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Colonial Museum and Geological Survey Department.

CATALOGUE
OF THE
ECHINODERMATA
OF NEW ZEALAND,
WITH
DIAGNOSES OF THE SPECIES.

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NEW ZEALAND.
JAMES HUGHES, PRINTER, LAMBTON QUAY, WELLINGTON.
1872.

P R E F A C E .

THE long coast line of New Zealand, with the many towns and villages situated on its bays and inlets, gives to naturalists in this country unusual facilities for studying the habits of the denizens of the sea, but observations on the habits of an animal, however interesting they may appear to be, are almost useless to science unless the observer is acquainted with its scientific name; and it is with the view of enabling New Zealand naturalists to ascertain the names of some of the animals that live on our coast, that this catalogue has been prepared. As no means have as yet been devised for maintaining a marine aquarium in a healthy condition without a constant stream of sea water passing through it, which generally entails considerable expense, the following description of a very simple, but at the same time very efficient, apparatus may prove of use:—Get two ordinary digger's "tin-dishes," one of which is so much smaller than the other that, when placed inside the larger one, the fingers can get round its edge so as to lift it up evenly and safely; perforate the bottom of the smaller dish with numerous small holes, and the apparatus is complete. The larger dish is to be filled with sea water, and the smaller placed inside it with the animals, etc. Every evening the inner dish is to be lifted carefully out, a fresh supply of sea water put into the outer one, and the inner replaced as quickly as possible. The inner dish should have a layer, half an inch deep, on its bottom of fine grit, just too large to pass through the holes in the bottom, and on this two or three stones with seaweeds growing on them may be placed, but care must be taken not to have too much vegetable life. When crabs are the object of study, it will generally be found necessary to have a tin plate, with the centre cut out so as to leave an edge about two inches broad projecting over the interior of the inner dish, placed over the top, otherwise they will climb out. An aquarium of this shape will be found much more convenient for studying the habits of animals than the ordinary deep-sided glass tanks, and when an animal is wanted for

examination it can be much more readily caught without disturbing the others.

In 1842 but one species of *Echinodermata* was known to inhabit New Zealand; since then nine others have been described in various publications in England and America, thus making our list up to ten species. In this catalogue thirty-four species are described, eighteen of them being, as far as I can make out, new to science, and six previously known as inhabiting other countries, but now, for the first time, included in the Fauna of New Zealand.

F. W. HUTTON.

Colonial Museum,
Wellington, November, 1872.

INTRODUCTION.

THE animals included in the class *Echinodermata* are commonly known as Star-fish, Brittle-stars, Sea-eggs or Sea-urchins, Sea-slugs or Sea-cucumbers, etc. They are all covered with a more or less leathery skin with variously shaped calcareous plates (*dermal plates* or *ossicula*) embedded in it. In the adult the external parts are arranged symmetrically round a central axis, or on what is termed the "radiate type;" but in the embryonic stages they are arranged symmetrically on either side of an axis, or on what is termed the "bilateral type."

In the Sea-urchins (*Echinoidea*) the body is entased in a shell or *test*, which is composed of twenty rows of hexagonal plates arranged in ten alternating zones, which pass from one pole of the animal to the other, each zone being composed of two similar rows. Five of these zones are composed of large plates not perforated, and are called the *inter-ambulacral areas*. The other five zones are called the *ambulacral areas*, and are composed of smaller plates perforated by minute holes, through which are protruded the *suckers*, which act as feet. The plates are covered over with polished tubercles; of these the largest (*primary tubercles*) are disposed in regular lines, while intermixed among the larger ones are numerous smaller ones (*secondary tubercles*) more irregularly placed. On these tubercles *spines* of different lengths are placed. The mouth is usually armed with calcareous teeth, and is always situated on the lower, or inferior surface of the body, while the anal aperture is sometimes on the lower, and sometimes on the upper, or superior surface. Surrounding the anus is a series of five large plates, each of which is perforated for the emission of the duct of an ovary or testis (*genital pores*); one of these plates is larger than the others, and supports a spongy tubercle, perforated by many minute apertures (*madreporic tubercle*). The sexes are distinct. Dispersed over the surface of the body are great numbers of minute appendages called *Pedicellariae*, but their nature, whether part of the animal or a parasite, is not yet known.

