the anterior third part there are two rows. In the posterior region, the internal papillae are very developed and reach more than 10 mm in length.

The eighteen tentacles are short and have a lobed disk.

The very dense calcareous spicules are composed of rods (pl. XII, fig. 8), straight or curved whose flat and enlarged ends are perforated with a large number of openings.

The single Polian vesicle is 20 mm in length. The stone canal is very short. We recognize a rudimentary calcareous ring.

The gonad is composed of two bundles of tubes located from place to place on the dorsal mesentery.

OPHNURGUS Théel.

1. *Ophnurgus glaber* (Walsh).

Plate VIII, fig. 3; Plate XII, fig. 1 to 3.

Ophnurgus asper Théel var. *glaber*, Walsh. Journ. Asiatic Soc. Bengal. Vol. LX, Part II, p. 198.
Gulf of Bengal. Depth 561 fathoms. 1 specimen.

This specimen was considered by Walsh as a simple variety of *Ophnurgus asper* Théel, but the differences with the species of the “Challenger” are too great for us to see it from this point of view and it appears necessary to us to make it the type of a new species.

The specimen is especially interesting because it is in a very good state of preservation, while the single individual Théel used to establish his genus *Ophnurgus* was, as the author said, extremely incomplete and so contracted and so folded that it was very difficult to indicate its true aspect.

The specimen is very flat. It measures 150 mm in length and 30 mm in width. It is whitish in color. The end of the pedicels and tentacles is yellowish. The color noted in the living animal was “salmon pink.” The mouth and the anus are both located at the ends of the body. The mouth is slightly ventral.

The ventral median radius is absolutely naked its entire length. On each side, the ventral surface is limited by a row of very developed appendages that can reach 17 to 20 mm in length and 5 mm in diameter at the base. The free end ends in a small spherical mamelon. We count from twenty three to twenty five of these appendages on each side of the body. Posteriorly, these appendages extend to the posterior end, but they shorten as they approach the end. Anteriorly, they disappear at the mouth.

If we consider the dorsal surface, we note that above each of these latero-ventral appendages is found a very elongated and narrow papilla that can reach up to 35 mm in length. As a result, each latero-ventral radius has a double row of appendages. The ventral ones are wider and shorter, the other dorsals thinner and longer. But while the first stop at the mouth as we just said, the latter are continuous up to the anterior end.

Finally, in each of the two dorsal radii, we find a double row of papillae, smaller than the preceding.

Some reach however, 20 mm in length. They extend the entire length of the body and most are clearly arranged in pairs. They are denser than the marginal papillae and each row contains about fifty of them. The size of these appendages varies considerably. There are large and small ones. But we cannot state, as Walsh said, that the large and small ones alternate.

The twenty tentacles are very developed. They are formed of a stem 10 mm in length, surmounted by a yellowish disk 3 mm, peltate and composed of about fifteen lobes.

The integument is thin, parchment like and containing numerous calcareous spicules. They have the form of elongated rods (p. XII, fig. 2 and 3) whose ends are dichotomized one or two times and usually, but not always, in a regular manner. These same spicules are found in the dorsal papillae. Other spicules (pl. XII, fig. 2b) are more massive, sometimes a little swollen in their middle region and their ends are simply bifurcated. We find these rods with dichotomized ends in the latero-ventral appendages. In their terminal region, the pedicels have a large agglomeration of spicules, small and sometimes slightly arched. The tentacles contain rods whose ends are covered with numerous short extensions and divided one or two times (pl. XII, fig. 1).

The longitudinal muscles are single and 2 mm in width. The digestive tube has a double curve and behind the water ring, it has a small projecting ring.

The water ring is more or less crenelated and has an elongated Polian vesicle 40 mm in length. The stone canal opens to the exterior and has a swelling toward its insertion on the ring.

The gonads are formed of two masses of vesicles.

SIMILARITIES AND DIFFERENCES. — The characters of the genus *Ophnurgus*, as it was established by Théel on a single specimen, apply well to our species except however in what concerns the form of the tentacles. Théel said that they are rather large ("rather large") while in our species they are rather slender.

As a consequence of the state of contraction of the dorsal region of the body of his specimen, Théel was not able to establish exactly the position of the papillae. He thought that they became to be arranged into two rows the length of each radius. The perfect state of preservation of our specimen allows us to confirm this opinion.

O. glaber differs from *O. asper* Théel by the form of its tentacles and by the calcareous spicules. *O. asper* Théel has two kinds of spicules in the body wall and in the pedicels: spinose rods with very irregular contours and simply curved rods. These two kinds of spicules are very different from the cruciform spicules that we encounter in *O. glaber*. It is for this reason that it has appeared necessary to us to separate specifically *Ophnurgus glaber* from *O. asper*, instead of considering it as a simple variety of this latter species.

2. *Ophnurgus invalidus* nov. sp.

Plate XII, fig. 9.

Station 279. Lat. N. 11°35'15". Long. E. 80°2'15". Depth 300 fathoms. 1 specimen.

The specimen is in very bad condition. The body is flat. Its length is 50 mm and its width is 20 mm. The anus is terminal and the mouth, although ventral, is located complexly at the anterior end of the body.

The ventral surface is flat and constitutes a sole limited laterally by very large marginal pedicels and can reach a length of 10 mm. We count about thirty of these pedicels. The anterior and posterior ones are relatively smaller than those of the middle region of the body. The ventral median radius is completely naked.

The dorsal surface is slightly convex. It has lateral papillae forming a single row and located immediately above the large pedicels. Each dorsal radius has about sixty papillae arranged in a double row. These papillae can reach 5 mm in length.

The mouth is surrounded by fifteen short tentacles, with an enlarged terminal disk.

The integument is riddled with calcareous spicules, visible with a magnifying glass and only one kind. We also find them both in the body wall and in the pedicels and papillae. They are rods (pl. XII, fig. 9) ending either in digitations or in a slightly enlarged part having numerous small openings and whose border is extended sometimes with small digitations. These two ways of ending of the rods evidently derive one from the other.

The individual is filled with mud and it has not been possible for us to study the internal organization.

SIMILARITIES AND DIFFERENCES. — The generic position of *O. invalidus* is very difficult to establish because it combines at the same time the genera *Ophnurgus* and *Scotodeima*.

It approaches the genus *Ophnurgus* by the presence of a ventral sole with a naked median radius limited by a single row of marginal pedicels, by the existence of lateral papillae above these pedicels and by two rows of appendages the length of the dorsal radii. But it is distinguished

especially by its fifteen tentacles instead of twenty and by its calcareous ossicles. These recall the rods that we find in *Scotodeima*, but they differ by the absence of crossed spicules. Finally, our species has only one row of lateral pedicels instead of two and its ventral median radius is completely naked while *Scotodeima* has rudimentary pedicels.

O. invalidus appears thus intermediary between the genera *Ophnurgus* and *Scotodeima*, but its affinities seem closer to *Ophnurgus*.

Théel brought into his diagnosis of his genus *Ophnurgus* the character taken from the presence of spinose rods. We have been led to place in the genus *Ophnurgus* a species, *O. glaber* (Wash), whose spicules are not spinose. *O. invalidus* has likewise smooth spicules but not having the same form as in *O. glaber*. It is distinguished especially by the number of tentacles. It would thus be necessary to modify the diagnosis of the genus *Ophnurgus* by mentioning that the number of tentacles can vary from 15 to 20 and that the spicules are not strongly spinose as Théel had observed in the single species that served him to establish the genus.

LAETMOGONE Théel.

1. *Laetmogone violacea* Théel.

Laetmogone violacea Théel. 1882. Challenger Reports. Vol. IV, p. 76, pl. XII.

Laetmogone violacea Sluiter. 1901 Die Holothurien der Siboga Expedition. Monographie XLIV, pl. 62.

Laetmogone violacea R. Perrier. 1902. Expedit. Scient. Du "Travailleur" et du "Talisman". Holothuries, p. 390, pl. XIX, fig. 1 to 7.

Station 150. Lat. N. 7°5'45". Long. E. 75°04'. Depth 719 fathoms. 1 specimen.

This specimen is only 50 mm in length by 7 to 8 mm in length. It corresponds exactly to the description of *L. violacea*. We count thirty lateral ventral pedicels and thirteen to fifteen dorsal papillae in each dorsal radius, which confirms the results of R. Perrier for this species.

BENTHOPHYCES nov. gen.

The body is fusiform with the mouth ventral and the anus dorsal. The ventral sole is clearly limited by very flattened mamelons, each surmounted by a pedicel. This border goes around the body in the sub-anal region and is continuous anteriorly with a peribuccal collar. The ventral median radius is naked. The dorsal radii are covered with numerous small papillae arranged more or less irregularly in a double row per radius. Each papilla is supported by a small mamelon. There are eighteen or twenty tentacles.

The calcareous spicules are of two kinds: rods and wheels.

The genus *Benthophyses* recalls by some of its characters the genus *Benthogone* Koehler. In fact, in it the mouth is ventral and the anus dorsal. The appendages of the body consist of ventral marginal pedicels and small dorsal radial papillae. The integument has the same two kinds of spicules: wheels and rods. Now in *Benthophyses*, the marginal border is very marked and is continued in the sub-anal region of the body. The small dorsal papillae are arranged in two rows and the calcareous spicules are also wheels. But the most conspicuous character of this genus consists of the presence around most of the appendages, either dorsal or ventral, of small raised areas that reach their greatest development in the ventral region.

1. *Benthophyces fragilis* nov. sp.

Plate VIII, fig 6 and 7; Plate XII, fig. 4 to 7.

Station 105. Lat. N. 15°2'. Long. E. 72°34'. Depth 740 fathoms. 1 specimen.

The fusiform body, a little rounded anteriorly, has a length of 135 mm and a width of 20 mm. The mouth is ventral. Its center is 7 mm from the anterior border. The anus is dorsal.

The ventral part of the body constitutes a very clear sole, flat, limited laterally by one row of numerous large mamelons nearly 10 mm in diameter and very flat. In the middle of each of them is a smaller mamelon corresponding to a pedicel whose diameter is about 2 mm. The ensemble of about forty large mamelons form around the sole a festooned border. In the posterior region of the body, the festoons are less developed and under the anus they are less apparent. In the anterior regions, the pedicels disappear and we find before the mouth a slight collar. Inside this border of large mamelons and on nearly all the ventral median radius we find a depressed and narrow region, granulose, more or less folded and having no pedicel.

The dorsal surface has a large number of small papillae spread out on the two dorsal radii. Toward the posterior part, these papillae are clearly arranged in two rows per radius, but before the posterior third of the body, their disposition becomes more irregular. Each papilla is located in the middle of a raised region with an irregular contour, forming mamelons that are smaller than those of the ventral surface.

These mamelons are very near each other and, as a result, the dorsal surface appears cracked. The dorsal median interradius is depressed nearly its entire length and thus constitutes a kind of median longitudinal groove that is especially accentuated in the posterior region of the body.

The mouth is surrounded by eighteen to twenty tentacles. The body wall is thick, whitish, steep, but extremely fragile and brittle. The specimen has been broken into two parts and the sections are now held open because of the rigidity of the skin. The calcareous spicules are of two kinds. These are first of all rods (pl. XXII, fig. 5 to 7) that can be strongly arched (fig. 5) or more massive (fig. 6 and 7). Among the latter, some are more elongated (fig. 6) and the others (fig. 7) smaller, thicker. They become nearly spherical. The second form includes wheels in the form of a shallow cone (pl. XII, fig. 4). The circular base has nine, eleven and even sixteen peripheral openings. The top is formed by the union of four to five rays leaving small openings between them. On the exterior part of the rays are small rounded mamelons.

APODOGASTER Walsh.

Walsh. 1891. Journ. Asiatic Society Bangal. Vol. LX, Part II, p. 202.

The principal characters of this new genus have been indicated by Walsh. According to this author, the body is delongated, flat and vermiform, a little wider in front than behind. The two edges have a border constituted like that of *Benthodytes* and crossed by long tubes of numerous pedicels. The unpaired ambulacrum is naked, while the lateral abulacra have a row of small pedicels located more below the lateral border. There is only a single row of papillae on each dorsal ambulacra. The tentacles number fifteen. The mouth is ventral and the anus terminal. The calcareous spicules are constituted of small granules and small plates in the form of a wheel.

According to what we observe in the single specimen given to us, the body rather is rectangular. It has, especially in front, a border constituted of a peribuccal collar that is extended onto the sides of the body, but that one does not find in the posterior region. The anus is sub-dorsal. The calcareous spicules are formed, not of small granules, but of very rare rods with a spinose surface and numerous wheels.

The genus *Apodogaster* is near the genus *Benthogone* Kœhler. It differs from it especially by the presence of a peribuccal collar that continues on each side in a very little developed border.

1. *Apodogaster Alcocki* Walsh.

Plate V, fig. 2 and 3; Plate XII, fig 13 to 14.

Apodogaster Alcocki. Walsh. 1901. Journ. Asiatic Society Bengal. Vol. LX, Part II, p. 202.
Station 112. Lat. N. 13°47'30". Long. E. 92°36'. Depth 561 fathoms. 1 specimen.

We add the following note to the short description of Walsh.

The body is flat and more or less rectangular with rounded ends. Its width is 65 mm and not 80 mm as Walsh indicated. Its width is 5 mm. The mouth is ventral and sub-terminal. The anus is terminal and slightly dorsal. According to the label, the color of the living animal was "light pink". The ventral surface in the specimen in alcohol is violet and the dorsal surface whitish.

The flat ventral sole has a median region slightly elevated that extends only half of its length and has no pedicel. Its lateral borders are a little withdrawn and each has a row of pedicels. These are twenty three to twenty five in number on each side. They can be missing in part. The body appears surrounded by a slightly marked marginal border on its sides, more distinct to the right than to the left. It is completely lacking in the anal region, but anteriorly it constitutes a violet and well-marked peribuccal collar, especially visible on the dorsal surface. The collar is composed of small papillae fused to each other their entire length. The lateral border seems also formed of papillae contiguous their entire length.

The dorsal surface has on each radius a single row of about forty papillae, most of which forming simple mamelons one millimeter in diameter but some are 1.5 mm long.

The fourteen to fifteen tentacles are short and their terminal disk is very enlarged with a mamelonated surface. The integument is very thick and is very easily detached. It contains calcareous spicules of two kinds: numerous wheels and some rods. The wheels (pl. XII, fig. 14) are conical. Their base has a dozen peripheral openings and at the top we recognize four separate peripheral openings separated by four rays arranged by pairs at the end of a central stem. The rods (pl. XII, fig. 13) are very rare. They are very elongated with the ends pointed and their surface covered their entire length with small spines located some distance from each other.

3° Family ELPIDIIDAE

PENIAGONE -Théel.

1. *Peniagone stabilis* nov. sp.

Plate III, fig. 4; Plate 5, fig. 11; Plate XII, fig. 21.

Peniagone Wyvillii Théel. Walsh. 1891. Journ. Asiatic Society Bengal. Vol. LX, Part II, p. 197.
Station 118. Lat. N. 12°20'. Long. E. 85 °8'. Depth 1803 fathoms. 1 specimen.

The body is sub cylindrical. The length is 28–30 mm and the width about 14 mm.

The mouth is ventral. The anus, terminal, is wide open. The color is uniformly grayish, but it is due to a slight deposit of mud that covers the individual. When we remove this layer, we perceive the true color is pink.

The ventral surface is slightly flat. It has, 5 mm behind the mouth, a lateral row of small appendages, six at the right and four at the left, that extend to a length of 14 mm. The anterior appendage is 4 mm in length. The others decrease progressively in size. All these appendages are united at their base by a very projecting ring. In the sub-anal region, this ring is very marked and shows on its border a half dozen inconspicuous lobes.

The dorsal surface is a little deformed. It has in front a triangular sail 5 mm in height and 10 mm in width. At the top of the sail, we find a small whitish papilla and on each side another very little developed papilla. Behind the base of this extension are two pairs of small papillae located, one at 1 mm, the other at 4 mm from the insertion of the sail.

The mouth is surrounded by ten short tentacles and whose terminal disk is lobed.

The integument is flaccid. It contains tetra-radial calcareous spicules (pl. XII, fig. 21) with branches, very long and slightly spinose. In the center is a stem that is generally bristly. A short distance from the central stem, each arm has a small extension, slightly inclined and with numerous spines.

SIMILARITIES AND DIFFERENCES. — Walsh reported this *Peniagone* as *P. Wyvillii* Théel. But the form of the sail composed of four large papillae in Théel's species is very different from that we have observed. On the other hand, the lateral row of appendages extend in our species more in front than in *P. Wyvillii* and in this posterior region, the sub-anal border is more marked than in this latter species.

