

3. Marine Fauna : Mergui Archipelago, Lower Burma.
 Collected by Jas. J. Simpson, M.A., B.Sc., and R. N. Rudmose - Brown, B.Sc., University of Aberdeen, February 1907—May 1907 : HOLOTHURIOIDEA. By JOSEPH PEARSON, D.Sc., F.L.S., Demonstrator and Assistant Lecturer in Zoology, University of Liverpool*.

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(Text-figures 18-21.)

Owing to the kindness of Mr. Simpson, I have had an opportunity of examining the collection of Holothurians obtained by him and Mr. Rudmose-Brown from the Mergui Archipelago. This collection, which comprises fourteen species, is typical of the Indian Ocean. There are no new species to record, and I have noted no points of special interest with the exception of the occurrence of *Thyone fusus* var. *papuensis*. This form, which differs only from *Thyone fusus* in the large size of the calcareous ring, is interesting because of its distribution. The latter species is distinctly northern in its distribution and occurs in the cold waters of N.W. Europe. The variety *papuensis* has been obtained only from tropical seas, once by the 'Challenger' in the Torres Straits, twice by Prof. Herdman off Ceylon, and it is also represented in the present collection.

The following is a list of species in the collection :

- Cucumaria imbricata* Semper.
Cucumaria semperi Bell.
Colochirus inornatus von Marenzeller.
Colochirus cucumis Semper.
Thyone fusus, var. *papuensis* Théel.
Thyone sacellus Selenka.
Actinocucumis typica Ludwig.
Phyllophorus cebuensis Semper.
Mülleria echinites Jaeger.
Holothuria curiosa Ludwig.
Holothuria impatiens Forskål.
Holothuria ocellata Jaeger.
Holothuria princeps Selenka.
Holothuria scabra Jaeger.

List of Stations at which Holothurians were obtained.

- STATION I. East of Tavoy Is. and Port Owen.
 Bottom. Sand, broken shell, and mud.
 Depth. 4-12 fathoms.
Holothuria curiosa.

* Communicated by Prof. W. N. PARKEE, Ph.D., F.Z.S.

STATION VII. Haycock Is. to Hummock Is.

Bottom. Rock and mud, or sand and shell.*Depth.* 5-15 fathoms.*Cucumaria imbricata.**Holothuria princeps.*

STATION VIII. Port Maria (Elphinstone Is.) and Castle Is.

Bottom. Sand.*Depth.* 1-5 fathoms.*Holothuria impatiens.*

STATION IX. Between Bentinck Is. and Courts Is

Bottom. Sand and shell.*Depth.* 12-26 fathoms.*Colochirus cucumis.*

STATION XIV. Bushby Is. pearling ground.

Bottom. Sand and mud.*Depth.* Shore to 21 fathoms.*Cucumaria semperi.*

STATION XVII. West of Sir John Malcolm Is.

Bottom. Coarse sand and broken shell.*Depth.* 13-18½ fathoms.*Colochirus cucumis.*

STATION XVIII. W. & S.W. of Page Is.

Bottom. Sand, shell, and rock.*Depth.* 10-21 fathoms.*Thyone sacellus.*

STATION XXII. Hastings Harbour.

Bottom. Rock and sand.*Depth.* 3-20 fathoms and shore.*Colochirus cucumis.*

STATION XXIV. Cat Is.

Bottom. Rock, sand, and broken shell.*Depth.* 8-22 fathoms.*Colochirus cucumis.*

STATION XXV. Gregory Group.

Bottom. Stones and broken shell.*Depth.* 4-14 fathoms.*Thyone sacellus.**Actinocucumis typica.**Phyllophorus cebuensis.*

STATION XXVIII. Riou Is., Hobson Is. and adjacent islands.

Bottom. Rock and sand.*Depth.* 2-8 fathoms.*Mülleria echinites.**Holothuria scabra.*

STATION XXXII. S.W. of Domel Is.

Bottom. Sand and mud.*Depth.* 26-29 fathoms.*Thyone fusus* var. *papuensis.*

STATION XXXIII. Christmas Is. Group.

Bottom. Rock, sand, and mud.*Depth.* 8-23 fathoms.*Colochirus cucumis.*

Moscós Islands.

*Cucumaria semperi.**Thyone sacellus.*

CUCUMARIA IMBRICATA Semper.

Ocnus imbricatus Semper, 1868 (7).**Ocnus javanicus* Sluiter, 1880 (9); Lampert, 1885 (13).*Ocnus imbricatus* Lampert, 1885 (13).*Ocnus typicus* Théel, 1886 (15).*Ocnus javanicus* Théel, 1886 (15).*Ocnus typicus* Ludwig, 1887 (17).*Cucumaria imbricata* Ludwig, 1891 (19); Sluiter, 1901 (20); Pearson, 1903 (21); Koehler & Vaney, 1908 (22).