In the Star-fish (*Asteroidea* and *Ophiuroidea*) the body is flat, pentagonal, or star shaped, and consists of a central body or *disc*, surrounded by five or more lobes or *rays*. The skin is strengthened by irregular moveable plates (*dermal plates* or *ossicula*), and often studded with calcareous spines. The mouth is inferior and central, and the anus is either dorsal or absent. In the *Asteroidea* the mouth is not provided with teeth, but in the *Ophiuroidea* it is surrounded with a masticatory apparatus called *mouth and teeth papilla*. In this family, also, each ray is enclosed by four rows of calcareous plates (*ray plates*), and on the upper surface of the disc, where each ray is attached, there is often a pair of larger plates called the *radial shields*. In the *Holothuroidea*, which includes the Tepangs or *Bêches-de-mer*, the body is elongated, and is contained in a tough skin containing minute calcareous plates of various shapes (*dermal plates*). The mouth is surrounded by a circle of branched *tentacula*, which can be protruded and withdrawn at pleasure; within this zone there is a circlet of calcareous plates imbedded in a muscular ring called the *oval or dental apparatus*.

SYNOPSIS OF THE FAMILIES.

CLASS :—ECHINODERMATA.

Body radiate ; skin more or less leathery, with variously shaped calcareous plates embedded in it.

ORDER :—OPHIUROIDEA.

PAGE

Star-shaped, without ambulacra on their under surfaces.

Ophiuridae.—Genital fissures two or four ; anus simple 1

ORDER :—ASTEROIDEA.

Star-shaped ; ambulacra on the under surface of the rays.

Asteriidae.—Ambulacra with four rows of suckers 4

Astropectinidae.—Ambulacra with two rows of suckers ; body star-shaped,
with spines 6

Pentacerotidae.—Ambulacra with two rows of suckers ; body without spines 7

Asterinidae.—Ambulacra with two rows of suckers ; body pentagonal, with
spines 9

ORDER :—ECHINOIDEA.

Rounded, covered with immoveable plates.

Cidaridae.—Mouth central ; anus central, superior 10

Chlypeastridae.—Mouth central or sub-central ; anus excentric, superior, or
inferior 12

Spatangidae.—Mouth excentric ; anus terminal 14

ORDER :—HOLOTHUROIDEA.

Elongate, soft ; skin with minute dermal plates.

Holothuridae.—Suckers present 15

Synaptae.—Suckers absent 16

ECHINODERMATA OF NEW ZEALAND.

ORDER:—OPHIUROIDEA.

Brittle Stars.

Free, rays five, long and slender, without ambulacra on their under surfaces; dermal plates moveable.

FAMILY:—OPHIURIDÆ.

Rays not branched, with spines along their sides, long, without ambulacra, and affixed to a rounded disc.

OPHIOTHRIX.

Disc with scales and spines, or thorny grains; radial shields large triangular swellings bounded on the inner sides by ridges; ray spines numerous, long, flattened; a small spine-like tentacle scale; outer ray joints with hooks.

West coast of America, Sandwich Islands, Society Islands, Australia, India, South Africa, West Indies, European seas.

1. OPHIOTHRIX CÆRULEA. sp. nov.

C.M.

Disc pentagonal, the sides with re-entering angles; radial shields naked, shagreened, the outer corner curved upwards, each pair separated by three rectangular plates, each bearing one or two long, tapering, rough, spines; centre of disc, and a band between the pairs of radial shields covered with small scales, each bearing a single spine. Rays about four times the diameter of the disc; under ray plates cordate, with the point truncated and turned inwards; upper ray plates rather broader than long, with the sides produced into angles and bent down; spines longer than the breadth of the ray, tapering and strongly spinose,

arranged in three rows. Mouth shields rhomboidal; tooth papillæ three in a row, except the lowest, which has only two.

Pale blue, with a band of purplish white, edged with purplish black, down the centre of the upper surface of the rays; under surface of the rays white; disc mottled with purplish; mouth papillæ yellowish.

About 3 inches from the tips of the rays.

OPHIONEREIS.

Disc covered with flat, equal, imbricating scales; smooth spines along the sides of the rays; one large tentacle scale; each upper ray plate furnished with a supplementary piece on either side.

West Indies, Red Sea, West coast of America, Tasmania.

