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THE ECHINODERMATA OF FUNAFUTI.

By THOMAS WHITELEGGE,

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# THE ECHINODERMATA.

BY THOMAS WHITELEGGE.

THE Collection of Echinodermata comprises one hundred and thirty specimens representing nineteen species, most of which belong to well known forms, common to the Pacific coral reefs.

Although devoid of new species, the material includes a few rare examples of great interest not hitherto represented in the Museum Collection.

The following are the Orders represented :—

	Species.
Echinoidea	7
Asteroidea	3
Ophiuroidea	3
Holothuroidea	6

The species of interest are *Echinothrix turcarum*, *Echinometra oblonga*, *Laganum depressum*, *Ophidiaster cylindricus*, *Culcita acutispinosa*, *Ophiarthrum elegans*, and *Holothuria imitans*.

The *Culcita acutispinosa* has been noticed at some length, and the non-specific value of external form has also been pointed out. In a subsequent article by Mr. Waite a note will be found on the commensalism of *Fierasfer* with *Holothuria argus*. Mr. Saville Kent has recorded a species of *Fierasfer* as occurring in the body cavity of *Holothuria mammifera*, on the Queensland coast.\* In this connection I venture to suggest that future observers should try to ascertain if *Fierasfer* is ever found in members of the genus *Muelleria*. Possibly the presence of anal teeth in *Muelleria* may be of use in excluding the fish from the body cavity.

## ECHINODERMATA.

### ECHINOIDEA.

#### ECHINOTHRIX TURCARUM, Schynv.

*Echinothrix turcarum* (Schynv.), Agassiz, Rev. Echini, Mem. Mus. Comp. Zool., iii., p. 416, pl. 111a, fig. 3.

Six specimens, in the two largest the spines are of a uniform dark colour, whilst the four smaller examples have the spines

\* Saville Kent—Great Barrier Reef, 1893, p. 240.

annulated with from five to nine whitish bands a little narrower than the intervening dark bands, except in the youngest specimens, which have them about equal in width.

Diameter of test of largest example.....	92mm.
Height           "           "           .....	48mm.
Diameter of smallest example.....	25mm.
Height           "           "           .....	11mm.

Native name, "Vanna."

HETEROCENTROTUS MAMILLATUS, *Klein.*

*Heterocentrotus mamillatus* (Klein), Agassiz, Rev. Echini, *l. c.*, iii., p. 428.

Only a few spines of this species were obtained; there is a fine specimen in the Museum Collection, from the Ellice Group, collected and presented by Dr. Luther, of H.M.S. "Dart."

Native name, "Fatuki."

ECHINOMETRA LUCUNTER, *Leske.*

*Echinometra lucunter* (Leske), Agassiz, Rev. Echini, iii., *l. c.*, p. 431.

One specimen.

This species is exceedingly common on the outer reefs and in the lagoon.

ECHINOMETRA OBLONGA, *Blainv.*

*Echinometra oblonga* (Blainv.), Agassiz, Rev. Echini, *l. c.*, iii., p. 433.

Nine specimens were obtained. Common on the outer reefs and in the lagoon.

ECHINUS ANGULOSUS, *Leske.*

*Echinus angulosus* (Leske), Agassiz, Rev. Echini, *l. c.*, i., p. 122; *id.* iii., p. 489.

There are two very small specimens which I refer to this species, the largest example is only 12mm. in diameter.

LAGANUM DEPRESSUM, *Less.*

*Laganum depressum* (Less.), Agassiz, Rev. Echini, *l. c.*, iii., p. 518.

A very fine series consisting of sixteen specimens, found in company with the following species.

MARETIA PLANULATA, *Lam.*

*Maretia planulata* (Lam.), Agassiz, Rev. Echini, iii., *l. c.*, p. 570.

Forty-eight examples, exhibiting great variation in colour; about one half of the specimens are of a uniform yellowish-white, the rest are more or less streaked or spotted with brown.

Dredged in abundance in thirteen fathoms of water in the lagoon, one mile west of the Mission Church.