One specimen from Station VII. Haycock Is.

This specimen agrees in every respect with the descriptions of Semper and Théel. The body has a total length of 40 mm. and is bent so that the trivium is on the convex side. There are 19 pedicels on each of the five ambulacra. The deposits are typical and agree with the sizes given by Théel.

General distribution. Bohol, Java, Hongkong, Ceylon, Bay of Bengal.

CUCUMARIA SEMPERI Bell.

Cucumaria semperi Bell, 1884 (12); Lampert, 1885 (13); Théel, 1886 (15).

Two specimens:—

One from Station XIV. Bushby Is. Length 20 mm.; breadth 6 mm.

One from Moscos Islands. Length 15 mm.; breadth 6 mm.

In the larger specimen the pedicels are arranged in five double rows. The smaller specimen is much crushed and the arrangement of the pedicels is hard to determine. The colour of the two specimens, which is yellowish-white in spirit, does not agree with the colour of the 'Alert' specimens described by Bell.

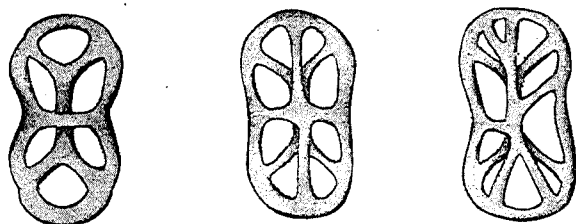
The calcareous ring (text-fig. 18 B) is one-sixth as long as the body. Both the radials and inter-radials have short triangular anterior prolongations. The radials also have long posterior

* The numbers in brackets refer to the Bibliography, pp. 193 & 194.

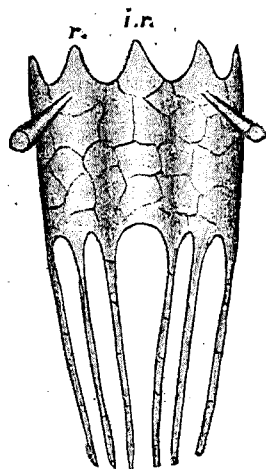
bifurcations. Both the radials and inter-radials are composed of a large number of pieces.

The retractor muscles connected with the calcareous ring are well developed and are attached to the body-wall half-way down the body.

Text-fig. 18.



A



B

Cucumaria semperi.A. Spicules. $\times 700$.B. Calcareous ring. $\times 16$.

r. = radial. i.r. = inter-radial.

The deposits agree with Bell's description and figures. The plates in the general integument are subject to considerable variation (see text-fig. 18 A).

The size of a normal plate is about 40μ long and 26μ broad.

General distribution. Port Denison, Torres Straits.

COLOCHIRUS INORNATUS von Marenzeller.

Colochirus inornatus von Marenzeller, 1881 (10); Lampert, 1885 (13); Théel, 1886 (15).

Six specimens. Locality not given.

	mm.	mm.	mm.	mm.	mm.	mm.
Length	65	45	45	52	53	39
Breadth	14	11	13	14	14	12

These specimens agree with Théel's description. They have the form which is typical of the genus *Colochirus*, i. e. a quadrangular body which becomes pentagonal at either end. The pedicels are confined to the ventral surface and are arranged in three rows. This species differs from many other members of this genus in not having the large tubercles. The colour in spirit is yellowish-white on the trivium and brown on the rest of the body. The pedicels are yellowish-white. There are ten tentacles, the two ventral ones being smaller than the rest. The tentacles are yellow.

The deposits are typical.

Length of perforated plates 67μ ; width 48μ .

Length of large scales 300μ .

Length of buttons 74μ .

General distribution. Japan, 'Challenger,' $11^{\circ} 6' N.$, $123^{\circ} 9' E.$

COLOCHIRUS CUCUMIS Semper.

Colochirus cucumis Semper, 1868 (7); Lampert, 1885 (13); Théel, 1886 (15); Sluiter, 1887 (18); Sluiter, 1901 (20).

Eleven specimens from Station IX. Between Bentinck Is. and Courts Is.

	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	
Length	19	24	22	22	31	32	40	47	47	48	60
Breadth.....	6	7	7	8	9	11	14	13	18	19	22

One specimen from Station XXIV. Cat Is.

Length 62 mm.; breadth 24 mm.

One specimen from Station XXXIII. "Christmas Is. Group."