2. OPHIONEREIS FASCIATA. sp. nov. C.M.

Disc round; radial shields small, half-covered, parallel, distant; scales small, larger near the margin; rays five to six times the diameter of the disc; under ray plates squarish, outer edge straight; upper ray plates rectangular, broader than long, outer edge concave; spines rounded, slightly tapering, about equal in length, longer than the breadth of the ray, placed in three or four rows; tentacle scale large, rounded, oval. Mouth shields broadly ovate; mouth papillæ small, round, and blunt, four on each side.

Yellowish white, the rays banded above and below with purplish black, and the disc irregularly marked with the same colour; mouth shields black; mouth papillæ white.

About 5 inches from the tips of the rays.

Wellington; Chatham Islands (H. Travers).

OPHIACTIS.

Disc circular, covered with radial shields, and overlapping scales, the latter with small spines.

West coast of America, West Indies, Mediterranean, English coast, Nicobar Islands, Sandwich Islands.

3. OPHIACTIS NIGRESCENS. sp. nov. C.M.

RADIAL shields narrow, oblong, widely diverging, shagreened; remainder of disc covered with small scales, bearing short round spines, giving them a granulated appearance; rays five, about six times the diameter

of the disc ; under plates broader than long, inner and outer margins convex, lateral margins concave, upper plates wedge-shaped, with the point truncate and turned inwards, outer margin convex ; spines cylindrical with blunt points, shagreened ; four in a row, the upper much longer than the others, and longer than the breadth of the ray ; mouth shields oblongo-pentangular, point outwards, narrowed inwards.

Dark brownish black.

About 6 inches from ray to ray.

OPHIURA.

Disc granulated ; ray spines numerous, shorter than the joints ; two tentacle scales ; an indentation in the back of the disc.

West Indies, New York, Mediterranean, Rio Janeiro, South Africa, West coast of Central America.

4. OPHIURA MACULATA. Verrill. C.M.

Pectinura maculata, Verrill, Proc. Bost. Soc. Nat. Hist., XII., 388.

DISC round, or sub-pentagonal ; ray four or four and a half times the diameter of the disc, tapering, rounded, or sub-carinate above ; under ray plates sub-octagonal ; upper plates broader than long, generally divided into two or more pieces ; side plates with nine or ten nearly equal, slightly pointed spines, more than half covering the next plate ; mouth shields broadly cordate, the point inwards ; mouth papillæ 6-8, the two outer ones broader ; teeth six ; side mouth plates more or less lenticular, broader than long.

Pale reddish brown, darker towards the points of the rays, spotted with darker.

About 16 or 17 inches from the tips of the rays.

Common. Chatham Islands.

5. OPHIURA CYLINDRICA. sp. nov. C.M.

SMALL ; disc sub-pentagonal ; rays from three to four times the diameter of the disc, scarcely tapering, and rather flattened above, lower ray plates longer than broad, outer edge convex ; upper plates convex on the outer edge and tapering inwards, nearly as long as broad ; side plates with six equal, rather pointed, short spines, which do not cover half of the next plate, mouth papillæ 6-8, the two outer ones broader ;

mouth shields irregular, cordate or lenticular, sometimes obsolete ; side mouth shields the same.

Pale yellowish brown, rays with dark brown transverse bands, edged with black, on the upper surface, and the disc spotted and mottled with the same.

About $2\frac{3}{4}$ inches from the tips of the rays.

ORDER:—ASTEROIDEA.

Star-fish.

Free, star-shaped, with ambulacra of double pores on the under surface, extending from the mouth to the end of the rays, which are developed from the body ; dermal plate moveable.

FAMILY :—ASTERIADÆ.

Back reticulated and covered with spines or tubercles ; ambulacra with four rows of feet.

ASTERIAS.

Rays few ; skeleton netted, with a single mobile spine at each anastomosis of the ossicula ; body covered with more or less prominent mobile spines.

Europe, North America, Chili, Australia.

6. ASTERIAS MOLLIS. sp. nov. .

C.M.

RAYS five, broad, rounded, tapering ; between three and four times the width of the disc ; spines single, acute, in longitudinal rows on the rays, but irregularly placed on the disc ; about nine rows of spines on a ray, the two lowest on each side placed close to the ambulacra, the outer composed of longer spines ; ambulacral spines shorter, in two rows.

Diameter about 4 inches.

MARGARASTER.

Skeleton largely reticulated, with smooth conicals between the reticulations, which are sharp edged and studded with rounded granules ; ambulacra bordered with a series of small short spines.

Pacific Ocean.