The form of the triangular sail with three lateral papillae as well as the lobed sub-anal ring characterizes sufficiently *P. stabilis*. The species is near *P. Willemöesi* (Théel), but the lateral papillae of the sail are more projecting than in this species.

We concur with the opinion of Hérouard and Perrier who consider *Elpidia Willemöesi* Théel to belong to the genus *Peniagone*.)

2. *Peniagone expansa* nov. sp.

Plate IV, fig. 10; Plate XII, fig. 27 to 28).

Station 117. Lat. N. 11°58'. Long. 88°52'17". Depth 1748 fathoms. 1 specimen.

The body is flattened, widened anteriorly and rounded behind. The dorsal surface is slightly convex. The length is 27 mm and the greatest width that occurs in the anterior region is 17 mm.

The color is uniformly grayish, but this tint, as for *Peniagone stabilis*, is because the integument is covered with a thin layer of mud and, as in this species, the true color is pink. The mouth is ventral the anus is terminal.

The ventral surface is flattened. On its sides, we observe a row of five appendages, more or less lying on the ventral sole. The anterior appendage is inserted some millimeters behind the mouth. It is 5 mm in length. The following ones, very thick, become shorter and shorter. They are united at their basal part by a ring that is continuous above the anus with a border having a half dozen short, truncated papillae.

The dorsal surface is continued in a trapezoidal sail, with an anterior lobed border that is prolonged in two lateral expansions 3 to 5 mm in length. Behind the insertion of the sail, we find on each side two short, whitish papillae, very close to each other.

The ten tentacles are short and their terminal disk is lobed.

The integument is thin and flaccid. It contains some calcareous tetra-radial spicules. Each spicule (pl. XII, fig. 27 to 28) is formed of four slightly curved arms, whose ends have some spines. At a short distance from the center, each arm has a very developed extension slightly inclined outwards. These extensions have, from place to place, scattered spines their entire length, especially toward the end. In the center of the spicule is a stem with spines that can reach the length of the secondary extensions of the arms.

SIMILARITIES AND DIFFERENCES. — *Peniagone expansa* is distinguished from the other species of the genus by the form of the dorsal sail with lateral extensions and intermediary lobes.

3. *Peniagone* (?) *obscura* nov. sp.

Plate XII, fig 25 to 26.

Station 118. Lat. N. 12°20'. Long. E. 85°8'. Depth 1803 fathoms. 1 specimen.

The specimen is in bad condition but its characters are sufficiently indicated for us to believe we can make a new species.

The body is sub-cylindrical, elongated in the anterior region and rounded in the posterior region. The length is 34 mm and the greatest width is 12 mm. The mouth is sub-terminal but ventral. The anus is dorsal. The color is yellowish white.

The body appears divided into two regions. The convex ventral region is continuous on the sides of the body and forms all around the dorsal region a ring that is particularly developed in the posterior region of the body.

We distinguish no lateral appendage, but the bad state of preservation of the specimen does not permit us to confirm their absence in this species. The tentacles are also removed and we no longer find, on the peribuccal disk, their ten bases of insertion.

We observe on the dorsal side, on the anterior third of the body, a small rectangular sail making a projection of 3 mm and 4 mm in length. On the right side of the sail, we distinguish the trace of a papilla that has been raised like the tentacles.

The integument has a spongy appearance and it is very brittle. It contains numerous tetra-radial calcareous spicules (pl. XII, fig. 25). The arms are placed two by two at the end of a short transverse stem. They have small spines that become more abundant toward the terminal region. Nest to the ends of the central stem and on two opposite arms are found two short extensions in the form of clubs, slightly inclined in the direction of the arms and covered with numerous spines. We also find spicules (pl. XII, fig. 26) whose arms are more numerous and slightly corrugated and that no longer have club-shaped extensions.

The longitudinal muscles are single, yellowish and are nearly 2 mm in width.

The gonads are very developed. Their branches are numerous and contain in their wall abundant calcareous spicules.

SIMILARITIES AND DIFFERENCES. — The bad condition of the single individual collected by the “Investigator” does not permit the referral of it to the genus *Peniagone* with all the desirable certainty. In fact, we have not been able to discover the lateral appendages, but, as we have said above, it is possible these appendages have been torn off. The presence of a dorsal sail, the tetra-radiate spicules and the ten tentacles are good characters of *Peniagone*. If the place in the genus *Peniagone* is maintained, our species comes near those where the dorsal sail has a very weak development like *P. affinis* Théel.

EURIPLASTES nov. gen.

Peniagone ecalcareia, that Sluiter attached with doubt to the genus *Peniagone*, should, according to R. Perrier, be separated from this genus. We agree with this point of view. Now among the holothuroids of the “Investigator”, we have found an individual that incontestably belongs to *P. ecalcareia* Sluiter but that differs specifically. We thus place this specimen and *P. ecalcareia* Sluiter into a new genus that we call *Euriplastes*. We characterize it in the following manner:

The posterior part of the ventral surface has, on its borders, a row of eight very developed and very distinct appendages. Anteriorly, this row is continued by a double row of smaller appendages that is extended up to the mouth. The anterior region has marginal appendages that are united in a kind of dorsal collar above the mouth. This is ventral and the tentacles probably number about twenty. The anus is terminal. The integument completely lacks calcareous spicules.

The genus *Euriplastes* recalls, by its anterior collar and the number of tentacles, the genus *Enypniastes* Théel known until now by a single species. The description of Théel was completed by Sluiter with the aid of specimens dredged by the “Siboga”. It is especially this description that we use to separate our genus from the genus *Enypniastes*. The distribution of the appendages is, in fact, different in the two genera and the genus *Enypniastes*. The distribution of the appendages is, in fact, different in the two genera. The genus *Euriplastes* is especially characterized by the position of the circle of anterior appendages above the mouth. But it is indisputable that the two genera have great affinities.

1. *Euriplastes obscura* nov. sp.

Plate IV, fig. 7, 8, and 9.

Station 118. Lat. N. 12°20'. Long. E. 85°8'. Depth 1803 fathoms. 1 specimen.

The form of the body recalls a truncated cone. The anterior region, widened, is 22 to 24 mm in width. The posterior region is only 10 to 12 mm in width. The total length is 40 mm. The mouth is ventral. The terminal anus is wide open. The mouth is found in the center of a prominent peribuccal disk, 10 mm in diameter, having on its periphery a flange of 4 mm in back condition.

The general color is grayish white, but passes to violet in the anterior region.

The ventral surface is slightly flattened and is surrounded laterally by a ring that becomes especially projecting in the posterior region and on which we count eight distinct and well developed appendages. Anteriorly, this ring is diminished and has only small, slightly projecting

papillae. These are spaced and arranged in two rows: four of them form an external row and two others constitute the internal row. The lateral ring is continued anteriorly by a kind of sail forming a semi-circular collar 20 mm in length and 10 mm in height that is overhangs the mouth. This collar is composed of a dozen papillae united by their base and whose free distal end is 2 mm in diameter and 2 mm in height. It has a straight flagellum 7 to 8 mm in length.

The dorsal surface has, behind the collar and to the left, a row of four small papillae. To the right we see only two of these papillae.

The tentacles are inserted on the periphery of the peribuccal disk. They are short and their end is bifid. They are raised for the most part. We believe there were twenty.

The internal surface of the integument is deep red. The longitudinal muscles are single and whitish. Their width is 2 to 3 mm.

The digestive tube is rectilinear. The single Polian vesicle is reddish. It has the form of a U with unequal branches. The gonads form two bundles of short, strongly branched tubes.

SIMILARITIES AND DIFFERENCES. — We have said above that *Peniagone ecalcareo* Sluiter should be placed in the genus *Euriplastes*.

E. obscura is distinguished from *E. ecalcareo* by its body, slightly flattened body on the ventral surface, more swollen in the posterior region and much less slender than in *E. ecalcareo*. The papillae of its collar is formed of two very distinct regions: a widened basal part and a filiform, thin and elongated extension, very distinct from the basal part, while in *E. ecalcareo* these appendages decrease progressively in width from the base to the top. In addition, they are more distinct and can even remain isolated their entire length as we have been able to convince ourselves in the type of Sluiter, while in our species, the basal regions are fused very intimately. Moreover, *E. obscura* has four dorsal papillae while *E. ecalcareo* completely lacks them. Finally, this last species does not have a peribuccal disk.

4° Family PSYCHROPOTIDAE.

BENTHODYTES Théel.

1. *Benthodytes sanguinolenta* Théel.

Benthodytes sanguinolenta Théel. 1882. Challenger Report. Vol. IV. Holothurioidea, p. 104, pl. XXIII, pl. XL fig. 4, 5; pl. XLII, fig 6.

Benthodytes sanguinolenta Ludwig. 1894. Reports on an exploration...by the U. S. Fish. Commission Steamer "Albatross", XII. The Holothurioidia. Mem. Mus. Comp. Zoöl., Harvard College, Vol. XVII, No. 3, p. 53, Taf. I, fig. 1–8.

Station 160. Lat. N. 15°2'. Long. E. 72°24'. Depth 740 fathoms. 1 specimen.

Station 254. Lat. N. 11°16'30". Long. E. 92°58'. Depth 669 fathoms. 1 specimen.

The two specimens are in bad condition. That of Station 160 measures 180 mm in length, the other is only 100 mm. In the first specimen, we have been able to count seventeen tentacles. The calcareous spicules of the wall of the gonads and of the tentacles are identical to those figured by Ludwig.

2. *Benthodytes glutinosa* R. Perrier.

Plate XII, fig. 10.

Benthodytes sanguinolenta Théel. Walsh, 1891. Journ. Asiat. Soc. Bengal. Vol. LX, Part II, p. 200.

Benthodytes papillifera Théel. Walsh, 1891. Journ. Asiat. Soc. Bengal. Vol. LX, Part II, p. 200.

Benthodytes glutinosus R. Perrier. 1902. Holothuries. Expéd. Scient. du "Travailleur" et du "Talisman." Pl. XIII, fig. 5, pl. XX, fig. 31.

Station 110. Lat. N. 9°34'. Long. E. 85°43'15". Depth. 1997 fathoms. 1 specimen.

Station 111. Lat. N. 12°50'. Long. E. 90°52'. Depth 1644 fathoms. 6 specimens.

Station 118. Lat. N. 12°20'. Long. E. 85°8'. Depth 1803 fathoms. 4 specimens.

Station 287. Lat. N. 21°8'30". Long. E. 65°47'. Depth 1506 fathoms. 11 specimens.

We refer all these specimens to *Benthodytes glutinosa* R. Perrier and bring into the same species the individual from Station 110 that Walsh described under the name *Benthodytes papillifera* Théel as well as those of Station 118 determined by Walsh as *B. sanguinolenta* Théel. We have been able to compare all the specimens to the types studied by R. Perrier. An in depth study shows us that they are only one and the same species.

The specimens have different sizes. The largest, which came from Station 287, has a length of 130 mm and a width of 40 mm. The other individuals from the same station are 95 to 85 mm in length and 25 to 15 mm in width. The smallest, coming from Station 2887, is 55 mm in length and an average width of 20 mm. The average length is thus 78 mm and the width is 20 mm. The ventral surface of all our individuals is convex while the dorsal surface is flat and formed of a thin wall.

The color of the two surfaces is different. The ventral surface is red in some individuals or very deep violet-black in others while the dorsal surface is whitish.

The ventral sole is limited by a border of very fine papillae, forming all around the body a slightly accentuated festoon. We have found an indication of this border in the types of R. Perrier. The ventral mouth is surrounded by twenty tentacles.

The largest specimen has on its dorsal surface violet black papillae of small size and distributed in small numbers the entire length of each dorsal radius in a single row, but we do not find these appendages in the other individuals.

R. Perrier indicates a decrease in calcareous spicules in the specimens from the "Talisman," but he found them in the integuments. We can confirm these observations, but we have found in the same specimens spicules in the wall of the gonads identical to those of the integument. In the individuals of the "Investigator," larger than those of the "Talisman," the integument has not shown us spicules, but we have found them in the gonads. These spicules (pl. XII, fig. 10) are rods, spiny at the ends and often having very spiny lateral branches. The spines are very stout and less numerous than in the specimens of the "Talisman."

The only difference between our holothuroids and the type of *Benthodytes glutinosa* R. Perrier thus consists in larger size of most of our specimens and the complete absence of calcareous spicules in the integument of the latter.

3. *Benthodytes superbus* nov. sp.

Plate VII, fig. 1 and 2; Plate XII, fig. 1 and 12.

Station 287. Lat. N. 21°8'30". Long. E. 65°47'. Depth 1506 fathoms. 2 specimens.

The body is more or less prismatic with the ventral sole very distinct. The length is 245 to 270 mm and the width is 40 to 45 mm. The height is from 30 to 35 mm.

The general color is deep gray with black longitudinal bands.

The mouth is ventral and terminal. The anus is dorsal and wide open.

The ventral sole has a middle region slightly conical, surrounded by a flat flange black in color. It is limited on the entire periphery by a row of conical papillae that can reach 10 mm in length and with a very widened base. We count more than fifty papillae on each half of the body.

The ventral median radius has pedicels that are more or less retracted and arranged in two irregularly alternating rows. These pedicels, about seventy in number, extend over the entire radius beginning behind the mouth. Their ends are blackish.

On the dorsal surface, each radius has a row of large conical papillae with a filiform end, and can be 15 to 25 mm in length. There is about a dozen of these irregularly distributed appendages. They are in a gray region limited on both sides by a blackish longitudinal band. In the anterior region, these papillae are more or less juxtaposed at their base. Likewise, in the middle region, these appendages are assembled in groups of two or three.

The tentacles are blackish and because of this very difficult to count. We think there is from twelve to fourteen. They have a leaf-like appearance. Their distal ends are enlarged and form a border cut into very numerous lobes.

The integument is very rigid and brittle. On the lateral and dorsal surfaces, it has scattered calcareous spicules visible to the naked eye and each forming a very distinct small white prominence with a star-like appearance. These calcareous spicules (pl. XII, fig. 11) are of very large size and it is difficult to obtain whole ones. They are formed of short, massive branches with ends themselves having short branches with a surface more or less spiny. In the center of the spicule sometimes there is a stem that is generally bristly. The number of branches varies from three to five.

The ventral surface has simple rods (pl. XII, fig. 12) or spicules with three branches. The tentacles do not contain spicules.

The internal organs are not preserved. The individuals were filled with mud. In one of them we found a mass of yellowish eggs, very strongly agglutinated. But it was not possible to recognize if the gonads were single or double. The internal surface of the integument is black.

SIMILARITIES AND DIFFERENCES. — The general aspect of *B. superbus* greatly recalls that of some *Pelopatides* and we were tempted at first to attach them to the synallactids. The internal organs were completely gone. The absence of the respiratory trees has no importance. We believe however that it is to the genus *Benthodytes* that our specimens belong. We can bring *B. superbus* close to *B. hystrix* Sluiter. It has like it a large size, very developed dorsal appendages and very large calcareous spicules forming on the dorsal part of the body masses visible to the naked eye. But it differs from it by the absence of a continuous border and by the form of the calcareous spicules.

EUPHRONIDES Théel.

1. *Euphronides bifiurcata* nov. sp.

Plate VIII, fig. 1 and 2; Plate XII, fig. 22.

Station 118. Lat. N. 12°20'. Long. E. 85°8'. Depth 1803 fathoms. 1 specimen.

This specimen has been reported incorrectly by Walsh as *Euphronides depressa* Théel, and, for reasons that we shall indicate later, we consider it a new species to which we give the name *E. bifurcata*.

The specimen is separated into two halves, but it is very easy to reconstitute it into its entirety. Its total length is 80 mm and its width is 20 to 25 mm. The color is a uniform violet black. The ventral surface is flattened into a sole at the ends of which are found the mouth and the anus. The dorsal surface is convex and the entire surface is covered with reddish warts similar to those that Ludwig described in *E. verrucosa*.

Twenty two mm before the posterior border of the body, inserting on the dorsal surface are two large flat and conical papillae 10 mm in length. These two papillae remain independent of each other for most of their length. They are united in their basal part where the width reaches 4 to 5 mm. The integument of these appendages is slightly rugose. Before their insertion, we see a small depressed area.

The ventral sole is very clearly limited on all of its periphery by a probably continuous border formed of very wide festoons and irregular contours. The mouth, whose center is located 10 mm from the anterior border, is surrounded by sixteen tentacles more or less irregularly arranged in two rows. Each tentacle ends in a flat, lobed disk.

On all of the ventral median radius, except in the region that immediately follows the mouth, are found about fifty scattered pedicels, arranged in two rows more or less regularly alternating with each other. All the pedicels are retracted and have a reddish terminal disk.

The warts of the dorsal surface contain large calcareous spicules in the form of a cross 1.5 to 2 mm in diameter that are impossible to obtain entire. The branches, sometimes slightly curved their entire length, have large conical and spaced spines. At their center of the cross is often a raised tip. Beside these large spicules, we find often smaller ones having the same composition (pl. XII, fig. 22).