Length 25 mm.; breadth 9 mm.

One specimen from Station XVII. West of Sir John Malcolm Is.

Length 70 mm.; breadth 16 mm.

One specimen from Station XXII. Hastings Harbour.

Length 17 mm.; breadth 6 mm.

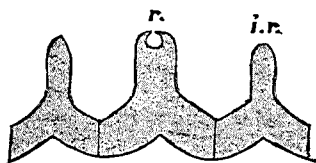
Externally the specimens agree with Théel's description. The posterior end of the body is upturned so that the anus assumes a dorsal position. There are five anal teeth. Contrary to Théel's statement, there appear to be scales around the anus. The body is broad in front and gradually tapers towards the posterior end. There are the well-defined double rows of pedicels on the trivium. The calcareous ring (text-fig. 19) is composed of ten simple pieces

which have no posterior prolongations. Anteriorly each radial is rod-shaped and the end is notched. The inter-radials also have anterior prolongations, but these are not notched.

The spicules agree with Théel's description. The spheres have a diameter of 44μ , and the cups have a width of 37μ .

General distribution. Bohol, Java, Japan.

Text-fig. 19.



Colochirus cucumis. Calcareous ring. $\times 5$.

r. = radial. i.r. = inter-radial.

THYONE FUSUS, var. *PAPUENSIS* Théel.

Thyone fusus, var. *papuensis* Théel, 1886 (15); Pearson, 1903 (21).

One specimen from Station XXXII. S.W. of Domel Is.

Total length 25 mm.; greatest width 12 mm.

This specimen has a characteristic appearance, being broad in the middle and becoming suddenly much narrower at the anterior and posterior extremities. Externally it resembles in a marked degree the northern form *Thyone fusus*. Of the four recorded specimens of the above variety, I have had an opportunity of examining three, and I find that the only important difference between the variety and the parent species is in the nature of the calcareous ring. In both cases the shape is identical, but the ring is much larger in the variety than in *Thyone fusus*. In the specimen under examination the calcareous ring has a length of 12 mm., *i. e.* half the length of the body. In a specimen of *Thyone fusus* examined by Théel, the calcareous ring was only one-fifth the length of the body, and in a specimen I have examined the ring was even shorter.

The deposits agree with Théel's description, and appear to be very similar to the deposits of *Thyone fusus*. In the Ceylon specimens examined by me (21), there were tables scattered throughout the general integument as well as the deposits in the pedicels. In the Mergui specimen there are practically no deposits in the general integument, but in the pedicels there are tables similar to those described by Théel, and resembling those found in the pedicels of *Thyone fusus*.

Length of tables in pedicels 67μ .

Diameter of tables in integument (Ceylon specimen) 59μ .

General distribution. Torres Straits, Ceylon.

THYONE SACELLUS Selenka.

Stobus sacella Selenka, 1867 (6).

Thyone rigida Semper, 1868 (7).

Stereoderma murrayi Bell, 1883 (11).

Thyone sacellus Bell, 1884 (12).

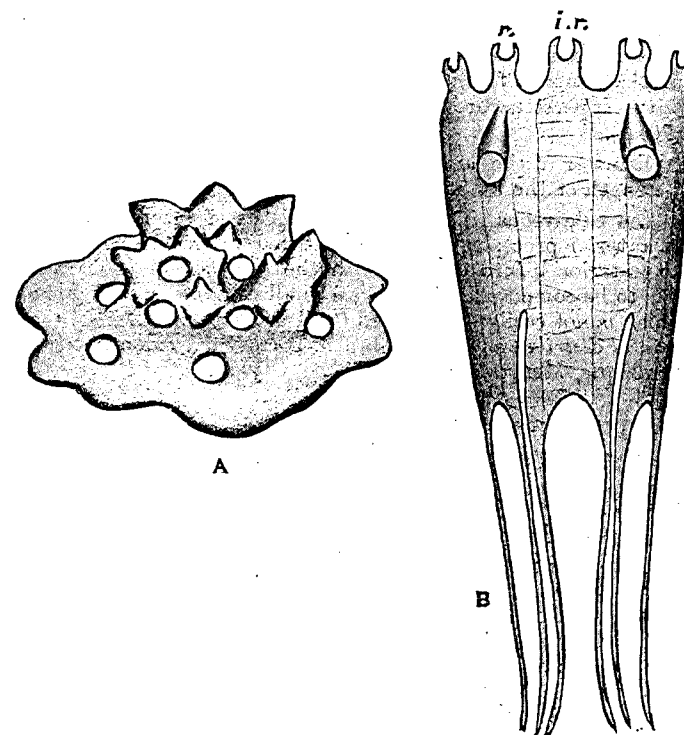
Stereoderma murrayi Lampert, 1885 (13).