7. MARGARASTER? SCABER. sp. nov. C.M.

RAYS seven, rounded, tapering, with six rows of spines on each ray, the two lower ones on each side placed close to the ambulacra, the upper on the side of the ray; rays from three to four times the width of the disc; upper surface covered with granular tubercles, which have occasionally a spine in the centre; occasionally an interrupted row of spines on the top of the rays; ambulacral spines slender, in two rows.

Diameter about 6 inches.

CELASTERIAS.

Rays swollen, numerous, free nearly to the base, and united beneath by a group of interradiial plates; interambulacral plates united directly to the first row of ventral plates, and these to a second row of larger plates without the intervention of open spaces; dorsal surface with large, strong, imbricated, irregularly arranged plates, bearing numerous short spines.

The general aspect is that of *Solaster*.

New Zealand only.

8. CELASTERIAS AUSTRALIS. Verrill. C.M.

C. australis, Verrill, Trans. Connecticut Acad. of Arts and Sciences, I., Part 2, March, 1867.

RAYS eleven or twelve, shorter than the breadth of the disc; upper surface covered with irregular reticulated ridges bearing short, thick, clavate, rounded topped spines, on the rays these ridges are arranged transversely. Ambulacra rather narrow, inner row of spines in transverse pairs, longish and slightly clavate; median row single or in longitudinal pairs, shorter and thicker than the inner row; outer row in clusters of fours, the two outer shorter than the two inner. Madriporic plate half way between the centre and edge of the disc.

Yellowish brown, ambulacral spines white.

COSCINASTERIAS.

Rays numerous, elongated, slender, united only at the base, without interradiial plates; disc small, spines prominent, arranged in longitudinal rows on the arms; ambulacra broad, suckers very numerous.

New Zealand only.

9. *OSGINASTERIAS MURICATA*. Verrill. C.M.

O. muricata, Verrill, l.c., p. 248.

RAYS eleven, in the adult about three times the diameter of the disc; upper surface covered with papillæ, each bearing a single spine, ambulacra very broad, margined with two rows of spines, inner single, cylindrical, erect; outer double, sloping away from each other, and looking as if bifurcated, but not connected at the base, longer than the inner series; ambulacral spines longer and more slender.

Brown or reddish brown, more or less marbled with deep blue; below yellowish white.

Diameter of largest about 8.5 inches.

FAMILY :—ASTROPECTINIDÆ.

Back flattish, netted, with numerous tubercles crowned with spines; ambulacra with only two rows of feet.

ASTROPECTEN.

Margin of the rays ciliated with a series of simple elongated spines, and with a series of large regular tubercles; ambulacral spines simple, linear.

All seas.

10. *ASTROPECTEN ARMATUS*. Gray? C.M.

A. armatus, Gray, Synopsis of the Species of Star-fish, p. 3.

ARMS about twice the diameter of the disc, tapering, with straight sides, and bordered with tubercles, each of which carries a single erect spine; sides of the rays fringed with long tapering, pointed, shagreened spines; upper surface granulated with tubercles bearing groups of short spines set close together, centre of disc prominent; lower surface with thick transverse plates covered with short clavate spines; mouth papillæ in two rows; mouth plates oval, hollowed in the centre.

Yellowish brown (dry); ray spines white.

About 6 inches in diameter.

South America.

HENRICIA.

Rays five, round, tapering, dorsal wart obscure, often hidden by spines.

Europe.

11. HENRICIA OCCULATA. Penn? C.M.

H. occulata, Gray, Synopsis of Star-fish. *Cribella occulata*, Forbes.

Rays about twice as long as the disc, blunt, with a terminal tubercle; disc and rays covered with oblong reticulating tubercles crowned with clusters of very short rough spines, ambulacra with a series on each side of short spines placed in groups of about six.

Light reddish brown, darker below (dry).

Diameter from tips of rays about 2 inches.

This species answers very well to Forbes' description, but I cannot make out any tubercles near the ambulacra.

FAMILY :—PENTACEROTIDÆ.

Body covered with roundish or elongated plates, covered with a smooth or granular skin; vent none.

ASTROGONIUM.

Body pentangular, flat above and below; both surfaces covered with granulated plates; margin protected by a double series of granulated shields; ambulacra with cylindrical truncated spines, in groups of four, of equal size, and with a series of similar, but rather larger, spines on their sides.