SIMILARITIES AND DIFFERENCES. — *E. bifurcata* is characterized by the arrangement in pairs of the two dorsal appendages, while in the other species we find only an unpaired appendage. In *E. cornuta* Verrill, the end of the appendage is simply bifid, but in *E. bifurcata* the separation into two parts is much more complete and extends nearly to the base. On the other hand, our species is clearly separated from *E. cornuta* by the absence of dorsal papilla. By its external appearance, *E. bifurcata* greatly recalls *E. verrucosa* Ludwig with its dorsal surface covered with large warts containing large calcareous spicules. But the latter species has the single dorsal appendage, the much wider marginal border and papillae on the dorsal surface.

PSYCHROPOTES Théel.

1. *Psychropotes minutus* nov. sp.

Plate VIII, fig. 4 and 5; Plate XII, fig. 23 and 24.

Laccadive Islands. Depth 1140 fathoms. 1 specimen.

This specimen was first reported by Walsh as *Psychropotes longicauda* Théel. Although it has some points of resemblance to this species of Théel, it is too separate from it for us to be able

to preserve the determination of Walsh. We consider it as forming a new species to which we give the name *Psychropotes minutus* because of its small size.

The body strictly speaking has a length of 65 mm and a width of 18 mm. It is surmounted by a greyish caudal appendage 55 mm in length. The ventral surface is a very clear flat sole. Seen in profile, the general form of *Ps. minutus* is very characteristic. The anterior part of the body is flat, but behind it rises progressively and passes insensibly to a very elevated posterior region 20 mm in height. The lower part of this posterior region forms a kind of rounded tail 10 mm in height forming a projection of 6 mm while the upper part is continued by the caudal region. The latter, strongly flattened laterally, is 5 mm toward its insertion. Then it is widened in its middle region where it is 10 mm and is then progressively reduced. Its free end is terminated in three small pointed lobes more or less separated. The dorsal surface has only a single papilla 2 mm long located in the middle of the left dorsal radius.

The ventral sole is limited on its entire periphery by a border formed of numerous festoons and that folds a little onto the sole in the anal region. The ventral median radius is covered its entire length with pedicels more or less regularly arranged in pairs. We have counted fifty three in all. The ventral mouth is located 12 mm from the anterior border. It is surrounded by sixteen tentacles whose end is discoidal and mameloned. The original symmetry of the ensemble of these tentacles has been more or less deranged by the presence of a lamellibranch siphons strongly encased in the integument. The siphons open into the buccal atrium. The cavity indicated in black in the figure indicates the location of this curious commensal that will be studied in another work.

The integument of the body strictly speaking and that of the caudal region encloses cruciform calcareous spicules with four branches (pl. XII, fig. 23 and 24). These are more or less fenestrated and sometime slightly curved. They all have the same dimensions. They have on their entire length some tips widened at their base and that become especially numerous toward the ends. At the center of the spicule is sometimes a spine, sometime a small extension.

The internal organs are not preserved. The longitudinal muscles are well developed and single.

SIMILARITIES AND DIFFERENCES. — *Ps. minutus* is very close to *Ps. longicauda*. As in it, the latero-ventral pedicels are numerous and make a continuous border. The ventral median radius has about fifty pedicels arranged on its entire length. But these two species differ from each other by some characters that do not permit us to unite them. *Ps. longicauda* has eighteen tentacles and four or five dorsal pairs of papillae while our species has only one dorsal papilla and sixteen tentacles. The profile is very different in the two species. In *Ps. longicauda*, the body is more or less discoidal, while in *Ps. minutus* it is very elevated posteriorly. As for the caudal appendage, it is enlarged and progressively decreases in *Ps. longicauda* while in *Ps. minutus* it is laterally flattened and wider in the middle than at the ends.

5° Family GÉPHYROTHURIDAE.

We consider as forming the type of this new family two specimens in very good state of preservation that have allowed us to study some important internal organs and that cannot be placed in any of the families presently accepted in the aspidochirote group. We propose the name Gephyrothuridés for this seventh family of aspidochirotés that is characterized in the following manner.

The body is cylindrical and the buccal region is narrower than the rest of the body. The two respiratory trees are rudimentary. Tentacular vesicles are lacking. Each dorsal radius has a row of appendages, but the others are absolutely naked.

The family Gephyrothuridae has some resemblance to Molpadiidés, but it is separated from all the other families of aspidochiotes by the absence of appendages on the trivium and by their exclusive presence on the bivium.

This family is represented presently by only a single genus, the genus *Gephyrothuria*, containing only one species, *Gephyrothuria Alcocki* nov. sp.

GEPHYROTHURIA nov. gen.

The body form recalls that of the Molpadiidés. The terminal mouth is surrounded by 15 terminal tentacles ending in a pair of mamelons. The buccal region is a little narrower than the rest of the body. Each dorsal radius has a row of very few appendages, but the radii of the trivium are completely naked. The calcareous ossicles are absolutely missing. Each of the two respiratory trees is constituted by a short tube and has only some lateral lobes.

1. *Gephyrothuria Alcocki* nov. sp.

Plate V, fig. 6, 7 and 8.

Station 278. Lat. N. 6°52'. Long. E. 81°11'. Depth 1912 fathoms. 2 specimens.

The two specimens collected by the "Investigator" differ a little from each other by their exterior aspect. One has a length of 50 mm and is 17 to 18 mm in diameter. The other, on the contrary, is contracted. It measures only 32 mm in length and is 14 mm in diameter. In the first individual, the mouth is obviously terminal and its diameter, 10 mm, is only a little less than that of the body strict speaking, as is the case in molpadiids. This mouth is surrounded by fifteen retracted tentacles whose terminal disk has two (?) mamelons. The anus is terminal and a little sub-dorsal.

The body wall is soft, smooth, a little granulose toward the perianal region. The color is pinkish. Its transparency allows the underlying longitudinal muscles to be seen.

The orientation of the body can be determined by the location of the gonoduct and we call the dorsal interradius, the interradius that has it. This opening is located some millimeters behind the buccal disk, between the two muscles of the dorsal radius. On the internal border of each of these muscles, we find some papillae arranged in a single row. The first specimen has three papillae in the left dorsal radius and four in the right radius. The other individual, which is contracted, has five papillae in the left dorsal radius and only four in the right radius. All these papillae are filiform. They have the same dimensions and reach 5 to 6 mm in length. They are the only appendages that we find on the body of these individuals. They belong thus exclusively to the bivium and there is not the least trace of appendages in the radii of the trivium.

We have opened the larger specimen in order to study the internal organs that are very well preserved. Only the digestive tube is in bad condition and because of this the interior of the body is full of mud.

The longitudinal muscles are all equally developed. They are violet in color and their width is only about 1 mm.

The calcareous ring is well developed. Its different pieces are solidly fused, without our being able to distinguish the radial and interrarial pieces. In each interval between two longitudinal muscles, the ring has three tips directed forward.

The single Polian vesicle is ovoid and located in the ventral median radius. Its length is 4 mm. The stone canal ends freely in the general body cavity. The gonad is located in the anterior third of the body in the dorsal interradius. It is constituted of a median canal that goes forward to open exteriorly by the gonopore. In its posterior region, this canal has on each side of the dorsal mesentery a series of genital ampoules.

Before and behind this gonad and between the muscles, we recognize some small ambulacral vesicles that correspond exactly to the dorsal appendages reported above. We do not see the least trace of vesicles in the ventral radii.

In the posterior region, the digestive tube has two conical respiratory trees, very short, in the form of a tube having some lateral lobes. The right organ is 10 mm in length and the left 5 mm. By the anal opening we see leave a small extension that is probably an eversion of the internal part of the rectum. An analogous extension was described by Théel in *Oneirophanta* and *Deima*.

INCERTAE SEDIS.

FILITHURIA nov. gen.

The body is slightly flattened. The flat ventral surface is limited laterally by a slight ring. The mouth is sub-terminal and the anus terminal.

The principal character of this genus is the presence at the surface of the integument of elongated appendages, kinds of very dense filaments. These appendages are arranged in a very regular fashion on each dorsal radius in two alternating rows. On the ventral surface, we find some analogous appendages, not only in the lateral radii but also in the interrarial spaces where they are distributed in an irregular fashion. There are twenty tentacles. The filiform appendages and the tentacles contain only calcareous spicules in the form of elongated rods. The internal organs are poorly preserved. There is no respiratory tree.

The absence of a respiratory tree permits referring the genus *Filithuria* to the elasipods. However it can be doubted because the internal organs are in too bad a state of preservation for us to confirm categorically that the respiratory trees are lacking in the living animal.

The very peculiar form of the appendages of the body and the localization of the calcareous spicules separates the genus *Filithuria* from all the known genera of elasipods. We do not even see to which family we can attach it. It is for this reason that we describe it here without being able to place it in a known family.

Filithuria elegans nov. sp.

Plate VI, fig. 1 and 2; Plate XII, fig. 29 to 31.

Station 116. Lat. N. 11°25'5". Long. E. 92°47'6". Depth 405 fathoms. 1 specimen.

The body has a length of 70 mm and a width of about 15 mm. The ventral region is slightly flattened. The dorsal region is a little convex. The mouth is ventral, but nearly terminal. The anus is obviously terminal. The body wall is whitish, thin and without any calcareous spicules. The color noted in the living animal was "purple."

The appendages consist of these very characteristic filaments that we have mentioned it in the diagnosis of the genus. They have an extreme fineness and reach a length of 10 to 15 mm. These appendages alternate regularly in the radii. We observe that the lateral radii of the ventral surface that have these appendages are more or less depressed. It is probable these depressions are not accidental. The appendages are also denser on the two lateral radii than on the three others. The ventral median radius has the appendages only in the posterior region. In the same region we find scattered on the interradii spaces some appendages shorter and still finer than the radial appendages.

The mouth is surrounded by twenty tentacles, each composed of a long peduncle, 4 to 5 mm in length, terminated by an enlarged disk having a half dozen lobed digits.

Only the filiform appendages and the tentacles contain calcareous spicules. In the appendages, these are rods with irregular contours and one end that terminates in a more or less mamelonated club (pl. II, fig. 30). The tentacles contain rods of a different form (pl. XII, fig. 29), flattened, a little arched and having an opening either at their end or at another part of their length.

The longitudinal muscles are single and 2 mm in width. The single Polian vesicle is large, 18 mm in length.

The calcareous ring (pl. XII, fig. 31) is formed of ten articulated pieces. The radials are trapezoidal, with the anterior border cut. The interradii are smaller and have a median ridge.

The gonads are formed of two bundles of single tubes, 5 mm in length and located from place to place on the dorsal mesentery.

DENDROCHIROTA.

1° Family CUCUMARIIDAE (PSOLIDAE.)

PSOLIDIUM Ludwig.

1. *Psolidium* (?) *rugosus* nov. sp.

Plate I, fig. 7, 8 and 9; Plate XIII, fig. 1 to 3.

Station 258. Lat. N. 8°23'. Long. E. 76°28'. Depth 102 fathoms. 1 specimen.

The body is flattened and oval. The mouth and anus are slightly prominent. The length is 12 mm. The width is about 10 mm and the thickness reaches 4 mm.

The ventral sole has pedicels on each radius arranged in two or three rows.

The dorsal surface is covered with imbricated plates. In the middle region of the body, the plates have a rounded border. Toward the border of the sole, they become smaller. In the area of the buccal and anal cones, the plates are elongated at the same time that they become thin. Their free border ends in a tip. We count seven rows of plates between the mouth and the anus and thirty in the transverse direction. The cones are covered with a large number of small plates.

The dorsal plates have a smooth surface. Between them, we observe some flexible papillae spread out on all the dorsal surface without apparent order. We find identical papillae near the center of some plates. Some dorsal plates have one or two rigid calcareous tips in the middle of their free border.

The fine membrane of the ventral sole contains numerous calcareous spicules. These (pl. XIII, fig 1) have the form of plates with irregular but rounded borders. They have oval openings of the same size and placed at equal distances from each other. Between these openings, the surface of the spicule has rounded mamelons.

The ventral pedicels end in a reticulated circular plate. They contain numerous elongated plates (pl. XIII, fig.3) with sinuous contours and some oval openings generally arranged in a single row.

The dorsal appendages contain a large number of reticulated plates (pl. XIII, fig. 2*b*) or rods with very branched ends (pl. XII, fig. 2*a*).

2. *Psolidium* (?) *translucidum* nov. sp.

Plate VI, fig. 11, 12 and 13); Plate XIII, fig. 8.

Station 267. Lat. N. 7°02'30". Long. E. 79°36'. Depth 589 fathoms. 2 specimens.

The body is oval and very flattened, a little curved. It has an anal cone on its dorsal surface and a very slightly accentuated buccal cone. The best preserved specimen measures 14 mm in length and 10 mm in width. The other is broken in part. Its length is 11 mm and its width is between 6 to about 8 mm.

The ventral surface is curved like the body. It is covered with a fine, very transparent membrane that permits seeing the internal organs. On its periphery, the sole has one or two rows of pedicels, one of which is completely marginal. The ventral median radius has appendages only at its ends where they are arranged in two rows. The middle part of this radius is absolutely naked.

The dorsal region is covered with very large imbricated plates, with a rounded free border whose size does not decrease sensibly on the border. At the center of these plates we find a small flexible appendage. Sometimes the same plate has two of these appendages.

The dorsal plates are smooth. Microscopically they are formed of a double network. The inner network has very thick trabeculae, leaving only small openings. It has on its outer surface a more open network.

The spicules of the ventral sole often have the form of an X (pl. XIII, fig. 8), whose terminal branches can be united and then circumscribe two oval openings. The surface of these spicules often is rough.

We can place only with doubt into the genus *Psolidium* the two holothuroids that we just described. In fact, Ludwig separated from the genus *Psolidium*, as he created it, species having fifteen tentacles to make the new genus *Theelia*. Now the tentacles are completely retracted and invisible in our specimens, so that it is absolutely impossible to count them. It is thus necessary to wait for specimens in better condition to permit decing the generic position of these species.

In any case, it is certain that *Psolidium* (?) *translucidum* and *rugosus* are new species very different from those in either the genus *Psolidium* or the genus *Theelia*. *Psolidium* (?) *translucidum* has no appendage in the middle part of the medio-ventral radius. It is placed thus because of this character beside *Psolidium* (?) *incertum* (Théel). But it differs from it by its very flat body and the calcareous spicules of the sole.

As for *Psolidium* (?) *rugosum*, it has, like *Ps. dorsipes* Ludwig and *Ps. gracile* Ludwig, rudimentary pedicels between the dorsal plates. It approaches especially *Ps. dorsipes* by its marginal double row of ventral appendages but it differs from it by the position of these two rows, both located on the fine membrane on the sole, by the dorsal pedicles that are not arranged in rows at the anterior and posterior ends of the body and by only one kind of calcareous spicules of the sole.

PSOLUS OKEN.

1. *Psolus membranaceus* nov. sp.

Plate VI, fig. 14 and 15; Plate XIII, fig. 4 and 5.

Station 258. Lat. N. 8°23'. Long. E. 76°28'. Depth 102 fathoms. 4 specimens.

These four specimens have different forms and dimensions. Their respective dimensions are the following:

	<i>Length</i>	<i>Width</i>	<i>Height</i>
1 st specimen	19 mm	10 mm	10 mm
2 nd specimen	22 mm	6 mm	10 mm
3 rd specimen	20 mm	9–10 mm	10 mm
4 th specimen	12 mm	4 mm	5 mm

The first individual has a rectangular sole 15 mm in length and 10 mm in width. The dorsal region is very elevated toward the buccal region where it extends a little before the ventral sole. The anal cone is less marked. In the three other individuals, the sole is less regularly rectangular and the buccal projection is less pronounced than in the first individual. The four have an anal cone nearly as developed as the buccal cone.

The dorsal surface is covered with plates that are imbricated on the sides of the body. In the fourth individual, on the contrary, the scales are strongly fused with each other on all the dorsal surface. Toward the median dorsal region, the large scales are more and more unconnected. Likewise, in the second specimen, the dorsal interradiial plates are completely separated from each other and, between them, we see a thin membrane. On the borders of the ventral sole, the plates become smaller.

There are about a dozen plates in the dorsal region between the mouth and the anus. In the middle region, they are nearly circular with a diameter of 2 mm. They are generally formed of a double network. But toward the buccal cone, they are strongly elongated and are 4 mm in length and 1 to 1.5 mm in width. They have then one pointed free end and one rounded more or less covered end. The same elongated plates are found on all the surface of the buccal cone. They are not contiguous but strongly disjointed and separated by spaces covered with a thin membrane. This is especially apparent toward the buccal region. This membrane has, immediately under the mouth, some very short appendages that appear to be rudiments of anterior extensions of the three radii of the trivium. Toward the anal cone, we see the plates are elongated and have an analogous modification to that we observe on the buccal cone, but less marked.