Thyone sacellus Lampert, 1885 (13); Bell, 1886 (14).

Thyone sacella Théel, 1886 (15).

Thyone sacellus Sluiter, 1887 (18); Ludwig, 1891 (19); Sluiter, 1901 (20); Pearson, 1903 (21).

Text-fig. 20.



Thyone sacellus.

A. Spicule. $\times 450$.

B. Calcareous ring. $\times 8$.

r. = radial. i.r. = inter-radial.

One specimen from Station XXV. Gregory Group.
Length 33 mm.; breadth 8 mm.

One specimen from Moscos Islands.

Length 60 mm.; breadth 9 mm.

Two specimens from Station XVIII. W. & S.W. of Page Is.

Length 105 mm. 106 mm.

Breadth 16 " 12 "

The general features of this species have been fully described by previous investigators. The hard integument due to the closely-packed spicules is characteristic of this species.

In the Ceylon Report I described plate-like spicules in addition to the deposits described by Théel and figured by Bell. A more detailed examination proves that these additional spicules have not the simple structure indicated by me in the Ceylon Report. In that report I described them as "plates having more than four holes and having short spines on the surface." That is the appearance presented from above, but in side view it is seen that from the centre of the large plate there arises an irregular massive superstructure which bears numerous spines (text-fig. 20 A).

Diameter of the large spinous tables ... 110 μ .

Length of the buttons 74 μ .

In the calcareous ring both the radials and inter-radials have short anterior processes which are notched in front. The radials have posterior bifurcations. Both the radials and inter-radials appear to be composed of numerous small pieces, the arrangement of which is not easily determined (text-fig. 20 B).

General distribution. Bohol, Japan, Torres Str., Aden, Zanzibar, Mozambique, Mergui, Java, Kurachee, Ceylon.

ACTINOCUCUMIS TYPICA Ludwig.

Actinocucumis typica Ludwig, 1875 (8).

? *Actinocucumis difficilis* Bell, 1884 (12).

Actinocucumis typica Lampert, 1885 (13); Théel, 1886 (15); Ludwig, 1891 (19).

One specimen from Station XXV. Gregory Group.

Length 55 mm.; breadth 9 mm.

There is nothing to add to previous descriptions of the external appearance.

The calcareous ring has no posterior prolongations (text-fig. 21 A).

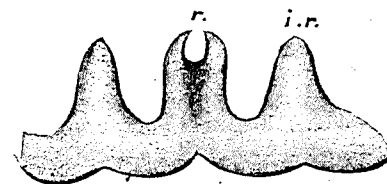
In addition to the small peculiar spicules, described by Théel as being "acorn-shaped," and which are very numerous, there are present delicate perforated plates which appear not to have been noticed hitherto. This is probably due to their being almost completely hidden by the other deposits (text-fig. 21 B).

Length of the "acorn-shaped" bodies ... 40 μ .

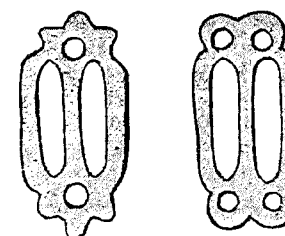
Length of perforated plates 40 μ .

General distribution. Bowen, Amoy, Albany Is., Torres Str., Kurachee.

Text-fig. 21.



A



B

Actinocucumis typica.

A. Calcareous ring. $\times 7$.

r. = radial. i.r. = inter-radial.

B. Plate-like spicules. $\times 750$.

PHYLLOPHORUS CEBUENSIS Semper.

Thyonidium cebuense Semper, 1868 (7); Lampert, 1885 (13); Théel, 1886 (15).

Phyllophorus cebuensis Ludwig, 1891 (19); Pearson, 1903 (21).

One specimen from Station XXV. Gregory Group.

Length 15 mm.; breadth 6 mm.

An extremely small and much contracted specimen, which agrees in the main with the descriptions given by previous authors.

Diameter of tables ... 85 μ .

Height of tables 85 μ .

General distribution. Philippines, Ceylon.

MÜLLERIA ECHINITES Jaeger.

Mülleria echinites Jaeger, 1833 (2); Semper, 1868 (7); Théel, 1886 (15); Ludwig, 1887 (17); Sluiter, 1901 (20).

One specimen from Station XXVIII. Riou Is.

Length 50 mm.; breadth 30 mm.

Agrees with Théel's description.

The pedicels on the trivium are arranged on three longitudinal ridges.

The deposits vary in size from 29 μ to 44 μ .