North Sea, Port Natal, Australia.

12. ASTROGONIUM MILIARE. Gray. C.M.

A. miliare, Gray, Pro. Zool. Soc., 1847, p. 80; Synopsis of Star-fish, p. 10.

RAYS from one-half to one-third the diameter of the disc, rounded at the end; marginal shields $\frac{20-22}{20-22}$ on each side, covered with uniform close granules; dorsal plates rather convex, covered with uniform granules.

Dark red or brown.

About 4 inches in diameter.

13. ASTROGONIUM RUGOSUM. sp. nov. C.M.

RAYS as long as the diameter of the disc, rather pointed; marginal shields $\frac{26}{26}$ on each side, covered with uniform close granules; dorsal plates flat, covered with uniform granules.

Reddish brown (dry).

About 4 inches in diameter.

PENTAGONASTER.

Body pentagonal, covered with convex smooth plates, those of the under side with a central sunken line with a central perforation, and a small pit at each end; marginal shields near the tips of the rays very large and swollen.

China, Australia.

14. PENTAGONASTER PULCHELLUS. Gray. C.M.

P. pulchellus, Gray, Synopsis of Star-fish, p. 11.

SIDES concave; marginal shields $\frac{6}{6}$; the apical ones very large and inflated, sometimes with a very small shield interposed between the angles; upper surface covered with moderately large convex plates, each plate, as well as the marginal shields, bordered by a single row of small granules; ambulacra rather narrow, bordered by a double row of short blunt spines.

Reddish brown (dry).

Diameter 4 inches.

Most of the plates on the under-surface have the sunk line, and occasionally they are seen on the lower marginal shields; sometimes there are two sunk lines on one plate.

China, New Zealand; found also at the Chatham Islands (H. H. Travers).

Var. B. C.M.

LIKE the last, but smaller; the apical shields very little swollen; dorsal plates much flatter, and with a line of seven or eight sub-hexagonal plates from the end of each ray towards the centre, many of the lower plates without the sunk line and pore.

Pale brown (dry).

Diameter $3\frac{1}{2}$ inches.

New Zealand.

OTHILIA.

Rays cylindrical, elongated; ambulacra with two very close series of filiform spines, skin smooth, polished, with moveable spines at the junction of the plates.

Virginia, Guacomayo, Brazil, Isle of France.

15. *OTHILIA LUZONICA*. Gray.

O. Luzonica, Gray, Ann. N. H., 1840, p. 282; *Echinaster eradanella*,
Mull. and Trosch. Ast., p. 24.

REDDISH brown; rays five or six, elongate, four times as long as the width of the body, with many blunt spines. (Gray.)

Isle of Luzon, Vera Cruz.

I have seen no specimens.

FAMILY :—ASTERINIDÆ.

Body discoidal or pentagonal, sharp-edged; skeleton formed of flattish imbricate plates.

ASTERINA.

Pentagonal, rather thick; back convex, lower surface flat; covered above and below with short spines; ambulacra bordered by a single row of spines.

English Channel, Mediterranean, Red Sea, West Indies, Cape of Good Hope, Tasmania.

16. *ASTERINA REGULARIS*. Verrill.

C.M.

A. regularis, Verrill, l.c., p. 250.

UPPER surface covered with rather large oblong papillæ, crowned with short blunt spines; arranged transversely, often more or less curved over the disc, and in oblique rows near the margin; spines of the lower surface single or double, arranged in rows; ambulacra broad, tips of rays emarginate.

Upper surface brown, often variegated with red, sometimes indigo blue; under surface white or yellowish.

About 3 inches in diameter.

Very common and very variable. The larger specimens can only be obtained by dredging, but the smaller are very common under stones between tide marks. Occasionally there is a raised boss in the centre, and a more or less obscure raised ray radiating towards each angle.

Found also at the Chatham Islands.

PTERASTER.

Ambulacra edged with a series of radiating webbed spines.

North seas, Cape of Good Hope.

17. PTERASTER INFLATUS. sp. nov.

C.M.

PENTAGONAL, with five radiating ribs, which are swollen and ovate on the inner half, and slightly convex on the outer half, margin thin, sharp; back tessellated with smooth flat tubercles, getting smaller towards the margin, where they are granulated; on the rays they are large, and irregularly placed, but showing some lines going the length of the rays; webbed ambulacral spines short, not much longer than the ambulacral spines; many of the flat tubercles, of the lower surface with short single blunt spines pointing inwards.