## ASTEROIDEA.

OPHIDIASTER CYLINDRICUS, *Lam.*

*Ophidiaster cylindricus* (Lam.), Perrier, Rev. Stellerides, Arch. de Zool. Exper., iv., p. 389; Loriol, Cat. Raisonne des Echin. Mém. Soc. Phys. et Hist. Nat. Gêneve, xxix., 4, p. 20, pl. xi., figs. 3-4.

Two specimens obtained under stones on the leeward or western side of the Atoll.

LINCKIA PACIFICA, *Gray.*

*Linckia pacifica*, Gray, Ann. & Mag. Nat. Hist., vi., 1840, p. 285; Perrier, *l. c.*, iv., p. 404.

Three examples, which were a brilliant blue colour when alive. Common in the lagoon.

Native name, "Munga-munga ti."

CULCITA ACUTISPINA, *Jef. Bell.*

*Culcita acutispina*, Jef. Bell, Ann. & Mag. Nat. Hist. (5), xii., p. 334.

To this species are referred, though with some hesitation, two specimens obtained in the lagoon. Generally both examples agree with the description given by the author, there are, however, a few characters present which are only slightly touched upon in the original diagnosis.

In the larger specimen the adambulacral spines are in two rows, the inner consisting of four or five spines to each plate; they are a little compressed, the central three being the longest. The outer row consists of two spines to each plate which are very unequal in size, the one nearest the actinostome is large, bluntly conical, and not as a rule higher than broad at the base. The smaller outer spine is almost undistinguishable from the granules which beset the surface generally; occasionally, however, they are more evident, and resemble the larger spines of the inner row.

The central interambulacral space of the actinal surface is closely studded with bead-like granules, varying in size from one to two millimetres in diameter. They are not seriate but scattered irregularly, and are either in contact with each other at the base or separated by a few granules.

On the space near the mouth angle, along the ambulacral groove and on the sides below the porous areas, the large granules are mostly acute, about as high as broad, and are at least their own diameter apart.

The sides of the porous areas and the whole of the abactinal surface is furnished with spines, narrower at the base and more acute than any of those on the actinal surface. The larger spines are mostly confined to the interporous spaces, and—in the large specimen under notice—give the upper surface a reticulate appearance.

In the smaller example the large acute spines are scattered over the porous and non-porous areas alike, and the areolate feature visible in the larger specimen is wanting. These spines are usually a little higher than broad, and two or three times their diameter apart.

The porous areas are densely packed with short acute spines, subspiniform granules and pedicellariæ, the latter are about two-thirds of a millimetre in length; when viewed from the lateral aspect they are seen to be slightly convex externally and meeting only at their tips.

Each pedicel is narrow in the middle with the base and apex dilated, the latter has its inner surface excavated, and the semi-circular margin minutely denticulated. The pedicellariæ are much more abundant on the lower half of the abactinal surface than in the upper central region,—usually from six to ten in a centimetre,—they are mostly confined to the porous areas, but occasionally they occur on the interporous spaces.

The minute granules on the abactinal surface are more or less acute and a little longer than broad at the base. The somewhat larger granules on the actinal surface are also mostly acute and about as high as broad; very few are rounded at the summit.

The pedicellariæ on the actinal surface are not very abundant, the majority are elevated a little above the adjacent granules, and present when closed an almost circular outline, some of the larger, however, are a little elongated.

Owing to their slight elevation, larger size, and lighter colour, the actinal pedicellariæ are quite conspicuous and easily distinguished from the small granules.

The madreporic plate is oval in shape, and has a few conical spines around its margin, similar spines surround the anus, and in the larger specimen some of the spines are granulose at the apex.

The number of marginal pore areas in the interambulacral space is thirteen in both specimens. From the margin to the anus there are nine or ten pore areas, and from the tip of the ambulacral groove to the anus there are seven in the large specimen. In the smaller example they are fewer, being eight or nine in the interambulacral space, and five from the apex of the arm to the anus.

There are seventy clusters of adambulacral spines along each side of the ambulacral groove, counting from the mouth angle to the end of the groove.

The following are the measurements of both examples:—

Large specimen.....R., 155mm. ; r., 100mm.