The ventral sole has pedicels on the three radii. The lateral radii have, on their entire length, two or three more or less irregular rows of pedicels that are especially developed toward their anterior angles. On the median radius, the pedicels are concentrated at the ends in a mass formed of three to four rows while, in the middle region, they become very rare, very separated from each other and form only a single row.

The ten tentacles have a large number of short mamelonated branches. The ventral tentacles are smaller and their branches are less numerous than the others.

The very thin walls of the ventral sole have numerous calcareous spicules. These (pl. XIII, fig 5) have the form of irregular plates of different dimensions, perforated with oval, nearly equal openings. They have no mamelon. The ventral pedicels have spicules of two kinds: short rods (pl. XIII, fig. 4 *c*), strongly dichotomized at the ends, and elongated rods (pl. XIII, fig. 4 *a, b*) having some lateral branches. These can be fused and then produce elongated plates having a line of perforations. The tentacles contain spicules similar to those of the ventral pedicels but often more massive and more irregular.

SIMILARITIES AND DIFFERENCES. — We place this species in the genus *Psolus* because of the arrangement of the appendages in the three radii of the ventral sole, but because we also observe

some rudimentary pedicels on the buccal cone, below the mouth, the species forms an interesting transition between the genus *Psolus*, whose appendages are all localized on the radius of the ventral sole, and the genus *Psolidium* that has appendages both on the radii of the trivium and on the dorsal surface. In *P. membranaceus*, the appendages of the dorsal surface are completely lacking, but the appendages of sole continues toward the mouth. The genus *Psolus* thus should not have such a narrow meaning that we generally accept. It can include forms whose appendages, instead of being strictly localized to the radii of the ventral sole, can be extended to other parts of the trivium.

2. *Psolus levis* nov. sp.

Plate VI, fig. 4, 5 and 6; Plate XIII, fig. 6 and 7.

Station 258. Lat. N. 8°23'. Long. E. 76°28'. Depth 102 fathoms. 10 specimens.

The body is strongly elevated, especially toward the buccal region. It decreases progressively toward the anus. The buccal and anal cones are not prominent.

The largest individuals measure 40 to 42 mm in length and 15 to 20 mm in width. Their height is 22 to 26 mm near the buccal cone. The smallest specimen is 16 mm long, 15 mm wide and 8 mm in height near the mouth.

The ventral sole is covered with a thin membrane. On its periphery, it has three rows of pedicels. One row is completely marginal, located on the fringe of the sole and formed of small appendages. A double row is located inside the preceding, formed of large pedicels that more or less alternate irregularly with each other. The ventral median radius is completely naked. In a single specimen, we have found a pedicel in the middle of its length.

The dorsal surface is covered with large imbricated plates, with irregular borders, rounded and sometimes a little sinuous. Their surface is completely smooth. Between the mouth and the anus, we find six to eight rows of plates. The plates are 5 mm in width and decrease in size toward the border of the sole where they are only about 1 mm in diameter.

The mouth is surrounded by five opercular pieces in the form of an equilateral triangle 5 mm in height. When these pieces are folded down, they cover completely the buccal cone and do not allow any free space between them. The anal cone is covered with numerous smaller plates.

The ten tentacles are about 5 mm in length. They are very arborescent. The two ventral tentacles are little different from the others.

The spicules of the ventral sole are irregular plates, more or less oval (pl. XIII, fig. 7) having some large central openings and peripheral openings smaller in diameter. The surface of the spicules has very large and spaced tubercles.

The tentacles and the pedicels contain flat rods (pl. XIII, fig. 6) that have along their entire length, from place to place, lateral projections more or less developed and some openings of variable size arranged in one or two rows.

The pedicels have a reticulated terminal plate.

SIMILARITIES AND DIFFERENCES. — *Psolus levis* greatly recalls *Ps. operculatus* Pourtalès, a species found by the "Challenger" and the "Blake." The specimens of the "Investigator" approach especially those of the "Blake," while being, in general, larger. The two species are distinguished by the following characters. The five opercular pieces of *Ps. levis* do not leave any space between them, while, according to Théel, in *Ps. operculatus*, the tips of the opercular pieces are not connected and leave a central star-like space between them. In *Ps. levis*, the dorsal plates are

smooth instead of being granulose and the sole has three rows of pedicels instead of two. Finally, the calcareous spicules are different in the two species.

2° Family RHOPALODINAE.

YPSILOTHURIA E. Perrier.

1. *Ypsilothuria bitentaculata* (Ludwig).

Ypsilothuria attenuata E. Perrier 1891. Les explorations sous-marines, p. 286, fig. 203.

Sphaerothuria bitentaculata Ludwig 1894. Report on an exploration...by the U.S. Fish. Commissio Steamer "Albatross" XII. The Holothurioidea. Mem. Mus. Comp. Zoöl. Harvard College. Vol. XVII No. 3, p. 141, Taf. I, fig. 5–14, Taf. XII, fig. 16-17.

Sphaerothuria bitentaculata. Mitsukuri 1897. Annotationes Zool. Japon. Vol. I, part IV, p. 149.

Sphaerothuria bitentaculata. R. Kœhler 1898. Sur les presence de la *Sphaerothuria bitentaculata* Ludwig dans l'Océan Indien. Zool. Anzeig., Bd. XXI, p. 384.

Sphaerothuria bitentaculata. Sluiter 1901. Die Holothurien der Siboga-Expedition. Siboga-Expeditie XLIV, p. 115.

Ypsilothuria attenuata. R. Perrier 1902. Expéditions scient. du "Travailler" et du "Talisman", Holothuries, p. 522, fig 13 dans le texte.

Laccadive Islalnds. Depth 902 fathoms. 4 specimens.

Station 199. Lat. N. 8°40'. Long. E. 81°27'35". Depth 800–637 fathoms. 3 specimens.

Station 113. Lat. N. 12°59'. Long. E. 93°23'10". Depth 683 fathom. 1 specimen.

Station 127. Laccadive Sea, off Minikoy Island. Depth 1200 fathoms. 3 specimen.

Station 177. Lat. N. 13°47'49". Long. E. 73°7'. Depth 636 fathoms, 7 specimens.

Station 230. Lat. N 7°40'. Long. E. 76°8'52". Depth 824 fathoms. 3 specimens.

Station 234. Lat. N. 13°50'30". Long. E. 93°26'. Depth 498 fathoms, 1 specimen.

Station 241. Lat. N. 10°12'. Long. E. 92°20'30". Depth 606 fathoms. 2 specimens.

Station 250. Lat. N. 6°54'30". Long. E. 79°34'30". Depth 480 fathoms. 1 specimen.

Station 254. Lat. N. 11°16'30". Long. E. 92°58'. Depth 669 fathoms. 4 specimens.

Station 269. Lat. N. 8°2'. Long. E. 76°30'. Depth 464 fathoms. 1 specimen.

Station 275. Lat. N. 8°20'. Long. E. 75°35'. Depth 171–131 fathoms. 1 specimen.

Station 276. Lat. N. 7°11'. Long. E. 76°35'30". Depth 1006 fathoms. 19 specimens.

We attach all the specimens of the "Investigator" to the species that was described so well by Ludwig. We consider as synonymous *Ypsilothuria attenuata* Perrier. This latter species was first attached by R. Perrier to *Y. bitentaculata*, but in his definitive memoir he considered it as a distinct species. The differences he invoked in favor of this point of view are taken from the size of the specimens and the form of the two anal and buccal stacks, both projecting and elongated into a vertical tube. We cannot attribute value to these characters because we see among the numerous specimens that we have in hand, the size of the body and the form of the tubes vary in very great limits. As for size, the individuals range between 4 to 20 mm. As for the form of the two stalks, we observe not only the analogous disposition to those that Ludwig gave the schematic, but all the transitions between the latter and the very exactly vertical stalks, parallel to each other and having the form attributed by R. Perrier to *Y. attenuata*/

The very form of the body strictly speaking presents also large variations. Sometimes it is strongly globose. Other times, it is elongated and cylindrical. Finally, other times it is slightly swollen and passes insensibly to the two stalks. All these variations have not the least importance and we cannot base specific distinctions on these dispositions so variable. We have preserved the

generic name applied by R. Perrier whose priority seems to us must be maintained for the reasons already indicated by R Perrier.

MOLPADIIDAE.

TROCHOSTOMA Danielssen and Koren.

1. *Trochostoma granulatum* Ludwig.

Trochostoma granulatum. Ludwig 1894. Reports on an exploration...by the U. S. Fish. Commission Steamer "Albatross" XII. The Holothurioidea. Mem. Mus. Como. Zoöll. Harvard College. Vol. XVII. No. 3. p. 158. Taf. XV, fig. 7–9; Taf. XVI, fig. 1–6.

Trochostoma ganulatum. Sluiter 1902. Die Holothurien der Siboga-Expedition, Siboga-Expeditie. XLIV, pl. 118. Station 278. Lat. N. 6°52'. Long. E. 81°11'. Depth 1912 fathoms. 1 specimen.
Station 110. Lat. N. 9°34'. Long. E. 85°43'15". Depth 1997 fathoms. 2 specimens.

The specimen from Station 278 measures 75 mm in total length and the caudal region is 10 mm. The two others have a total length of 26 to 32 mm and the tail varies from 5 to 10 mm.

The relation between the length of the body and that of the tail are different from those that Ludwig noted in his species, but we do not attribute importance to these difference that are due only to the state of contraction of the individual.

The spicules of the body strictly speaking are triradiate. In the large specimen, they are elongated following one of their axes and have three central openings alternating with three smaller peripheral openings. In the small specimen, their form corresponds exactly to that described by Ludwig.

The calcareous spicules of the caudal region are identical in our three individuals and conform to those that Ludwig figured.

2. *Trochostoma albicans* Théel.

Plate XIII, fig. 9 and 10.

Trochostoma albicans Théel 1886. Challenger Report, Holothurioiden, Zool., Vol. XIV, 44, pl. III, fig. 2, pl. XI, fig. 3.

Trochostoma albicans R. Perrier 1902. Expédit. Scient. du "Travailleur" et du "Talisman" Holothuries. P. 526, pl. XXII, fig. 7–8.

Station 261. Lat. N. 8°10'. Long. E. 76°26'. Depth 445–386 fathoms. 1 specimen.
Station 131. Lat. N. 16°01'. Long. E. 81°25'. Depth 410 fathoms. 1 specimen

All individuals are retracted. Their total length varies from 57 mm to 75 mm and the length of the tail is between 20 and 28 mm.

The calcareous spicules are very developed and the stems of the central column, a little thicker and stronger at the base than in the type of Théel, are very inclined in relation to the disk. In the specimen dredged at 410 fathoms, the surface of the plates is bristly with spines (pl. XIII, fig. 9) but this peculiarity is obviously not sufficient to require a specific separation.

3. *Trochostoma andamanense* Walsh.

Plate XIII, fig. 11 to 15.

Trochostoma andamanense Walsh. 1891. Journ. Asiatic Soc. Bengal. Vol LX, Part II, p. 203.

Andaman Islands. Depth. 500 fathoms. 2 specimens.

Station 222. Lat. N. 13°27'. Long. E. 93°12'30'. Depth 405 fathoms. 2 specimens

Station 233. Lat. N. 13°17'15". Long. E. 98°10'. Depth 185 fathoms. 3 specimens.

Station 234. Lat. N. 13°50'30". Long. E. 93°26'. Depth 498 fathoms. 3 specimens.

Station 235. Lat. N. 14°13'. Long. E. 93°40'. Depth 370–419 fathoms. 1 specimen.

Station 263. Lat. N. 8°56'. Long. E. 81°09'. Depth 771–665 fathoms. 1 specimen.

Station 265. Lat. N. 9°32'. Long. E. 80°59'30". Depth 594–225 fathoms. 2 specimens.

The individuals have very marked exterior differences. The more or less cylindrical body always has a caudal extension. The total length varies from 25 to 140 mm and the caudal region is between 3 to 17 mm. The diameter of the body strictly peaking varies between 14 and 30 mm. That of the base of tail varies between 1.5 mm and 6 mm.

The buccal disk has a diameter of 3 to 11 mm and has fifteen short tentacles having at their end a pair of lateral extensions. In one of the specimens from Station 265, the tentacles are arranged in a horseshoe shape. The buccal disk is connected to the body by a very short neck.

The integument of the body strictly speaking contains red spicules and some turriiform calcareous spicules more or less circular and triradiate. These calcareous spicules (pl. XIII, fig 11 and 12) have three large central openings that alternate with smaller peripheral openings. At the center of the spicule is a very tall column, formed of three stems united by a series of stages. The stems often have toothed borders.

The caudal region has turriiform calcareous spicules (pl. XIII, fig. 18 to 15) whose base forms the principal part, more or less rounded and generally has two large opposite extensions. The principal part has three large openings, while the rest of the plate has a large number of smaller openings. At the center of the spicules is a column formed of three vertical stems united by some stages that can reach a very great length. We have seen a plate (pl. XIII, fig 14) that has three extensions.

SIMILARITIES AND DIFFERENCES. — Walsh has brought *Trochostoma andamanense* close to *Tr. antarcticum* Théel. These two species can be distinguished easily by the form of the calcareous spicules. *Tr. granulatum*, which Ludwig described after the publication of the memoire of Walsh, is very close to *Tr. andamanense*. It is separated from it especially by the arrangement of the small columns formed of the three fused stems.

4. *Trochostoma concolor* nov. sp.

Plate V, fig. 9; Plate XIII, fig. 16 to 18.

Gulf of Bengal. Depth 475 fathoms. 2 specimens.

The jar that contains these two specimens carries the designation “*Trochostoma coerulea* Walsh”. This species has not been described by Walsh.

These specimens are of very large size. The length varies from 125 to 150 mm and their greatest diameter is 45–60 mm. The buccal disk is 8 mm in diameter. The body swells progressively from the anterior end to each its greatest diameter towards a third of its length, then

it decreases in the caudal region whose diameter is not greater than 7 mm. The body strictly speaking is violet blue from a pigment that is very abundant in one of our specimens. It has a nearly uniform color while in the other, this pigment is mottled. The caudal region is whitish.

The buccal disk has fifteen tentacles. Each, toward the end, has a pair of accessory extensions. The anus is surrounded by a kind of more or less fringed collar.

The integument of the body strictly speaking contains only red spicules, more or less oval. The caudal region alone contains triradiate ossicles of different aspects. Some (pl. XIII, fig. 16 and 17) forms plates with three large central openings surrounded sometimes with small peripheral openings. These plates with irregular contours often have marginal extensions. At the center is a short stem with numerous spines. In one case (pl. XIII, fig. 17), the end of this stem has thin, elongated extensions parallel to the plane of the plate. Other spicules (pl. XIII, fig. 16a, 16b) have the form of triradite rods, whose ends dichotomize one or two times. Finally, we have observed a spicule (pl. XIII, fig. 18) that can be compared to a cross with one branch ending in a tip while the others have elongated openings arranged sometimes in pairs.

SIMILARITIES AND DIFFERENCES. — By the presence of certain spicules (pl. XIII, fig. 16), *Trochostoma concolor* approaches *Tr. granulatum* Ludwig and also *Tr. intermedium* Ludwig. But it is distinguished from them by its exterior aspect, the absence of calcareous spicules in the body strictly speaking and by the form of the spicules of the caudal region.

5. *Trochostoma concolor* var. *caudatum* nov. var.

Plate XIII, fig. 19 to 22.

Station 199. Lat. N. 8°40'. Long. E. 81°27'35". Depth 800 to 637 fathoms. 2 specimens.

We consider these two individuals as simple varieties of our species *Tr. concolor*. The total length is respectively 110 mm and 67 mm. The very distinct tail in the two individuals has a length that varies between 20 and 16 mm. The fifteen tentacles have at their end, on each side, a small digitiform extension. The integument of the body strictly speaking is thinned and strongly spotted and marbled by an orange-red pigment. They contain only red spicules and some rare triradiate rods (pl. XIII, fig. 19), short and with bifurcated ends.

The caudal region is whitish. The rugose integument contains some elongated plates (pl. XIII, fig. 20 to 22) that have from place to place two diametrically opposite extensions. Their central region has three large symmetrically arranged openings and some secondary peripheral openings alternating with the preceding. At the center of the spicule are three short stems whose ends have some tips.

SIMILARITIES AND DIFFERENCES. — We have separated this variety from the individual types because of the presence of a very differentiated caudal region and of triradiate rods in the integument of the body strictly speaking as well as the form of the ossicles of the caudal region.

6. *Trochostoma elongatum* nov. sp.