Reddish (dry).

Diameter $5\frac{1}{2}$ inches.

 ORDER:—ECHINOIDEA,

Sea-eggs.

More or less rounded, without rays; body covered with immoveable calcareous plates, bearing spines, ambulacra perforated for the exertion of the suckers.

 FAMILY:—CIDARIDÆ.

Mouth central, inferior; anus central, superior; ambulacra extending from mouth to anus; teeth complicated.

CIDARIS.

Body globose; anus and mouth nearly equal; ambulacra continuous from mouth to anus; spiniferous tubercles perforate; spines of several forms.

18. CIDARIS (STEPHANOCIDARIS) TUBARIA. Lam. C.M.

Cidarites tubaria, Lamarck, Anim. sans Vert., III., 382.

HEIGHT about three-fifths of the diameter; one tubercle on each inter-ambulacral plate, none on the ambulacral; nine large tubercles in a row, bordered at a short distance by a ring of small tubercles, space between the rows smooth; ambulacral spaces narrow, bordered on the right by two, and on the left by a single row of minute tubercles, smooth in the

middle, very slightly waved ; each ambulacrum composed of a single row of pores in pairs, each pair separated by a ridge ; primary spines moderate, slightly tapering, those on the back shorter and dilated into a flat topped expansion at the apex ; slightly longitudinally ribbed ; ribs crenated, sparsely tuberculated near the base, which, as well as the basal prominence, is finely striated ; secondary spines short, flattened, finely striate, deeply crenated or tuberculated on the sides.

ECHINUS.

Body globose ; ambulacra continuous from mouth to anus ; spiniferous tubercles imperforate ; spines of one form.

19. ECHINUS (PSAMMECHINUS) CHLOROTICUS.

A. Agassiz.

C.M.

Psammechinus asteroides, Gir., Proc. Bost. Soc.

HEIGHT equal to one-half or three-fifths of the diameter ; rows of pores near the mouth obliquely parallel, three pairs in a row ; ambulacral spaces with three rows of primary spines on the lower half, passing into two towards the apex, the central row smaller ; inter-ambulacral spaces with six rows, the second and fifth larger ; tubercles on prominent bases ; small tubercles between the pores ; spines thick, tapering, point blunt, longitudinally ribbed ; ribs sub-moniliform, and broader than the grooves ; primaries about three times the length of the secondaries.

Shell greenish, with white tubercles, passing into yellowish white round the mouth, covered with a dark brown skin, spines greenish, the smaller ones tipped with yellow.

Diameter 3 to 6 inches.

Common.

20. ECHINUS ELEVATUS. sp. nov.

C.M.

HEIGHT nearly equal to the diameter ; rows of pores very oblique, parallel, three pairs in a row ; inter-ambulacral plates with 6-9 primary tubercles in a more or less regular transverse line, ambulacral plates with two or three ; tubercles small, without prominent bases, nearly equal in size ; ambulacra of equal width throughout ; spines short, slightly tapering, point rounded, longitudinally grooved ; grooves broader than the ridges, and transversely striated ; base surrounded by a row of rough rounded tubercles.

Shell and spines pinkish purple ; tubercles and ambulacra lighter.
Diameter 2 inches.

21. *ECHINUS ALBOCINCTUS*. sp. nov. C.M.

HEIGHT three-fifths of the diameter ; pores forming a rather irregular zigzag row of single pairs ; ambulacral plates with one primary tubercle, inter-ambulacral with three on the lower half, but near the apex with one central tubercle surrounded by small ones on the edge of the plate ; ambulacra narrow ; tubercles moderate ; spines tapering, longitudinally grooved ; grooves much broader than the ridges.

Shell brownish purple ; spines reddish purple, broadly tipped with white.

Diameter 1 inch.

FAMILY :—CLYPEASTERIDÆ.

Mouth inferior, central or sub-central ; anus excentric, superior, or inferior ; ambulacra not continuous.

LAGANUM.

Pores united by a cross groove ; infra-ambulacral grooves simple, straight ; ambulacral petals narrow, open at the end ; anus inferior ; body pentagonal ; mouth with teeth.

22. *LAGANUM ROSTRATUM*. Ag.