General distribution. Indian Ocean, Celebes, Sumatra, Fiji Is.

HOLOTHURIA CURIOSA Ludwig.

Holothuria curiosa Ludwig, 1875 (8); Lampert, 1885 (13); Théel, 1886 (15); Sluiter, 1901 (20).

One specimen from Station I. East of Tavoy Is.

Length 53 mm.; breadth 17 mm.

This specimen agrees with the descriptions of previous authors.

Diameter of tables ... 37 μ to 48 μ .

Length of buttons ... 41 μ .

General distribution. Bowen, Fiji, New Guinea, Philippines.

HOLOTHURIA IMPATIENS Forskål.

Fistularia impatiens Forskål, 1775 (1).

Trepang impatiens Jaeger, 1833 (2).

Holothuria fulva Quoy & Gaimard, 1833 (3).

Thyone impatiens Blainville, 1834 (4).

Sporadipus impatiens Grube, 1840 (5).

Holothuria botellus Selenka, 1867 (6).

Holothuria impatiens Lampert, 1885 (13); Théel, 1886 (15); Bell, 1886 (14); Bell, 1887 (16); Ludwig, 1887 (17); Sluiter, 1887 (18); Sluiter, 1901 (20); Koehler & Vaney, 1908 (22).

One specimen from Station VIII. Port Maria.

Length 50 mm.; breadth 17 mm.

The specimen is much shrunken, but agrees with Théel's description in all respects.

Diameter of tables ... 92 μ .

Length of buttons ... 80 μ to 95 μ .

General distribution. Mediterranean, East Coast Africa, Indian Ocean, East Indies, Pacific Islands.

HOLOTHURIA OCELLATA Jaeger.

Holothuria ocellata Jaeger, 1833 (2); Semper, 1868 (7); Théel, 1886 (15); Koehler & Vaney, 1908 (22).

Locality not given.

Two dried specimens.

Length 220 mm. 135 mm.

Breadth 55 " 45 "

There is a well-defined ventral surface on which are found numerous pedicels not arranged in definite rows. The dorsal side of the body is well arched, and at each side of the body there are large protuberances. The mouth is ventral.

The deposits agree with Théel's description.

General distribution. Celebes, Torres Str.

HOLOTHURIA PRINCEPS Selenka.

Holothuria princeps Selenka, 1867 (6); Lampert, 1885 (13); Théel, 1886 (15).

One specimen from Station VII. Haycock Is.

Length 93 mm.; breadth 20 mm.

This specimen agrees very closely with Selenka's and Théel's

descriptions. The tables have eight peripheral holes and a larger central one. The margin of the table is spinous. The spine is very short, and bears at the extremity eight large teeth as well as numerous smaller spines. The smooth buttons generally have six holes, but in some cases there are eight or ten.

Height of the tables 52 μ .

Diameter of the tables ... 63 μ .

Length of buttons 55 μ .

General distribution. Florida, Egmont Key.

HOLOTHURIA SCABRA Jaeger.

Holothuria scabra Jaeger, 1833 (2).

Holothuria tigris Selenka, 1867 (6).

Holothuria scabra Semper, 1868 (7); Lampert, 1885 (13); Théel, 1886 (15); Sluiter, 1887 (18); Ludwig, 1887 (17).

Holothuria cadelli Bell, 1887 (16).

Holothuria scabra Sluiter, 1901 (20).

Holothuria gallensis Pearson, 1903 (21).

Holothuria scabra Koehler & Vaney, 1903 (22).

One specimen from Station XXVIII. Riou Is.

Length 175 mm.; breadth 60 mm.

This form is undoubtedly identical with *Holothuria gallensis* Pearson.

Diameter of tables ... 70 μ .

Height of tables 44 μ .

Length of buttons ... 37 μ .

General distribution. Indian Ocean from East Coast of Africa to the East Indies, Philippines, Fiji.

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4. A Revision of the British Species of Ostracod Crustacea belonging to the Subfamilies *Candoninae* and *Herpetocypridinae*. By G. STEWARDSON BRADY, M.D., LL.D., D.Sc., F.R.S., C.M.Z.S. (With Note on a Parasitic Worm, by Miss M. V. LEBOUR, M.Sc.)

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(Plates XIX.-XXX.)*

The species dealt with in this paper are separated from most other Cyprididæ by the absence, or the very scanty development, of setæ on the posterior antennæ, together with a full development of the caudal rami. When a setose antennal fascicle is present it never reaches further than the extremities of the terminal claws, and usually falls much short of them, so that in all cases the animal is destitute of swimming capacity. The species may

* For explanation of the Plates see pp. 217-220.