Plate I, fig. 5; Plate XIV, fig. 1 to 3.

Station 114. Lat. N. 13°21'. Long. E. 93°27'. Depth 922 fathoms. 1 specimen.

The total length is 49 mm. The body strictly speaking measures 28 mm in length and 8 mm in maximum width. The caudal region is 26 mm. Its width is 2.5 mm at its base. It ends in a tip. The general color is grayish.

The integument of the body strictly speaking is thin and rugose because of the presence of numerous calcareous spicules. These are formed of plates with three central opening and a stem at their center whose end has numerous terminal tips (pl. XIV, fig 2 and 3). We sometimes find secondary peripheral openings. Some spicules have non-fused branches between them and some can even be reduced to three central branches more or less dichotomized, with a short, thick column in their center, and ending in numerous tips.

The integument of the caudal region is thick and rugose. It contains some arced rods, with a more or less pointed end (pl. XI, fig. 1). The central region is enlarged and has some openings of large size surrounded sometimes by smaller openings. At the center of the rod is a short extension whose end spreads out into a disk with a rim armed with numerous tips.

SIMILARITIES AND DIFFERENCES. — *Trochostoma elongatum* approaches *Tr. granulatum* Ludwig. Its calcareous spicules recall, in fact, those that Ludwig has represented in *Tr. granulatum* (pl. XV, fig. 7 and 9 and pl. XVI, fig. 4). Nevertheless, the differences are so great that we cannot unite the two forms. Moreover, *Tr. elongatum*, with its very elongated caudal region, has a different aspect from that of *Tr. granulaum*.

7. *Trochostoma pauperum* nov. sp.

Plate XIII, fig 23.

Station 280. Lat. N. 11°29'45 ". Long. E. 80°02'36". Depth 446 fathoms. 1 specimen.

The swollen body has a total length of 75 mm and a diameter of 32 mm. The caudal region is very short and measures only 6 mm in length and 2 mm in width. Its end is rounded.

The integument of the body strictly speaking is soft and has the consistency of rubber. We have recognized 2 layers. The external has a grayish color. The internal is violet black and its surface is more or less grainy. This latter layer alone contains red spicules and the integument of the body strictly speaking contains no calcareous spicules.

The tail is pinkish and rugose. Its integument contains calcareous spicules in the form of flattened rods (pl. XIII, fig. 23), whose central part is flattened with more or less sinuous borders. The central region is perforated by two to four openings.

The single Polian vesicle is ovoid and measures 2 to 3 mm. The stone canal is very convoluted and it is free in the general cavity. The calcareous ring exists, but it is thin and is very difficult to see because of the state of contraction of the tissues where it is embedded. The gonads are formed of very developed and branched bundles.

SIMILARITIES AND DIFFERENCES. — *Trochostoma pauperum* is near *Tr. granulatum* Ludwig. The rod-shaped spicules it contains in its caudal region resembles some spicules Ludwig found in the tail of *Tr. granulatum*, but these spicules lack the central stem and we no longer find rods with a short central stem with a series of spines. Finally, *Tr. pauperum* completely lacks calcareous spicules in the integument of the body strictly speaking.

Tr. pauperum, like *Tr. concolor*, has only calcareous spicules in the caudal region. The integument of the body contains only red spicules, but we cannot confuse it with the latter that has exterior characters and completely different calcareous spicules.

8. *Trochostoma ecalcareum* nov. sp.

Plate XIII, fig. 23.

Station 279. Lat. N. 11°35'15"/ Long. E. 80°02'15". Depth 300 fathoms. 1 specimen.

The body is strongly swollen. It measures 68 mm in length and 34 mm in diameter. It has a very short tail 3 mm in length and 2 to 3 mm in diameter. The body strictly speaking is clear gray in color. The tail is violet.

The integument of the body has the appearance of a membrane of rubber. We do not find any calcareous spicules but only red spicules.

The single Polian vesicle is spherical and measures 8 mm in diameter. Its wall appears reticulated. The stone canal is very convoluted. The left respiratory tree extends up toward the pharynx that it passes by. It is a longitudinal canal with, from place to place, short branches. The calcareous ring is very developed and has on its surface longitudinal stripes. In each radius it has an anterior tip sometimes bifid and a small posterior tip. In each interradius, two small anterior tips are each extended by a slightly projecting ridge. The gonads are formed of bundles of very branched tubes.

SIMILARITIES AND DIFFERENCES. — *Trochostoma ecalcareum* is near *Tr. pauperum* by its exterior form but while it calcareous spicules in its caudal region, *Tr. ecalcareum* completely lacks them

ANKYRODERMA Danielssen and Koren.

1. *Ankyroderma musculus* (Risso.).

Molpadia musculus. Risso 1826. Histoire naturelle des principales productions de l'Europe méridionale et particulièrement de celles des environs de Nice et des Alpes maritimes. T.V. p. 31–32, fig. 31–32.

Ankyroderma Danielsseni. Théel 1886. Challenger Reports. Vol. XIV, Holothurioidea, p. 39, pl. II, fig. 6.

Ankyroderma muaxulus. Ludwig 1891. Zeitsch. F. wiss. Zool., Bd. LI, p. 569. Taf. XXIX.

Ankyroderma Danielssen. Walsh 1891. Journ. Asiaic Soc. Bengal, Vol LX, part. II, p. 202.

Ankyroderma Danielsseni. Ludwig 1894. Reports on an exploration...by the U.S. Fish Commission Steamer "Albatross." XII. The Holothurioidea. Mem. Mus. Comp. Zoöl. Harvard College, Vol. XVII. No. 3, p. 164, Taf. XVII, fig. 1–9.

Ankyroderma spinosum. Ludwig. 1894. Reports on an exploration...by the U.S. Fish Commission Steamer "Albatross." XII. The Holothurioidea. Mem. Mus. Comp. Zoöl. Harvard College, Vol. XVII, No.3, p. 171, Taf. XVII, fig10, Taf. XVIII, fig. 1–12.

Ankyroderma Danielsseni. Kœhler 1896. Résultats scientifiques de la campagne du "Caudal." Echinodermes. p. 188.

Ankyroderma Danielsseni. Sluiter 1901. Die Holothurien der Siboga-Expedition. Siboga Expeditie. XLIV, p. 120.

Ankyroderma spinosum. Sluiter 1901. Die Holothurien der Siboga-Expedition. Siboga Expeditie. XLIV, p. 120.

Ankyroderma Danielsseeni. Hérourard 1902. Holothuries provenant des campagnes de la "Princesse Alice." Résultats des campagnes du Prince de Monaco fasc. XXII, p. 45.

Ankyroderma musculus, R. Perrier 1902. Expédition scient. du "Travailleur" et du "Talisman." Holothuries, p. 529, pl. XXII, fig. 16–22.

Adaman Islands. Depth 265 fathoms. 1 specimen.

Gulf of Bengal. Depth ? 1 specimen.

Station 133. Lat. N. 15°43'30'. Long. E. 81°19'39". Depth 678 fathoms. 1 specimen.

Station 134. Coast of Kistna. Depth 753 fathoms. 2 specimens.

Station 145. Lat. N. 15°5'3". Long. E. 72°38'10". Depth 696 fathoms. 1 specimen.

Station 184. Lat. N. 22°14'25". Long. E. 67°8'55". Depth 947 fathoms. 1 specimen.

Station 199. Lat. N. 8°40'. Long. E. 81°27'35". Depth 800–637 fathoms. 5 specimens
 Station 230. Lat. N. 7°40'. Long. E. 76°0'52". Depth 824 fathoms. 1 specimen.
 Station 231. Lat. N. 7°34'30". Long. E. 76°8'23". Depth 836 fathoms. 1 specimen.
 Station 234. Lat. N. 13°50'30". Long. E. 93°26'. Depth; 498 fathoms. 3 specimens.
 Station 250. Lat. N. 6°54'30". Long. E. 79°34'30". Depth 480 fathoms. 1 specimen.
 Station 254. Lat. N. 11°16'30". Long. E. 92°58". Depth 669 fathoms. 1 specimen.
 Station 256. Lat. N. 7°58'. Long. E. 79°23'. Depth 837 fathoms. 2 specimens.
 Station 261. Lat. N. 8°10'. Long. E. 76°26'. Depth 445–386 fathoms. 1 specimen.
 Station 270. Lat. N. 9°47'30". Long. E. 75 °32'. Depth 589–564 fathoms. 1 specimen.

We absolutely share the point of view of R. Perrier on the subject of the synonymy of *A. Danielsseni* that we unite with *A. musculus*. But, in addition, the study of numerous specimens that we have had between our hands leads us to unite *A. spinosum* Ludwig with *A. musculus*. It was on the form of the calcareous spicules of the trunk and on the relatively greater length of the tail that Ludwig had separated *A. spinosum* from *A. Danielsseni*. Now, we can confirm in all *Ankyroderma* collected by the "Investigator" (*A. musculus* and others) of very great variation in the relative length of the trunk and the tail. These variations can be related, in part, to the state of contraction of the specimens. It does not seem possible to us to base the specific characters on these differences. If we compare the numbers given by Ludwig for *A. Danielsseni* we note that the relation between the length of the tail and that of the trunk vary from 1/2.2 to 1/4.2. As for *A. spinosum* itself, Ludwig took as type a specimen whose total length is 77 mm and that of the tail is 28 mm. The relation is thus 1/1.75. In other specimens, the length respective to the tail and the trunk is 5 and 13, 14 and 74, 5 and 45, giving a ratio very different from the 1/1.75 and that shows us it can have very great variations. The specimen represented (pl. XXVII, fig 10) has a remarkably short tail and measures only 13 mm at the maximum while the body is 110 mm. (It is possible that this specimen is that which Ludwig said the "Schwanzspite war abgerissen").

We report in all 23 specimens of *A. musculus*. Here are the respective dimensions of the trunk and the tail that we have taken from the specimens.

<i>Trunk</i>	<i>Tail</i>	<i>Trunk</i>	<i>Tail</i>	<i>Trunk</i>	<i>Tail</i>	<i>Trunk</i>	<i>Tail</i>
80 mm	?	45 mm	8 mm	30 mm	17 mm	26 mm	20 mm
70 "	25 mm	40 "	?	30 "	15 "	25 "	12 "
60 "	25 "	35 "	8 "	30 "	19 "	24 "	12 :
60 "	20 "	35 "	8 :"	30 "	10 "	20 "	8 :
47 "	17 "	33 "	12 "	30 :	10 "	18 "	12 "
46 "	15 "	32 "	7 "	27 :	12 "		

Some specimens are in too poor condition to be able to give the exact length of the tail.

We see, by this table, that there is very great variation in the relative length of the two regions of the body.

The calcareous spicules of the numerous species that we refer to *A. musculus* have very constant forms. The rods of the caudal region, as well as the spatulas and the anchors of the body strictly speaking, are identical to those that have been described in *A. musculus*, *A. Danielssen* and *A. spinosum*. The other spicules of the body have sometimes the form of elongated and fusiform plates, sometimes the form of more or less circular and perforated plates. These two forms are similar to those that have been described by Théel and Ludwig in *A. Danielsseni*. However, the circular plates always have a central stem crowned with spines whose number is frequently six and

whose base is sometimes perforated with large central openings. These are most often accompanied by one or two periphery openings alternating with the preceding. All these spicules have in their periphery some extensions similar to those of spicules described by Ludwig in *A. spinosum*. Essentially, we find all the intermediaries between the spicules of *A. Danielsseni* and *A. spinosum*.

We thus see no sufficient reason to separate *A. spinosum* from *A. Danielssen* and *musculus*. Even the terms of transition are numerous and extensive. At the same time, the differences in the form of the body and the spicules are so entangled and subtle that it is not even possible to preserve the names *Danielsseni* and *spinosum* as distinct varieties. For us, *A. musculus* is a very polymorphic species and very cosmopolitan and the names that have been created to consecrate orders different than those that we have numerated above cannot be maintained.

It is not the same with other differences that we observe in a constant manner in several specimens and that we use to establish two new varieties of *A. musculus* that we write under the name of *acutum* and *undulatum*.

2. *Ankyroderma musculus* Risso var. *acutum* nov. var.

Plate XIV, fig. 4 to 7.

Gulf of Bengal. Depth 561 fathoms. 1 specimen.

Station 131. Lat. N. 16°1'. Long. E. 81°25'. Depth 410 fathoms. 1 specimen.

Station 184. Lat. N. 22°14'25". Long. E. 67°8'55". Depth 947 fathoms. 3 specimens.

Station 254. Lat. N. 11°16'30". Long. E. 92°58'. Depth 669 fathoms. 1 specimen.

Station 256. Lat. N. 7°58'. Long. E. 79°23'. Depth 937 fathoms. 2 specimens.

Station 272. Lat. N. 12°41'45 ". Long. E. 40°45". Depth 902 fathoms. 1 specimen.

Station 273. Lat. N. 12°47'. Long. E. 73°44'45. Depth 870–823 fathoms. 5 specimens.

We distinguish and separate from *A. musculus* Risso (sensu latiore) a variety that has much more consistency in characters than all the other individuals referred to *A. musculus*.

The specimens are of different sizes. Their total length varies between 100 mm and 59 mm. The caudal region is very developed and its length varies between 15 and 80 mm. The relation between the body strictly speaking varies from 1/14 to 1/4 and is frequently 1/2.

The tail is conical. Its diameter at the base varies between 4 and 10 mm. The body is strongly pigmented in red or black. Its integument is rugose, thick toward the anterior region and thin toward the caudal region. The tail is pigmented toward the base and whitish at the end. The integument is rugose.

The fourteen to fifteen tentacles are short and generally retracted. On each side they have a small lateral extension at their rounded end

The calcareous spicules of the body strictly speaking are composed of oval, red spicules, of triangular plates and spatulas. We have been able to find only a fragment of an anchor. The others must have fallen out. Most of these spicules have the usual form that we know in *A. musculus*.

The triradiate plates (pl. XIV, fig. 4) have an irregular contour and their form is variable. Some are more or less round. Other have two extensions often diametrically opposed but sometimes very close. At the center of the plate are three openings of large size, surrounded by smaller openings that go into their extensions where their size diminishes more and more. A central column is raised in the middle of the plate. It is short and composed of three nearly juxtaposed stems and united by some transverse beams. We sometimes encounter these triradiate plates incompletely developed.

The spatulas (pl. XIV, fig. 6) have various forms. Some end in an oval disk with some large central openings and small peripheral openings. The handle is formed of a single elongated rod, having openings only at the base. In one case, the handle was separated from the enlarged part by a slight constriction. Finally, we have observed (pl. XIV, fig 6b) a spatula with two elongated rods but of different sizes.

The spicules of the caudal regions are rods (pl. XIV, fig 7), very elongated and slightly curved. The central part is a little swollen with three central openings in the middle of which rises a very short column with a pointed or rounded tip. It often spreads out into a disk surrounded by numerous tips.

SIMILARITIES AND DIFFERENCES. — We have believed it necessary to create this variety of *A. musculus* because of the constant presence in all the rods of the caudal region of a small central extension in the form of a tip or a crown of a series of tips. Such spicules are encountered in all parts of the tail. This character would be important enough to justify the creation of a new species if Ludwig had not reported in *A. musculus*, at the base of the caudal region, rods having a slight tip nearly 0.17 mm in height, while those of the integument of the tail itself completely lacks them. At their free end, the spines observed by Ludwig is often divided into two very short tips. In our variety, these rods are not encountered only at the base of the tail but in its entire extent. This character is very constant in all the specimens.

3. *Ankyroderma musculus* (Risso) var. *undulatum* nov. var.

Plate XV, fig. 13.

Station 233. Lat. N. 13°17'15". Long. E. 99°10'. Depth 185 fathoms. 1 specimen.

Station 260. Lat. N. 6°54'30". Long. E. 79°34'30". Depth 480 fathoms. 2 specimens.

The respective lengths of these three individuals are, for the body strictly speaking, 35 mm, 30 mm and 20 mm. For the caudal region, 17 mm, 17 mm and 8 mm.

The body strictly speaking is pigmented while the caudal region is whitish. The integument of the body contains the same calcareous spicules as in *A. musculus*. In the caudal region, these spicules have some very special variations. In one of the individuals of Station 250, which at the same time is the smallest, we find only rods (pl. XV, fig 13) whose enlarged central region has some large openings and some rounded lateral expansions from the sinuous border. In the two other specimens, the caudal region contains, besides these spicules, some rods analogous to those of *A. musculus*.

These rods have lateral expansions never encountered in the true *A. musculus*. Their co-existence with the other normal rods in the two specimens and their exclusive presence in the third seem to show that these spicules can vary to some degree and their modifications are not sufficiently important to justify the creation of a new species. We also consider the specimens that have them as forming a simple variety of *A. musculus*.