L. rostratum, Agassiz, Mon Scutelle, 118, t. 25 ; Gray, Cat. Echnd., Brit. Mus., p. 9.

BODY oblong, elongate, produced behind ; vertical star rather large. (Gray.)

I have seen no specimens.

ARACHNOIDES.

Body circular ; ambulacra short ; ambulacral spaces broader than the inter-ambulacral ; anus superior, marginal ; mouth central, with teeth.

23. *ARACHNOIDES ZEALANDIÆ*. Gray. C.M.

Echinarachnius zealandicæ, Gray, Dieff. New Zealand, II., p. 264.

DEPRESSED, convex above ; margin sinuated ; ambulacral spaces raised ;

ambulacra curved with sixty-five, or less, pairs of pores, according to age ; apex tubercular, a smooth groove down the centre of each ambulacral space, from the apex to the mouth ; inter-ambulacral spaces irregularly distantly granulated ; ambulacral spaces with granules arranged in straight oblique lines sloping outwards and towards the groove ; under side the same, but the inter-ambulacral spaces broader and with larger granules ; a pentagonal space with irregular granules surrounding the mouth ; outside of the ambulacra concentrically sub-plaited, especially on the edges of the raised ambulacral spaces ; back convex ; below flat ; spines very finely cancellated.

Shell pale brown, spines dark brown.

From 3 to 4 inches in diameter.

Common.

ECHINONEUS

SHELL thin, elongate, sub-cylindrical ; tubercles very numerous ; placed in more or less regular series, mamillate, but not crenulated or perforated ; mouth oblique ; anus very large, elongate, inferior, between the mouth and the hinder margin ; genital pores four, very close, at the apex of the inter-ambulacral area ; mouth sub-central ; no teeth.

24. ECHINONEUS VENTRICOSUS. Ag. and Desor.

E. ventricosus, Agassiz and Desor., Ann. Sci. Nat. 1847, p. 144.

SHELL large, swollen ; anus short.

Paris Museum.

I have seen no specimens.

ECHINOBRISSUS.

Ovate ; mouth inferior, sub-central, pentagonal, not margined ; anus superior, excentric lodged in a groove.

Australia.

25. ECHINOBRISSUS RECENS. Mn. Edw. C.M.

E. recens, Gray, Cat. Echinod., Brit. Mus., p. 37.

OBOVATE, broader behind, greatest height at the anterior margin of the anus ; anus ovate, longitudinal, a groove from its posterior margin to the base ; mouth sub-pentagonal, rather anterior, transverse, situated in a deep depression, without any raised edge ; genital pores four, the two

anterior nearer together than the two posterior; ambulacra five, truncated, sides parallel, but converging close to the apex, a double row of pores on each side, median and anterior $\frac{20}{20}$, posterior $\frac{27}{27}$; entire surface, except the dorsal ambulacral spaces and the anal groove, covered with numerous small, round, shallow depressions, each with a small papilla not rising much above the general surface; oral ambulacra stellate.

Length, 1.1; greatest breadth, .95; greatest height, .45.

A single specimen is in the Museum; locality not stated.
Australia.

FAMILY :—SPATANGIDÆ.

Mouth excentric, inferior; anus terminal; ambulacra not continuous; no teeth.

AMPHIDOTUS.

Body ovate or cordate, convex, with two sets of ambulacra, dorsal and oral; four of the dorsal ambulacra truncate, oblong; dorsal impression within the ambulacra; sub-anal impression ovato-cordiform, terminal.

26. AMPHIDOTUS ZEALANDICUS. Gray.

C.M.

Echinocardium zealandicum, Gray, Cat. Echn., Brit. Mus., p. 44.

CORDIFORM, nearly as broad as long, centre and anterior end depressed; back above the anus very prominent; dorsal impression oval, rather angled posteriorly; a deep groove from the ovarium pores to the base of the anterior end; genital pores four on each side, two transverse, and two inclining obliquely inwards; ambulacra in shallow grooves, the dorsal ones slightly tapering, and truncate at the extremity, the anterior have $\frac{5}{10}$ pairs of pores, the posterior $\frac{7}{7}$; anus round, surrounded by seven plates; post-anal impression cordiform; post-oral spinous space lanceolate; spines short, curved, brown, pointed; longer on the under surface.

Length rather more than an inch.

ORDER:—HOLOTHUROIDEA.

Sea-slugs.

Body soft, generally with fringed tentacula round the mouth; skin with minute calcareous plates of various shapes; a calcareous ring round the œsophagus.