Small ditto.....R., 115mm. ; r., 85mm.

R., measured along the side of the groove from mouth angle to the extremity of the arm ; r., from mouth to commencement of pore areas.

Diameter, large specimen.....220mm.

Height " " ..... 85mm.

Diameter, small specimen.....172mm.

Height " " ..... 60mm.

An examination of the members of the genus *Culcita* shows that it is greatly in need of revision ; too much attention has been paid to the outward form, which presents characters of little specific value.

If a specimen is obtained and placed in a vessel with sea water, and allowed to assume a symmetrical shape, and afterwards killed in strong spirit, when thoroughly preserved it may be dried and will retain its shape, having the abactinal surface convex. If on the other hand it is plunged direct into strong alcohol without regard to its shape, it will retain its original and often very unsymmetrical form. Cake-like or flat examples are in most cases due either to drying without previous curing in spirits, or drying after being in very weak spirit.

In *Anthenea acuta*, Perrier—common in Port Jackson—we have a good example in illustration of the above remarks.

This species often attains to nine or ten inches in diameter, and is a most variable species as far as the convexity of the abactinal surface is concerned and in the granulation. Having trawled thousands of specimens, and noted that, however unsymmetrical when brought up in the trawl, if placed on a level surface in a little sea water they soon regain their natural form, and may be killed in that state either by flooding them with fresh water or by placing them in strong spirit.

It has often happened when we have obtained the *Anthenea* in abundance that some have been lying about the deck, others entangled in the trawl, or buried beneath the seaweeds for many hours. Ultimately these specimens have been hastily gathered up and placed in spirits, resulting in a series of distorted examples, which would be very misleading to a worker unacquainted with the form of a well preserved specimen.

The following are the measurements of four specimens of *Anthenea acuta*, Perr., showing the differences due to the mode of preservation :—

R.....130mm.	R.....115mm.	} Well preserved.
r..... 63mm.	r..... 65mm.	
Height 50mm.	Height 37mm.	
R.....110mm.	R.....113mm.	} Badly preserved.
r..... 50mm.	r..... 65mm.	
Height 17mm.	Height 20mm.	

#### OPHIUROIDEA.

##### OPHIOCOMA SCOLOPENDRINA, *Agass.*

*Ophiocoma scolopendrina*, Agass., Mém. Soc. Sci. Nat. Neuchatel, i, p. 192, 1835; Lyman, Chall. Rep. Zool., v., p. 170, pl. xlvii., fig. 3.

One half grown specimen.

##### OPHIOCOMA ERINACEUS, *Müll. & Trosch.*

*Ophiocoma erinaceus*, Müll. & Trosch., Syst. Asteriden, p. 94, 1842; Lyman, Ill. Cat. Mus. Com. Zool., i., 1865, p. 85.

Twenty-two examples, mostly young.

##### OPHIARTHURUM ELEGANS, *Peters.*

*Ophiarthrum elegans*, Peters, Monatsb., K. Akad. Wiss. Berlin, 1851, p. 464.

One half grown specimen.

#### HOLOTHUROIDEA.

##### MUELLERIA ECHINITES, *Jaeger.*

*Muelleria echinites*, Jaeger, De Holoth., 1883, pp. 17-18, pl. iii., fig. 6; Semper, Reisen Arch. Phil. Holoth., 1868, p. 76, pl. xxx., fig. 8.

One specimen obtained at low water line on the outer reef. Native name, "Funafuna."



HOLOTHURIA ARGUS, *Jaeger*.

*Holothuria argus*, Jaeger, De Holoth., 1833, p. 19, pl. ii., fig. 1 ; Semper, Reisen Arch. Phil. Holoth., 1868, p. 80, pl. xxx., fig. 11 ; Saville Kent, Great Barrier Reef, p. 56, p. 238, pl. xii., fig. 7.

One example, found on a sandy bottom in the lagoon, where it was fairly common.

HOLOTHURIA ATRA, *Jaeger*.

*Holothuria atra*, Jaeger, De Holoth., 1833, p. 22 ; Semper, Reisen Arch. Phil. Holoth., 1868, p. 88, pl. xxvi. ; Théel, Chall. Rep., Zool., xiv., p. 181, pl. vii., fig. 4.