4. *Ankaryroderma brevicaudatum* nov. sp.

Plate XV, fig 1 to 10.

Station 233. Lat. N. 13°17'15". Long. E. 93°10'. Depth 185 fathoms. 4 specimens.

The length of the body strictly speaking varies from 18 to 25 mm and its diameter is about 15 mm. The caudal region is more or less cylindrical with a rounded end. It measures from 3 to 6 mm in length and about 3 to 4 mm in diameter.

The integument of the body is thin, a little rugose, greyish in color sometimes with patches of red. It has red ovoid spicules, triradiate spicules, some spatulas and some anchors.

The triradiate spicules are present in several forms. Some (pl. XV, fig. 3 and 4) are formed of branches whose flat extremities have a small number of openings. At the center rises a column formed of the parallel stems united to each other by some transverse beams. The others (pl. XV, fig. 1) form more or less circular plates with irregular contours and a fine network, circumscribing three large central openings and some peripheral openings. In the center of these plates rises also a column with three stems.

The spatulas (pl. XV, fig. 9) have very variable forms. They are very enlarged and their handle is short. The openings are very large toward the handle while the periphery has openings of small size. The handle itself is pierced its entire length. It has an irregular form and it often has lateral extensions.

The anchors (pl. XV, fig. 7 and 8) are simple, with short and curved branches. The hilt (pl. XV, fig 8) forms a circular disk with four large openings.

The integument of the caudal region is more or less thick, white or greyish white. They have turriform triradiate spicules (pl. XV, fig 5 and 6). The base of these spicules is elongated often in two diametrically opposite directions, but sometimes the form is more irregular. It has three central openings surrounded by a large number of other openings whose dimensions are uniform. At the center rises a very tall column, formed of three nearly parallel stems united to each other by 4 or 5 stages of transverse beams.

The interradiial pieces of the calcareous ring (pl. XV, fig 10) have three anterior tips. The radial pieces have two anterior tips and a strong posterior extension slightly curved and a bifid end.

SIMILARITIES AND DIFFERENCES. — *A. brevicaudatum* is easily distinguished from all the species already described. By its spatulas with branched arms, it is near *A. tridens* Sluiter from which it differs by the form of the spatulas and the anchors. The spicules of the caudal region recall those of *A. perforata* Sluiter, and especially those that we described in *A. contortum*. These are distinguished by a shorter central column and by very developed extensions. The triradiate spicules of the body wall clearly characterize this species.

5. *Ankyroderma contortum* nov. sp.

Plate XIV, fig 8 to 13.

Coast of Kistna. Depth 753 fathoms. 1 specimen.

The total length is 84 mm, including the caudal region that measures 9 mm. It is conical. Its width at the base is 4 to 5 millimeters and it connects insensibly to the body strictly speaking whose larger diameter reaches 6 mm. The buccal disk is 5 mm in diameter. The general color is maroon brown. The integument is thick and a little rugose.

The fifteen tentacles are short, massive and their rounded end has a small extension on each side.

The integument of the body strictly speaking contains triradiate spicules (pl. IV, fig 18) whose branches are dichotomized and are often united to each other to circumscribe elongated openings.

At the center of the disk rises a column coming from the fusion of the short, strong stems and ending in a series of tips. We have found a spicule (pl. XIV, fig 18*d*) in which the end of one of the branches has a mamelonated swelling.

The spatulas (pl. XIV, fig 12) is formed of plates with one or two short extensions. They have a small number of large openings irregularly arranged. The anchors (pl. XIV, fig. 9–11) have two short curved branches. Their handle (fig. 9–10) is oval and has a large opening accompanied on each side by a smaller opening.

The spicules of the caudal region greatly resemble those of our *A. polymorphum*. They are formed of plates having two opposite extensions. Their enlarged central region has three central openings accompanied by some peripheral openings. At the center of the spicule rises a column formed of three short stems with a top crowned with a series of spines.

The radial parts of the calcareous ring (pl. XIV, fig. 8) have each a very developed posterior extension and a short anterior extension. The interradian parts have two very short anterior tips and two rounded posterior mamelons.

The single Polian vesicle is ovoid and reaches 3 mm. It is connected to the oral ring by a very fine peduncle.

SIMILARITIES AND DIFFERENCES. — The spicules of *A. contortum* are very characteristic. Those of the caudal region alone recall those of our *A. polymorphum* and of *A. perforata* Sluiter, but the form of the other spicules permit easy separation of them from these two species. The spatulas do not have the very distinct handle. They thus represent the exaggeration of the form of those of *A. tridens* Sluiter.

6. *Ankyroderma intermedium* nov. sp.

Plate XV, fig. 19 to 25.

Kistna coast. Depth 753 fathoms. 1 specimen.

Station 199. Lat. N. 8°40'. Long. E. 81°27'35". Depth 800–637 fathoms. 7 specimens.

The length of the body strictly speaking varies from 19 to 115 mm and the width from 8 to 25 mm. The length of the caudal region varies between 4 and 17 mm. This region is most often cylindrical, except however toward the base where it is enlarged and connected to the body.

The body is greyish in color. The tail is whitish.

The fifteen tentacles are short, stocky and have on each side of their rounded end a small digitiform extension.

The integument of the body contains oval red spicules (pl. XV, fig. 19), triradiate spicules, anchors and spatulas. The triradiate spicules (pl. XV, fig 20) have only three branches with bifurcated ends. They have in the center two or three simple stems whose bases of insertion only are generally preserved.

The anchors (pl. XV, fig. 21 to 22) end in two short branches. Their handle is elongated, cylindrical and their hilt has three branches whose ends are thick and can be united by peripheral arcs.

The spatulas have the form of a spoon (pl. XV, fig. 25) with sinuous contours. They have a large number of openings. The peripheral openings are generally smaller than the central ones.

The calcareous spicules of the caudal region are formed of turriiform plates (pl. XV, fig. 23 and 24) whose bases are extended in two diametrically opposed extensions. This base has three central openings alternating with two or three peripheral openings. At the center rises a column

formed of three stems, united with each other by three stages of transverse beams that end in a crown of spines. The calcareous ring resembles that of our *A. polymorphum*.

SIMILARITIES AND DIFFERENCES. — *A. intermedium* approaches *A. Roretzii* Marenzeller by the form of the turriiform spicules of the tail and by the spoon-shaped spatulas. But in *A. intermedium*, the turriiform spicules have more elongated extensions, the spatulas have more irregular contours and the handle is perforated. We no longer find here the cups reported for *A. Roretzii* but only triradiate spicules. *A. intermedium* also has some affinities with *A. perforata* Sluiter, but the calcareous spicules are very distinct so that we cannot confuse the two species. Finally, *A. intermedium* is also close to our species *A. contortum* and *A. polymorphum* but it cannot be confused with them.

7. *Ankyroderma polymorphum* nov. sp.

Plate XIV, fig. 14 to 19.

Station 102. Lat. N. 15° 38'. Long. E. 82°30'. Depth 920–690 fathoms. 1 specimen.

This specimen measures 50 mm in length including the tail that is 15 mm in length. The maximum diameter of the body is 10 mm. The buccal disk is 5 mm in diameter and the base of the tail about 2 to 3 mm. The integument is white with red patches. It is rugose.

The spicules of the body strictly speaking contain oval red spicules, triradiate plates, and anchors.

The plates (pl. XIV, fig 18 ad 19) are often more or less rounded, with sinuous contours. They have three central openings arranged with the base of a column formed of three stems ending in a crown of spines and some peripheral openings nearly the same size as the central openings.

The spatulas (pl. XIV, fig. 14) have an oval or quadrangular plate with a rounded rim. One of its sides is extended by a flat and rectangular handle that sometimes has one or two accessory branches. Toward the handle, the plate has large openings, but it has toward the rounded terminal border a very large number of peripheral openings. The handle has likewise very elongated openings over its entire length.

The anchors (pl. XIV, fig 15 and 16) are very peculiar. They have different forms. Some have two short arms (fig. 16 *c*). Others (fig. 15 and 16 *a*) have three slightly curved arms located at equal distances from each other. Others finally (fig. 16 *b*) have four arms arranged more or less exactly in pairs. The handle and the hilt of these anchors are identical to those of the anchors of our *A. intermedium*.

The spicules of the caudal region (pl. XIV, fig. 20) form enlarged plates in their center that are continued by two diametrically opposed extensions. At the center are three openings arranged at the base of a small column formed of the contiguous stems and that ends in a series of tips. The rest of the plate has some openings that extend up toward the extensions.

The interradiial parts of the calcareous ring (pl. XIV, fig. 17) have some very small tips directed forward and two posterior mamelons. The projecting radial parts are extended posteriorly in a strong tip whose end is bifid and anteriorly by one or two much smaller tips.

SIMILARITIES AND DIFFERENCES. — *A. polymorphum* is distinguished from all other presently known *Ankyroderma* by its anchors with two, three or four branches. It comes close to our *A. intermedium* by the form of the spatulas and the turriiform plates of the caudal region.

SYNAPTIDAE

PROTANKYRA Ostergren.

1. *Protankyra denticulata*

Plate XV, fig 36 to 39.

Station 131. Lat. N.16°01'. Long. E. 18°25'. Depth 410 fathoms. 1 specimen.

This specimen is composed of a trunk of the body lacking the anterior region measuring 70 mm in length. The contour is polygonal and the diameter is 12 mm.

The integument is brownish and a little rugose. The plates of the anchors (pl. XV, fig 38) are quadrangular with rounded borders. Their openings are larger in the central region than at the periphery. In the region of the handle, we see a secondary network formed of a very fine and very dense mesh.

The anchors (pl. XV, fig. 36 and 37) are strong, with slightly curved arms and with a large number of small teeth on their external border. These teeth are usually interrupted at the base of the arms. However, in one anchor that we have represented (pl. XV, fig. 37), the teeth continue without interruption from one side to the other. The hilt is divided into lobes by small handles and it is finely toothed around the entire periphery. The military spicules (pl. XV, fig. 39) are oval.

SIMILARITIES AND DIFFERENCES. — *P. denticulata* is close to *P. Benedeni* Ludwig. It differs from it by its more rectangular plates and by the secondary network of the narrow region of the plates. The border of the arms of the anchors is also more strongly toothed and the hilt of the anchors is finely toothed, while it is smooth in *P. Benedeni*.

2. *Protankyra conferta* nov. sp.

Plate XV, fig. 26 to 29.

Station 262. Lat. N. 8°48'. Long. E. 80°37'. Depth 805 fathoms. 1 specimen.

Station 133. Lat. N. 15°43'30". Long. E. 81°19'30". Depth 678 fathoms. 1 specimen.

The specimen from Station 262 is incomplete and the anterior end is missing. The preserved portion measures 72 mm in length. It is whitish and more or less contracted. The integument is warty. The other specimen has kept the anterior end. It measures 50 mm in length and its integument is brownish. The internal organs no longer exist.

The twelve tentacles have at their end a double pair of accessory branches.

The anchor plates (pl. XV, fig. 28) are ovoid. Their periphery is strongly toothed. They have a large number of openings, a few larger in the central region than at the periphery. Moreover, we find on all the surface of the plate small openings intercalated more or less regularly between the

large openings. The periphery of all these openings have very numerous teeth. Toward the region of the handle, we recognize a secondary network superposed on the principal network. Sometimes this secondary network is very coarse (pl. XV, fig. 29); sometimes it is formed by the entanglement of fine branches.

The anchors (pl. XV, fig 27) are slender and symmetrical. Their hilt has a large number of more or less delimited branches. The arms of the anchor are very pointed and they have on the external border six to seven teeth. The base of the arms is slightly truncated and lacks teeth.

The military spicules (pl. XV, fig 26) are represented by short stocky rods with slightly swollen ends.

SIMILARITIES AND DIFFERENCES. — *P. conferta* recalls *P. suspecta* Sluiter by its oval anchor plates and large number of openings. But in our species the periphery of the plates has teeth and a secondary network in the region of the handle. The hilt of the anchors is also more branched. Finally, the military spicules are more oval than in *P. suspecta*.

3. *Protankyra errata* nov. sp.

Plate XV, fig. 14 to 16.

Ankyroderma Mazenzelleri Théel. Walsh. 1891. Journ. Asiatic Soc. Bengal. Vol. LX, Part II. P. 203.
Andaman Islands. Depth 130–150 fathoms. 2 specimens.
Gulf of Bengal. Depth 480 fathoms. 1 specimen.

The specimen dredged at 480 fathoms has been reported by Walsh as the genus *Ankyroderma*, without doubt because of the peculiar form that it has. In fact, the anterior part is wide and not contracted, while the following region, very contracted, is much narrower. This results in an appearance that can indicate at first sight a molpadiid. The anterior region, non-contracted, is 70 mm in length and 10 mm in diameter and the following part is 25 mm in length and 3 mm in diameter. The two other individuals are, respectively, 4 and 8 mm in length. One is strongly contracted. The other has a conical form with the anterior region very extended.

The eleven to twelve tentacles are short, stocky and destroyed on the outside. They have pairs of digitations, sometimes even three, at their end.

The anchor plates (pl. XV, fig. 14) are oval and elongated. Their borders are irregular and have some teeth and unequal extensions. The openings are very numerous and the periphery has a small number of teeth. The handle is inflected in its middle and has an opening on each side. In the region of the handle, the openings are very much smaller and more numerous.

The anchors (pl. XV, fig 15) are symmetrical. Their arms are slightly curved and have on their external border a dozen teeth that do not reach the point of union of the arms where we encounter them sometimes two small isolated teeth. The hilt is little developed and has on its free part some short extensions irregularly disposed.

The military spicules (pl. XV, fig. 16) consist of short rods, slightly curved, with bifurcated ends.

SIMILARITIES AND DIFFERENCES. — *P. errata* greatly recalls by the form of its plates and anchors, *P. Benedenni* Ludwig. But it differs by its military spicules in the form of elongated rods and with bifurcated ends, by the toothed openings of its plates and by the hilt of the anchors having numerous tips on its surface.

4. *Protankyra tristis* nov. sp.

Plate XV, fig. 17 and 18.

Station 97. Lat. N. 18°26'. Long. E. 85°24'. Depth 1310 fathoms. 1 specimens.

The specimen is very incomplete. The anterior end is missing and the length of the part preserved is only about 25 mm. The integument is greyish white and has a warty surface.

The anchor plates (pl. XV, fig. 17) are quadrangular with the anterior end rounded and the posterior end truncated. The borders are regularly and irregularly toothed. These plates have some openings, scarcely larger in the center than at the periphery and whose periphery has some teeth. The handle of the plate forms an enlarged band connected to the plate at three or four points and has some openings.

The anchors (pl. XV, fig. 18) a stem slightly swollen toward the hilt. This is composed of two dichotomized and smooth branches. The arms of the handle are nearly equal and have four teeth on their external border.

SIMILARITIES AND DIFFERENCES. — *P. tristis* recalls *P. aculeata* (Théel) by the form of the anchors. It is distinguished by the dentition of the periphery of the openings of the plates and by the hilt of the anchors that is dichotomous at the end.

5. *Protankyra timida* nov. sp.

Plate XV, fig. 33 to 35.

Station 112. Lat. N. 13°47'30". Long. E. 92°36'. Depth 561 fathoms. 1 specimen, Andaman Islands. Depth 650 fathoms. 1 specimen.

The anterior end of each individual alone is preserved with a length of 12 and 15 mm. The general color is whitish.

The buccal disk is expanded. Its diameter is 8 mm. It is surrounded by twelve short, stocky tentacles and has at the end two pairs of small digitations.

The anchor plates (pl. XV, fig. 84) are trapezoidal, with irregular borders having numerous peripheral extensions. They have in their middle region two principal openings, elongated following the large axis of the plate. Before and behind these openings, we find a row of three small and rounded openings. Finally, we encounter toward the periphery of the plate, other smaller openings that are more numerous beyond the handle. These are wide, with irregular contours. It is fixed to the plate by five or six tips. The large openings have on their periphery a small number of plates.

The anchors (pl. XV, fig. 33) are strong. The handle has a slight swelling separated by a very marked constriction of the hilt that is wide, slightly flared and with very weakly toothed borders. The branches of the anchor are strong and have four teeth in the external half.

The calcareous ring (pl. XV, fig. 35) is formed of parts with rounded contours and not having any anterior or posterior tip. There is no difference between the radial and interradial parts.

SIMILARITIES AND DIFFERENCES. — *P. timida* forms with *P. Challengeri* (Théel), *P. bicornis* Sluiter and *P. Sibogæ* Sluiter a distinct group of *Protankyra* where the plates have only a small number of large openings. It is distinguished by the clear symmetrical arrangement of the plates that are asymmetrical in the three preceding *Protankyra*. The form of the anchors is likewise elongated in these species.