FAMILY:—HOLOTHURIDÆ.

Suckers for locomotion; mouth surrounded by plumose tentacula, which can be retracted within the mouth; body contractile; calcareous teeth in the mouth.

HOLOTHURIA.

No suckers on the middle of the back; tentacula twenty; back convex, under surface flattened.

27, HOLOTHURIA MOLLIS, sp. nov.

C.M.

Body soft, tapering slightly posteriorly; a row of large tubercles like suckers on each side, and another row of fewer suckers on each side of the back; lower surface with many small suckers irregularly placed; tentacula twenty, shortly peduncled, on hollow cylinders, and ending in frondose appendages, which are longer on the outside; dental apparatus short; respiratory organs moderately branched; longitudinal muscles very broad.

Yellowish, largely mottled with brown above, and in a lesser degree below; tentacles yellowish brown.

About 6 inches in length, and $1\frac{1}{2}$ in breadth.

The suckers are arranged in five rows, but the two upper ones are nearly obsolete; the three other rows are near together, and often run one into the other; from two to four abreast in a row; these five rows can be well seen near the posterior end, when the intestine and muscular tissue has been removed.

THYONE.

Body nearly regular, covered with scattered papillose suckers; tentacula ten.?

28. *THYONE LONGIDENTIS*. sp. nov. C.M.

CYLINDRICAL ; body rugose, with numerous small suckers ; head smooth, transversely striated, tentacula five, short, thick, clavate, pedunculated, frondose ; dental apparatus very long, nearly half the length of the body, tubular for half its length, the rest cut into five teeth.

Brown ; tentacula pale brown.

About an inch in length.

The dental apparatus is composed of five plates, each bifid for half its length, joined to one another, and the lateral process of the two adjacent plates together form a tooth.

29. *THYONE BREVIDENTIS*. sp. nov. C.M.

CYLINDRICAL, rather flatter below, and rounded at both ends ; papillate all over with suckers, those on the back larger and farther apart ; tentacula ten, very short, of unequal length, triangular, frondose ; teeth very short ; longitudinal muscles narrow, attached to the dental apparatus.

Brown ; tentacles pink, with yellowish tips.

Rather more than an inch in length.

30. *THYONE CAUDATA*. sp. nov. C.M.

CYLINDRICAL, tapering rather suddenly to the tail ; body rough, covered with papillæ, except the posterior end, which is transversely ridged ; tentacula ten, moderate, peduncled and frondose ; dental system large, with five bifid teeth.

Reddish brown, paler at the extremities.

Length, 2·5 ; breadth, ·5.

FAMILY :—SYNAPTÆ.

No suckers.

SYNAPTA.

Tentacula long or short ; dermal plates anchor-shaped.

31. *SYNAPTA UNCINATA*. sp. nov. C.M.

Body curved, tapering behind, broadest at the mouth ; tentacula thirteen, very short, merely tubercles, with two incurved hooks at the end of each.

Pale reddish brown.

Length, .6; breadth at anterior end, .2.

Dermal plates anchor-shaped; the flukes equal.

32. *SYNAPTA INÆQUALIS*. sp. nov.

C.M.

CONICAL; inflated anteriorly and tapering behind; soft, minutely papillose; tentacles none.?

Brownish grey.

Length, 1; breadth at the interior end, .33.

Dermal plates anchor-shaped, with one fluke much longer than the other.

CHIRODOTA.

Cylindric; tentacula elongate, digitate at their extremity; skin thick.

33. *CHIRODOTA? ALBA*. sp. nov.

C.M.

CYLINDRICAL, tapering behind; skin reticulated, and with longish papillæ on the back and sides; tentacula ten, large, branched and plumose.

White; skin translucent; tentacles brownish white, spotted with violet on the inside near the base.

Length, 1.

Wellington Harbour (H. Travers).

MOLPADIA.

Body attenuated posteriorly; tentacula simple, short, cylindrical.

34. *MOLPADIA CORIACEA*. sp. nov.

C.M.

BODY cylindrical, tapering rather suddenly into an attenuated and tapering tail, which is half the length of the body, skin rough, coriaceous; body transversely wrinkled; anterior end smooth; mouth with from ten to twenty short, simple papillæ; teeth five, long, bifid, longitudinal muscles with a deep central groove.

Pale brown.

Length, 4; breadth, .65.

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