Four specimens ; very abundant on the outer reefs.

Native name, "Malorli."

HOLOTHURIA VAGABUNDA, *Selenka*.

*Holothuria vagabunda*, Selenka, Beiträge Anat. Syst. Holoth., Zeits. f. Wiss. Zool., xvii., 1867, p. 334, pl. xix., figs. 75-76 ; Semper, Reisen Arch. Phil. Holoth., 1868, p. 88, pl. xxi. ; Lampert in Semper's Reisen Arch. Phil., iv., p. 71, pl. i., figs. 3-19.

Two specimens, obtained in the mangrove swamps under stones at low tide.

HOLOTHURIA PARDALIS, *Selenka*.

*Holothuria pardalis*, Selenka, Beiträge, Anat. Syst. Holoth. Zeits. f. Wiss. Zool., xvii., 1867, p. 336, pl. xix., fig. 85 ; Semper, Reisen Arch. Phil. Holoth., 1868, p. 87, pl. xxx., fig. 31.

Four specimens, obtained in the mangrove swamps.

HOLOTHURIA IMITANS, *Ludwig*.

*Holothuria imitans*, Ludwig, Arb. Zool. Zoot. Inst. Wurzburg, ii., 1875, p. 109, pl. vii., fig. 41 ; Lampert in Semper's Reisen Arch. Phil., iv., p. 80.

With some hesitation I refer to this species five small specimens, which agree in the main with the descriptions given by Ludwig, Lampert, and Théel.

The tentacles are twenty in number, the colour is dark brown, the deposits consist of curved bars and tables. The bars appear to be confined to the ambulacral appendages and to the tentacles ;

in the former the bars have processes on each side which often join, forming a series of more or less complete holes; in the latter the bars are strongly curved, and have very small processes along the convex edges and ends only the concave side is smooth. The tables have the smaller four toothed ends pointed outwards towards the skin, the inner and very much larger ends have eight teeth or rather four pairs, each pair being closer together than the space separating them; these teeth are often dilated and denticulate at the ends.

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## CORRECTIONS.

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- Page iii., paragraph 2, line 2—*for* “Mervyn” *read* “Mostyn.”
- „ 9, „ 4, line 1—*for* “Mervyn” *read* “Mostyn.”
- „ 20, foot-note § —*for* “1844” *read* “1884, p. —.”
- „ 71, paragraph 3, line 4—*for* “supplied” *read* “applied.”
- „ 97, line 6 —*for* “Nob” *read* “Latr.”
- „ 98, line 17 —*for* “Nob” *read* “Macq.”
- „ 155, heading, above Echinodermata, *read* “[VII.]”
- „ 220, line 34 —*for* “VIRIDE” *read* “VIRIDIS.”
- „ 231, line 2 —*for* “genealogies” *read* “genealogies.”
- „ 250, foot-note § —*for* “ix.” *read* “xi.”
- „ 276, foot-note † —*for* “1897” *read* “1887.”
- „ 301, foot-note \* —*for* “1876” *read* “1878.”
- „ 389, paragraph 3, line 1—*add after* fig. 2, “and Plate xxvii., fig. 1.”
- „ 389, „ 4, line 3—*for* “fig. 6” *read* “fig. 2.”
- „ 389, „ 4, line 7—*for* “fig. 7” *read* “fig. 1.”
- „ 390, „ 3, line 2—*for* “fig. 8” *read* “Plate xxvii., fig. 2.”
- „ 390, „ 3, line 10—*delete* “fig. 8.”
- „ 392, „ 2, line 4—*for* “perceptable” *read* “perceptible.”
- „ 398, „ 2, line 4—*for* “indicate” *read* “indicates.”
- „ 398, „ 4, line 4—*for* “have” *read* “has.”
- „ 399, „ 4, line 8—*for* “reject” *read* “rejects.”
- „ 528, line 16 —*for* “davidi” *read* “davidis.”
- „ 530, line 38 —*for* “Chiridota” *read* “Chirodota.”