6. *Protankyra inflexa* nov. sp.

Plate XV, fig. 30 to 32.

Gulf of Bengal. Depth 410 fathoms. 2 specimens.

These two specimens are incomplete. One has the anterior end that measures 42 mm in length. The other has the trunk of the anterior region 110 mm in length.

The mouth is surrounded by twelve short, massive tentacles damaged on the outside. Each has at their end two pairs of digitated extensions. The diameter of the expanded buccal disk is 6 to 7 mm.

The integument is warty and maroon brown in color.

The miliary spicules (pl. XV, fig. 32) have the form of slightly curved rods sometimes with swollen and bifid ends.

The anchor plates (pl. XV, fig. 30) are obovate with irregular borders. They have in their central part large openings from which radiate smaller openings. The periphery of some of these openings has a few teeth. The handle is formed of a secondary, very dense network having the aspect of a series of small tangled rods.

The arms of the anchors (pl. XV, fig. 31) are curved and they have on their external border six or seven teeth that do not pass the middle. At the point of their joining, the two arms are inflected and determine thus a returning angle. The handle is swollen in its median part and it ends in a hilt composed of two very separated parts whose border is slightly toothed.

SIMILARITIES AND DIFFERENCES. — *P. inflexa* approaches, by the obovate form of the plates, *P. similis* (Semper), *aculeata* (Théel), *Verrilli* (Théel) and *insolens* (Théel) but it differs from them by a great difference in size between the openings of the center and of the periphery, the secondary network of the handle, by the miliary spicules that are composed of very elongated rods and finally by the characters of the anchors.

ANAPTA Semper.

1. *Anapta* (?) *dubiosa* nov. sp.

Plate XV fig. 11 and 12.

Gulf of Bengal. 410 fathoms. 2 incomplete morsels.

The first fragment includes the anterior region. It is 20 mm long and about 14 mm in diameter. Its contour is polygonal. The other fragment is a trunk 30 mm in length lacking the anterior region.

The integument is maroon in color. It contains only miliary spicules (pl. XV, fig. 11) formed of rods more or less curved and with swollen ends that are sometimes bifurcated.

The twelve tentacles have at their end two pairs of digitiform extensions. They are short, stocky and their form is absolutely identical with that of *Protankyra*.

The calcareous ring (pl. XV, fig. 12) is very distinct. The wide radial parts are formed of two thickenings connected in the form of a U at their base and are separated by a flat portion. The

interradial parts have an elongated median thickness enlarged at the base and fused to the radial parts, and two lateral flat portions.

The gonads are formed of very fine tubes.

SIMILARITIES AND DIFFERENCES. — The systematic position of this holothuroid is very difficult to establish. The absence of anchors and of anchor plates in the integument is certainly a character of *Anapta*, but, on the other hand, the tentacles with two pairs of digitations and miliary spicules in the form of rods is found in numerous representatives of the genus *Protankyra*. Ostergren considers *Anapta subtilis* Sluiter as a species of synaptid probably in the state of regeneration. It is the only species of *Anapta* whose tentacles have four or five digitations, but it does not have calcareous spicules. The other *Anapa* have pinnate tentacles as Semper indicated in the diagnosis of the genus *Anapta*.

EXPLANATION OF THE PLATES

Plate I.

- Fig. 1. *Perisona magna* (⁸) nov. gen., nov. sp.; ventral surface.
Fig. 2. *Bathyzona incerta*, nov. gen., nov. sp.; dorsal surface.
Fig. 3. *Bathyzona incerta*, nov. gen., nov. sp.; ventral surface.
Fig. 4. *Benthothuria cristatus*, nov. sp., lateral view.
Fig. 5. *Trochostoma elongatum*, nov. sp.; lateral view.
Fig. 6. *Mesothuria incerta*, nov. sp.; dorsal surface; slightly enlarged.
Fig. 7. *Pelopatides mammillatus*, nov. sp.; dorsal surface.

Plate II.

- Fig. 1. *Pelopatides insignis*, nov. sp.; dorsal surface.
Fig. 2. *Pelopatides modestus*, nov. sp.; ventral surface.

Plate III.

- Fig. 1. *Allopatides dendroides*, nov. sp.; dorsal surface.
Fig. 2. *Dendrothuria similis*, nov. gen., nov. sp.; ventral surface.
Fig. 3. *Bathyplores assimilis*, nov. sp.; ventral surface.
Fig. 4. *Peniagone stabilis*, nov. sp.; lateral view; enlarged.
Fig. 5. *Benthothuria distortus*, nov. sp.; lateral view; slightly enlarged.
Fig. 6. *Pelopatides ovalis* (Walsh), ventral surface.
Fig. 7. *Pelopatides ovalis* (Walsh), dorsal surface.
Fig. 8. *Pseudostichopus occultatus* Marenzeller var. *plicatus*, nov. var.; dorsal posterior region; about two times enlarged.

Plate IV.

- Fig. 1. *Bathyplores profundus*, nov. sp.; ventral surface.
Fig. 2. *Bathyplores profundus*, nov. sp.; dorsal surface.
Fig. 3. *Pseudothuria duplex*, nov. gen., nov. sp.; ventral surface.
Fig. 4. *Synallactes* (?) *pellucidus*, nov. sp.; ventral surface; enlarged two times.
Fig. 5. *Synallactes* (?) *pellucidus*, nov. sp.; dorsal surface, enlarged two times.
Fig. 6. *Amphideima Investigatoris*, nov. gen., nov. sp.; ventral surface.
Fig. 7. *Euriplastes obscura*, nov. gen., nov. sp.; lateral view.
Fig. 8. *Euriplastes obscura*, nov. gen., nov. sp.; ventral surface.
Fig. 9. *Euriplastes obscura*, nov. gen., nov. sp.; dorsal surface.

⁸ Except for special indications, the drawings of the animals are at natural size.

Fig. 10. *Peniagone expansa*, nov. sp.; ventral surface; enlarged about two times.

Plate V.

- Fig. 1. *Synallactes rigidus*, nov. sp.; dorsal surface.
- Fig. 2. *Apodogaster Alcocki* Walsh; ventral surface; slightly enlarged.
- Fig. 3. *Apodogaster Alcocki* Walsh; dorsal surface; slightly enlarged.
- Fig. 4. *Perizona magna*, nov. gen., nov. sp.; ventral posterior region.
- Fig. 5. *Pelopatides gelatinosus* (Walsh); ventral surface.
- Fig. 6. *Gephyrothuria Alcocki*, nov. gen., nov. sp.; ventral surface.
- Fig. 7. *Gephyrothuria Alcocki*, nov. gen., nov. sp.; dorsal.
- Fig. 8. *Gephyrothuria Alcocki*, nov. gen., nov. sp.; opened ventrally.
- Fig. 9. *Trochostoma concolor*, nov. sp.
- Fig. 10. *Bathyploetes variabilis*, nov. sp.; ventral surface.
- Fig. 11. *Peniagone stabilis*, nov. sp.; ventral surface; X 1 ½.

Plate VI.

- Fig. 1. *Filithuria elegans*, nov. gen., nov. sp.; dorsal surface.
- Fig. 2. *Filithuria elegans*, nov. gen., nov. sp.; ventral surface.
- Fig. 3. *Oneirophanta conservata*, nov. sp.; ventral surface.
- Fig. 4. *Psolus levis*, nov. sp., dorsal surface.
- Fig. 5. *Psolus levis*, nov. sp., ventral surface.
- Fig. 6. *Psolus levis*, nov. sp.; lateral view.
- Fig. 7. *Psolidium* (?) *rugosum* nov. sp.; silhouette, lateral view; enlarged about two times.
- Fig. 8. *Psolidium* (?) *rugosum*, no. sp.; dorsal view; enlarged about two times.
- Fig. 9. *Psolidium* (?) *rugosum*, nov. sp.; ventral surface; enlarged about two times.
- Fig. 10. *Mesothuria squamosa*, nov. sp.; dorsal surface.
- Fig. 11. *Psolidium* (?) *translucidum*, nov. sp.; lateral silhouette. X 3.
- Fig. 12. *Psolidium* (?) *translucidum*, nov. sp.; dorsal surface. X 3.
- Fig. 13. *Psolidium* (?) *translucidum*, nov. sp.; ventral surface. X 3.
- Fig. 14. *Psolus membranaceus*, nov. sp.; ventral surface. X 2.
- Fig. 15. *Psolus membranaceus* nov. sp.; lateral view. X 2.

Plate VII.

- Fig. 1. *Benthodytes superba*, nov. sp.; lateral view.
- Fig. 2. *Benthodytes superba*, nov. sp.; ventral surface.

Plate VIII

- Fig. 1. *Euphronides bifurcata*, nov. sp.; dorsal surface.

- Fig. 2. *Euphronides bifurcata*, nov. sp.; ventral surface.
 Fig. 3. *Ophnurgus glaber* Walsh; dorsal surface; slightly enlarged.
 Fig. 4. *Psychropotes minutus*, nov. sp.; ventral surface.
 Fig. 5. *Psychropotes minutus*, nov. sp.; lateral view.
 Fig. 6. *Benthophyces fragilis*, nov. gen., nov. sp.; ventral surface.
 Fig. 7. *Benthophyces fragilis*, nov. gen., nov. sp.; dorsal surface.

Plate IX.

Fig. 1–8. *Pseudostichopus occultatus* Marenzeller, var. *plicatus*, nov. var.

- Fig. 1, *a* and *b*. Plates of the perianal region. X 245.
 Fig. 2, *a-d*. Rods of the pedicels. X 245.
 Fig. 3, *a-d*. Rods of the gonads. X 245.

Fig. 4–9. *Mesothuria incerta*, nov. sp.

- Fig. 4. Calcareous ring: *ir*, interradial piece; *r*, radial piece. X 5
 Fig. 5 *a-c*. Turriform spicules of the body wall, seen from the front. X 245.
 Fig. 6. Turriform spicule of the dorsal wall, seen from the side. X 245.
 Fig. 7, *a-b*. Turriform spicules of the lateral papillae. X 245.
 Fig. 8, *a-b*. Turriform spicules of the ventral papillae. X 245.
 Fig. 9. Terminal plate of the ventral pedicels. X 165.

Fig. 10–11. *Mesothuria squamosa*, nov. sp.

- Fig. 10, *a-b*. Turriform spicules of the integument, seen from the front. X 245.
 Fig. 11, *a-b*. Turriform spicules of the integument, seen from the side. X 245.

Fig. 12–16. *Synallactes rigidus*, nov. sp.

- Fig. 12, *a-b*. Cruciform spicules, seen from the side. X 245.
 Fig. 13, *a-b*. Cruciform spicules, seen from the front. X 245.
 Fig. 14, *a-b*. Cruciform spicules with united branches seen from the front. X 245.
 Fig. 15. Turriform spicule. X 245.
 Fig. 16. Rods. X 245.

Fig. 17–21. *Synallactes dubius*, nov. sp.

- Fig. 17, *a-c*. Turriform spicules of the appendages, seen from the side. X 245/
 Fig. 18. Turriform spicule of the appendages, seen from the front. X 245.
 Fig. 19. Turriform spicule with circular base. X 245.
 Fig. 20, *a-d*. Rods. X 165.
 Fig. 21. Calcareous ring: *ir*, interradial piece; *r*, radial piece. X 2.

Fig. 22–25. *Synallactes pellucidus*, nov. sp.

- Fig. 22. Turriiform spicule of the body wall, seen from the side. X 245.
Fig. 23. Turriiform spicule of the body wall, seen from the front. X 245.
Fig. 24. Turriiform spicule of the appendages, seen from the front. X 245.
Fig. 25. *a* and *b*, flat rods of the appendages. X 245.

Fig. 26–30. *Synallactes Wood-Masoni* (Walsh).

- Fig. 26. Disk of a large size, with large central meshes and four stems. Seen from the front. X 150.
Fig. 27. Disk with central stems, seen from the side. X 150.
Fig. 28. Disk of a small size from latero-ventral appendages. X 150.
Fig. 29. Flat rods from the appendages *a-c*, X 55. *d*, X 150.
Fig. 30. Elongated disk. X 55.

Plate X.

Fig. 1–3. *Bathyplores assimilis*, nov. sp.

- Fig. 1, *a-b*. Cruciform spicules, seen from the side. X 245.
Fig. 2. Cruciform spicule, seen from the front. X 245.
Fig. 3. Rod. X 165.

Fig. 4–8. *Bathyplores crenulatus*, nov. sp.

- Fig. 4, *a-c*. Turriiform spicules, seen from the front. X 245.
Fig. 5, *a-b*. Turriiform spicules, seen from the side. X 245.
Fig. 6. Rod. X 245.
Fig. 7, *a-b*. C-shaped spicules. X 245.
Fig. 8. Reticulated plate (rare). X 245.

Fig. 9–18. *Bathyplores variabilis*, nov. sp.

- Fig. 9, *a-b*. Cruciform spicules from the dorsal wall, seen from the front. X 245.
Fig. 10, *a-b*. Cruciform spicules from the dorsal wall, seen from the side. X 245.
Fig. 11. C-shaped spicules from the dorsal wall. X 245.
Fig. 12. Cruciform spicule from the dorsal papillae, seen from the front. X 165.
Fig. 13. Cruciform spicule from the dorsal papillae, seen from the side. X 165.
Fig. 14, *a-b*. Flat and branched rods of the dorsal papillae. X 165.
Fig. 15. Spinose rods of the dorsal papillae. X 165.
Fig. 16. Reticulated plate of the dorsal papillae (rare). X 165.
Fig. 17. Cruciform spicules of the ventral pedicels. X 165.
Fig. 18. Rod of the ventral pedicels. X 165.

Fig. 19–20/ *Bathyplores profundus*, nov. sp.

Fig. 19. Cruciform spicule, seen from the front. X 245.

Fig. 20. Cruciform spicule, seen from the side. X 245.

Fig. 21–24. *Bathyploetes papillosus*, nov. sp.

Fig. 21, *a-b*. Cruciform spicules of dorsal papillae, seen from the front. X 165.

Fig. 22, *a-b*. Cruciform spicules of the dorsal papillae, seen from the side. X 165.

Fig. 23. Rod of dorsal papillae. X 165.

Fig. 24. Cruciform spicule of the ventral surface. X 165.

Fig. 25-26. *Pelopatides verrucosus*, nov. sp.

Fig. 25, *a-d*. Rods of ventral median pedicels. X 165.

Fig. 26. Triradiate spicule with short central stem. X 165

Fig. 27–30. *Pelopatides gelatinosus* (Walsh).

Fig. 27, *a-f*. Rods with dichotomized ends. X 245.

Fig. 28, *a-c*. Triradiate spicules. X 245.

Fig. 29. Triradiate spicules with dichotomized ends having a central stalk surmounted by spines.
X 245.

Fig 30. Cruciform spicule, seen from the front. X 165.

Plate XI.

Fig. 1–4. *Pelopatides ovalis* (Walsh).

Fig. 1, *a-c*. Triradiate spicules with central stem from the body wall, seen from the front. X 165.

Fig. 2, *a-b*. Triradiate spicules with central stem from the body wall, seen from the side. X 165.

Fig. 3, *a-d*. Rods with dichotomized ends from the dorsal papillae. X 165.

Fig. 4, *a-b*. Triradiate spicules from the dorsal papillae. X 165.

Fig. 5–7. *Bathyzona incerta*, nov gen., nov. sp.

Fig. 5, *a-c*. Triradiate spicules with central stem, seen from the front. X 165.

Fig. 6. Central stem, seen from the side. X 165.

Fig. 7. Rod with a stem in its center (it is broken). X 165.

Fig. 8–12. *Dendrothuria similis*, Nov. gen, nov. sp.

Fig. 8. Cruciform spicules with spinose arms from the body wall. X 165.

Fig. 9. Cruciform spicule with terminal disks from the body wall. X 165.

Fig. 10. Spinose rod from the body wall. X 245.

Fig. 11. Cruciform spicule with spinose arms from the gonads. X 245.

Fig 12, *a*. Spinose spicules from the gonads. X 245.

Fig. 12, *b-c*. Spinose spicules from the gonads. X 165.

Fig. 13–15. *Deima Blakei* Théel.

Fig. 13, *a-f*. Spicules with several branches from the gonads. X 55.

Fig. 14. Circular plate with simple network. We find from place to place some small stems on the nodes of the network. X 40.

Fig. 15. Portion of a circular plate showing the formation of a double network. X 40.

Fig. 16–19. *Oneirophanta conservata*, nov. sp.

Fig. 16. Plate from the dorsal wall. X 55.

Fig. 17. Developing plate of a dorsal papilla. X 55.

Fig. 18. Rod of the lateral papilla. X 55.

Fig. 19, *a-b*. Rod of lateral appendages. X 55.

Fig. 20. *Allopatides dendroïdes*, nov. gen., nov. sp.

Fig. 20. Dendroid spicules of the marginal papillae. X 245.

Fig. 21. *Perizona magna*, nov. gen., nov. sp.

Fig. 21, *a-d*. Branched and spinous spicules from the marginal border. X 245.

Fig. 22–23. *Pelopatides insignis*, nov. sp.

Fig. 22. Spinose rods. X 245.

Fig. 23. Rods of large size, not spinose. X 245.

Fig. 24–26. *Pelopatides modestus*, nov. sp.

Fig. 24, *a-b*. Branched and spinose spicules. X 245.

Fig. 25. Rod of large size, not spinose. X 245.

Fig. 26, *a*. Branched not spinose spicule. X 150.

Fig. 26, *b*. Branched not spinose spicule. X 245.

Plate XII.

Fig. 1–3. *Ophnurgus glaber* Walsh.

Fig. 1. Rod of pedicels. X 40.

Fig. 2, *a-d*. Rods with dichotomized ends of latero-ventral pedicels. X 150.

Fig. 3. Rod with dichotomized ends from dorsal papillae. X 150.

Fig. 4–7. *Benthophyces fragilis*, nov. gen., nov. sp.

Fig. 4, *a-b*. Wheels. X 245.

Fig. 5. Curved rods. X 245.

Fig. 6. Rods from the anterior region of the body. X 165.

Fig. 7, *a-f*. Rods from the posterior region of the body. X 165.

Fig. 8. *Amphideima Investigatoris*, nov. gen., nov. sp.

Fig. 8, *a-c*. Straight and curved rods. X 55.

Fig. 9. *Ophnurgus invalidus*, nov. sp.

Fig. 9, *a-c*. Rods from the integument. X 55.

Fig. 10. *Benthodytes glutinosa* R. Perrier.

Fig. 10, *a-b*. Rods from the gonads. X 55.

Fig. 11–12. *Benthodytes superba*, nov. sp.

Fig. 11, *a-c*. Cruciform spicules. X 40.

Fig. 12, *a-c*. Rods from the dorsal surface. X 40.

Fig. 13–14. *Apodogaster Alcocki* Walsh.

Fig. 13. Spinose rods (rare).

Fig. 14, *a-b*. Wheels. X 245.

Fig. 15–18. *Synallactes horridus*, nov. sp.

Fig. 15. Cruciform spicule from papillae, seen from the front. X 165.

Fig. 16. Cruciform spicule from papillae, seen from the side. X 165.

Fig. 17. Cruciform spicule with several branches, some of which are united by their periphery. X 165.

Fig. 18. Rod. X 165.

Fig. 19–20. *Mesothuria abbreviata*, nov. sp.

Fig. 19. Turriform spicule, seen from the front. X 385.

Fig. 20. Turriform spicule, seen from the side. X 385.

Fig. 21. *Peniagone stabilis*, nov. sp.

Fig. 21. Tetraradiate spicule with spinose mamelons. X 55.

Fig. 22. *Euphronides bifurcata*, nov. sp.

Fig. 22. Cruciform spicule of small size. X 245.

Fig. 23–24. *Psychopotes minutus*, nov. sp.

Fig. 23. Cruciform spicule from the dorsal and lateral wall. X 245.

Fig. 24. Cruciform spicule from the caudal region. X 245.

Fig. 25–26. *Peniagone* (?) *obscura*, nov. sp.

Fig. 25, *a-b*. Tetraradiate spicules with spinose mamelons. X 55.

Fig. 26. Branched spicules. X 245.

Fig. 27–28. *Peniagone expansa*, nov. sp.

Fig. 27, *a-b*. Tetraradiate spicules with spinose mamelons and central stem, seen from the front. X 55.

Fig. 28, *a-c*. Tetraradiate spicules with spinose mamelons, seen from the side. X 55.

Fig. 29–31. *Filithuria elegans*, nov. sp.

Fig. 29, *a-b*. Rods from tentacles. X 165.

Fig. 30, *a-c*. Rods from pedicels. X 245.

Fig. 31. Calcareous ring: *ir*, interradial piece; *r*, radial piece. X 8.

Plate XIII.

Fig. 1–3. *Psolidium* (?) *rugosum*, nov. sp.

Fig. 1, *a-b*. Spicules from the ventral sole. X 165.

Fig. 2, *a-b*. Spicules from dorsal papillae. X 245.

Fig. 3, *10c*. Spicules from ventral pedicels. X 165.

Fig. 4–5. *Psolus membranaceus*, nov. sp.

Fig. 4, *a-c*. Spicules from ventral pedicels. X 165.

Fig. 5, *a-d*. Spicules from the ventral sole. X 55.

Fig. 6–7. *Psolus livis*, nov. sp.

Fig. 6, *a-d*. Spicules from ventral pedicels. X 165.

Fig. 7, *a-d*. Spicules from the ventral sole. X 150.

Fig. 8. *Psolidium* (?) *translucidum*, nov. sp.

Fig 8, *a-d*. Spicules from the ventral sole. X 245.

Fig. 9–10. *Trochostoma albicans* Théel.

Fig. 9, *a-b*. Perforated plate from the body wall, showing some spines on their surface, seen from the front. X 150.

Fig. 10. Spicule from the body, seen from the side. X 150.

Fig. 11–15. *Trochostoma andamanense* Walsh

Fig. 11, *a-g*. Turriform spicules from the body strictly speaking. X 150.

Fig. 12, *a-c*. Turriform spicules, seen from the side. X 150.

Fig. 13, *a-c*. Elongated and fusiform plates from the caudal region. X 150.

Fig. 14. Plate with three extensions from the caudal region. X 150/

Fig. 15. Plate from the caudal region. X 150.

Fig. 16–18. *Trochostoma concolor*, nov. sp.

Fig. 16, *a-d*. Spicules from the caudal region. X 165.

Fig. 17. Spicule whose stem has extensions parallel to the plane of the base. X 165.

Fig. 18. Plates whose extensions form a kind of cross. X 165.

Fig. 19–22. *Trochostoma concolor*, var. *caudatum*, nov. var.

Fig. 19. Triradiate spicule from the body strictly speaking. X 165.

Fig. 20. Spicule from the caudal region recalling those of *Tr. concolor*. X 165/

Fig. 21. Elongated and fusiform plate from the caudal region, seen from the front. X 165.

Fig. 22, *a-b*. Elongated and fusiform plate from the caudal region, seen from the side. X165;

Fig. 23. *Trochostoma pauperum*, nov. sp.

Fig. 23. Fusiform plates from the caudal region seen from the front. X 150.

Fig. 24. *Trochostoma ecalcaeum*, nov. sp.

Fig. 24. Calcareous ring: *ir*, interradial part; *r*, radial part. X 8.

Plate XIV.

Fig. 1–3. *Trochostoma elongatum*, nov. sp.

Fig. 1, *a-g*. Rods of the tail, the middle region alone is shown. X 150.

Fig. 2, *a-e*. Spicules of the body strictly speaking, seen from the front. X 150.

Fig. 3. Spicule of the body strictly speaking, seen from the side. X 150/

Fig. 4–7. *Ankyroderma musculus* (Risso), var. *acutum*, nov. var.

Fig. 4, *a-l*. Circular or fusiform plates from the body strictly speaking, seen from the front. X 35 –55.

Fig. 5. Spicules from the body wall, seen from the side. X 150.

Fig. 6, *a-b*. Spatulas. X 55.

Fig. 7. Rods from the caudal region. *a*, X 150; *b-h*, X 55.

Fig. 8–13. *Ankyroderma contortum*, nov. sp.

Fig. 8. Calcareous ring. X 5.

Fig. 9. Hilt of an anchor, seen from the side. X 245.

Fig. 10. Hilt of an anchor, seen from the front. X 245

Fig. 11. Arms of the anchor. X 150.

Fig. 12. Spatulas. *a*, X 245; *b*, X 150.

Fig. 13, *a-h*. Triradiate spicules from the body strictly speaking. X 245 /

Fig. 14–20. *Ankyroderma polymorphum*, nov. sp.

Fig. 14, *a-b*. Spatula. X 165.

Fig. 15. Anchor with three branches. X 165.

Fig. 16, *a-c*. Ends of anchors showing the variations in the number of arms. X 165.

Fig. 17. Calcareous ring. X 4.

Fig. 18. Triradiate plate of the body strictly speaking, seen from the front. X 165.

Fig. 19. Triradiate plate of the body strictly speaking, seen from the side. X 165.

Fig. 20. Fusiform plate from the caudal region. X 165.

Plate XV.

Fig. 1–10. *Ankyroderma brevicaudatum*, nov. sp.

Fig. 1. Turriiform plate with circular base from the body strictly speaking. X 150.

Fig. 2. Red spicule from the body strictly speaking. X 150.

Fig. 3, *a-b*. Triradiate spicules from the body, seen from the front. X 150.

Fig. 4. Triradiate spicules from the body, seen in profile. X 150.

Fig. 5. Turriiform plate from the caudal region, seen in profile. X 150.

Fig. 6, *a-c*. Plate from the caudal region, seen from the front. X 150.

Fig. 7. Arm of an anchor. X 150.

Fig. 8. Hilt of an anchor. X 150.

Fig. 9. Spatula. X 150.

Fig. 10. Calcareous ring. X 6.

Fig. 11–12. *Anapta* (?) *dubiosa*, nov. sp.

Fig. 11. *a-e*. Miliary spicules. X 165.

Fig. 12. Calcareous ring. X 3.

Fig. 13. *Ankyroderma musculus* (Risso), var. *undulatum*, nov. var.

Fig. 13, *a-b*. Rods of the caudal region. We have shown only the middle region. X 165.

Fig. 14–16. *Protankyra errata*, nov. sp.

Fig. 14. Anchor plate. X 150

Fig. 15. Anchor. X 55.

Fig. 16. Miliary spicules. X 150.

Fig. 17–18. *Protankyra tristis*, nov. sp.

Fig. 17. Anchor plate. X 165.

Fig. 18. Anchor. X 80.

Fig. 19–25. *Ankyroderma intermedium*, nov. sp.

Fig. 19. Red spicule from the body strictly speaking. X 150.

Fig. 20. Triridiate spicule from the body strictly speaking. X 150.

Fig. 21. Anchor. X 150.

Fig. 22, *a-d*. Different forms of the hilt of the anchors. X 245.

Fig. 23, *a-c*. Fusiform plates of the caudal region, seen from the front. X 150.

Fig. 24. Fusiform plate of the caudal region, seen from the side. X 150.

Fig. 25, *a-b*. Spatulas. X 150.

Fig. 26–29. *Protankyra conferta*, nov. sp.

Fig. 26, *a-b*. Miliary spicules. X 165.

Fig. 27. Anchor. X 40.

Fig. 28. Anchor plate. X 55.

Fig. 29. Portion of an anchor plate toward the region of the handle. X 165.

Fig. 30–32. *Protankyra inflexa* nov. sp.

Fig. 30, *a-b*. Anchor plates. X 55.

Fig. 31. Anchor. X 55.

Fig. 32. Miliary spicules. X 55.

Fig. 33–35. *Protankyra timida*, nov. sp.

Fig. 33. Anchor. X 165.

Fig. 34. Anchor plate. X 165.

Fig. 35. Calcareous ring. X 5.

Fig. 36–39. *Protankyra denticulata*, nov. sp.

Fig. 36. Anchor. X 30.

Fig. 37. Portion of an anchor showing the periphery of the arm that is entirely denticulated. X 30.

Fig. 38. Anchor plate. X 55.

Fig. 39. Miliary spicules. X 55.

Auct. del.

Werner & Winter lith. Frankfurt s. M.

1. *Perizona magna*. — 2-3. *Bathyzona incerta*. — 4. *Benthothuria cristatus*. — 5. *Trochostoma elongatum*.
6. *Mesothuria incerta*. — 7. *Pelopatides mammillatus*.

Auct. del.

Werner & Winter lith. Francfort s. M.

1. *Pelopatides insignis*. — 2. *Pelopatides modestus*.

Auct. del.

Werner & Winter lith. Frankfurt s. M.

1. *Allopatides dendroïdes*. — 2. *Dendrothuria similis*. — 3. *Bathyplores assimilis*. — 4. *Pentagone stabilis*.
5. *Benthothuria distortus*. — 6-7. *Pelopatides ovalis*. — 8. *Pseudostichopus occultatus* var. *plicatus*.

Auct. del.

Werner & Winter lith. Frankfurt s. M.

1-2. *Bathyplores profundus*. — 3. *Pseudothuria duplex*. — 4-5. *Synallactes* (?) *pellucidus*.
6. *Amphideima investigatoris*. — 7-9. *Euriplastes obscura*. — 10. *Peniagone expansa*.

Auct. del.

Werner & Winter lith. Francfort a. M.

1. *Synallactes rigidus*. — 2-3. *Apodogaster Alcocki*. — 4. *Perizona magna*. — 5. *Pelopatides gelatinosus*.
6-8. *Gephyrothuria Alcocki*. — 9. *Trochostoma concolor*. — 10. *Bathyplores variabilis*. — 11. *Peniagone stabilis*.

Auct. del.

Werner & Winter lith. Frankfurt s. M.

1-2. *Filithuria elegans*. — 3. *Onciophanta conservata*. — 4-9. *Psolus levis*. — 7-9. *Psolidium (?) rugosum*.
10. *Mesothuria squamosa*. — 11-13. *Psolidium (?) translucidum*. — 14-15. *Psolus membranaceus*.

Auct. del.

Werner & Winter lith. Francfort s. M.

1-2. *Bentholytes superba*.

Auct. del.

Werner & Winter lith. Frankfurt s. M.

1-2. *Euphronides bifurcata*. — 3. *Ophururgus glaber*. — 4-5. *Psychropotes minutus*. — 6-7. *Benthophycus fragilis*.

Auct. del.

- 1-3. *Pseudostichopus occellatus* var. *plicatus*. — 4-9. *Mesothuria incerta*. — 10-11. *Mesothuria squamosa*. — 12-16. *Synallactes rigidus*.
 17-21. *Synallactes* (?) *dubius*. — 22-25. *Synallactes* (?) *pellucidus*. — 26-30. *Synallactes* (Food-Masoni).

Auct. del.

1-3, *Batyplotes assimilis*. — 4-8, *Batyplotes crenulatus*. — 9-18, *Batyplotes variabilis*. — 19-20, *Batyplotes profundus*.
21-24, *Batyplotes papillosus*. — 25-26, *Pelopatlides verrucosus*. — 27-30, *Pelopatlides gelatinosus*.

1-4. *Pelopatus ovalis*. — 5-7. *Batbyzona incerta*. — 8-12. *Dendrothuria similis*. — 13-15. *Deima Blakei*. — 16-19. *Onchophanta conservata*.
20. *Allopatus dendroides*. — 21. *Perizoma magna*. — 22-23. *Pelopatus insignis*. — 24-26. *Pelopatus modestus*.

Auct. del.

1-3. *Ophmurgus glaber*. — 4-7. *Benthophycus fragilis*. — 8. *Amphideima Investigatoris*. — 9. *Ophmurgus invalidus*. — 10. *Benthodytes glutinosa*.

11-12. *Benthodytes superba*. — 13-14. *Apodogaster Alcocki*. — 15-18. *Synallactes horridus*.

19-20. *Mesothuria abbreviata*. — 21. *Pentagone stabilis*. — 22. *Euphronides bifurcata*. — 23-24. *Psychropotes minutus*.

25-26. *Pentagone (?) obscura*. — 27-28. *Pentagone expansa*. — 29-31. *Filithuria elegans*.

Auct. del.

- 1-3. *Psolidium* (?) *rugosum*. — 4-5. *Psolus membranaceus*. — 6-7. *Psolus levis*. — 8. *Psolidium* (?) *translucidum*. — 9-10. *Trochostoma albicans*.
 11-15. *Trochostoma andamanense*. — 16-18. *Trochostoma concolor*. — 19-22. *Trochostoma concolor* var. *caudatum*.
 23. *Trochostoma pauperum*. — 24. *Trochostoma ecalcareum*.

Auct. det.

1-3. *Trochostoma elongatum*. — 4-7. *Ankyroderma musculus* var. *acutum*. — 8-13. *Ankyroderma contortum*.
14-20. *Ankyroderma polymorphum*.

Auct. del.

- 1-10. *Ankyroderma brevicandatum*. — 11-12. *Anapta(?) dubiosa*. — 13. *Ankyroderma musculus* var. *undulatum*. — 14-16. *Protankyra eroda*.
 17-18. *Protankyra tristis*. — 19-25. *Ankyroderma intermedium*.
 26-29. *Protankyra conferta*. — 30-32. *Protankyra inflexa*. — 33-35. *Protankyra timida*. — 36-39. *Protankyra denticulata*.