

ECHINODERMATA OF THE FLINDERSIAN REGION SOUTHERN AUSTRALIA

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Plate xii.

THE Phylum *Echinodermata* appears to have been somewhat neglected by South Australian zoological workers.

Tenison-Woods (1877) gave a list of the Sea-urchins of Australia. Thirteen species are there said to inhabit our shores, and in a supplementary paper (1878) another one is added. A large number of Australian Sea-stars was described by Gray in an appendix to Jukes' Voyage of the "Fly". Quoy and Gaimard, "Voyage Astrolabe", described three species of Australian Holothurians. Tate (1882) supplied a short list of Sea-urchins from South Australia.

Dr. H. L. Clark (1928) named a number of Sea-lilies, Sea-stars, Brittle-stars and Sea-urchins, mainly the results of dredgings by Sir Joseph Verco, and forwarded by the South Australian Museum. Dr. Clark, in company with Mr. H. M. Hale, collected Echinoderms during a brief visit to Port Willunga in 1932, as recorded by him in 1938. The same author described a new Basket-star from Cape Dutton, South Australia, in 1939.

The present authors now endeavour to systematize the *Echinodermata* recorded from the Flindersian Region, the whole coastline from Wilson's Promontory, Victoria, to Geraldton, Western Australia, and including the northern and western coasts of Tasmania. Where a species apparently belongs to the Dampierian Region and is recorded north of Cape Leeuwin, its extralimital character is noted. The same applies to Peronian species recorded at the eastern end of the Flindersian. Following the type locality, we have listed the exact localities in the Flindersian Region of authentic specimens.

We have found that the determination of genotypes, and the fixing of type localities, are primary necessities in any account of a zoological nature, therefore we have endeavoured to determine and fix this basic information first.

Dr. Clark in his work "Echinoderms of Australia", indicated that conclusions arrived at by a distant zoologist were not the most satisfactory, and it required local students to intensify the study. We take this step having the knowledge that at present there is no worker giving this phylum special attention here.

In the previous sectional lists published, several localities are inaccurate, and we have endeavoured to give exact localities wherever possible. A little disorder has arisen in Dr. Clark's work through the failure to recognize natural Zoological Regions, and this has tended to confuse results.

The material, the basis of this list, includes the results of Verco's dredgings, besides original South Australian Museum specimens.

Dr. Clark's 1928 holotypes are in the South Australian Museum and are here referred to under our registration numbers; his 1938 collection was, however, taken by him to America. We have received valuable assistance, with specimens, from the members of the Malacological Society of South Australia, especially Messrs. G. Pattison and W. G. Buick. The results of our own collecting are also recorded.

Phylum ECHINODERMATA

CLASS ASTEROIDEA

Order PHANEROZONIA.

FAMILY ASTROPECTINIDAE.

Genus ASTROPECTEN Gray 1840.

Genotype: *Astropecten aurantiacus* Tiedemann 1816 = *Astropecten aranciatus* Linné 1758 (Mediterranean).

ASTROPECTEN PECTINATUS Sladen 1883.

Astropecten pectinatus Sladen 1883, p. 251.

Type locality. Port Jackson, New South Wales. Döderlein (1917, p. 166) records this species from Bass Strait and Port Phillip. The specimen recorded by H. L. Clark (1928, p. 371), from Petrel Bay, St. Francis Island, South Australia, appears to be this species. (K.38 S.A.M.).

ASTROPECTEN PREISSII Müller and Troschel 1843.

Astropecten preissii Müller and Troschel 1843, p. 119.*Type locality.* Fremantle, Western Australia.

Distribution. South Australia: Marino, Port Noarlunga, Port Willunga, Sellicks, Spencer Gulf, north coast of Kangaroo Island, Flinders Island 37 fathoms. Western Australia: Fremantle, Shark Bay.

South Australian examples are reddish brown in life.

The subspecies *albanicus* Döderlein (1917, p. 162) is a wide armed variety and we have it from Spencer Gulf (K.43 S.A.M.). The dimensions of this specimen are $R = 60$ mm., $r = 15$ mm., $br. = 17$ mm.

ASTROPECTEN TRISERIATUS Müller and Troschel 1843.

Astropecten triseriatus Müller and Troschel 1843, p. 118.*Astropecten arenarius* Perrier 1876, p. 286.*Type locality.* South-western Australia.*Distribution.* Western Australia: Fremantle, also north-western Australia.

We have not taken this species in South Australia, and the record is probably extralimital from the Dampierian Region.

ASTROPECTEN VAPPA Müller and Troschel 1843.

Astropecten vappa Müller and Troschel 1843, p. 119.*Type locality.* South-west Australia.

Distribution. South Australia: Spencer Gulf, juvenile (K.44). Western Australia: Shark Bay, Albany.

ASTROPECTEN SYNTOMUS H. L. Clark 1928.

Astropecten syntomus H. L. Clark 1928, p. 372.

Holotype: Reg. No. K.45. South Australia.

ASTROPECTEN SCHAYERI Döderlein 1917.

Astropecten schayeri Döderlein 1917, p. 60.

Type locality. Tasmania.

Distribution. Victoria: Portland. Tasmania.

Genus LONCHOTASTER Sladen 1885.

Genotype: *Lonchotaster tartareus* Sladen 1889 (Atlantic and Southern Oceans).

LONCHOTASTER MAGNIFICUS H. L. Clark 1916.

Lonchotaster magnificus H. L. Clark 1916, p. 30.

Type locality. Great Australian Bight, 80–120 fathoms.

LONCHOTASTER FORFICIFER Sladen 1889.

Lonchotaster forficifer Sladen 1889, p. 106.

Type locality. Near Antarctic Circle, lat $62^{\circ} 26' S.$, long. $95^{\circ} 44' E.$, depth 1975 fathoms, Diatom ooze.

Distribution. Also South Australia, lat. $53^{\circ} 55' S.$, long. $108^{\circ} 35' E.$, 1950 fathoms from Diatom ooze.

Genus PSILASTER Sladen 1885.

Genotype: *Astropecten andromeda* Müller and Troschel 1842. (Europe).

PSILASTER ACUMINATUS Sladen 1889.

Psilaster acuminatus Sladen 1889, p. 225.

Type locality. North-west of Port Hardy, New Zealand, 150 fathoms.

Distribution. South Australia: Great Australian Bight. Bass Strait. Victoria, Gabo Island, 80–200 fathoms.

FAMILY LUIDIIDAE.

Genus LUIDIA Forbes 1839.

Genotype: *Luidia fragilissima* Forbes 1839 = *Luidia ciliaris* Philippi 1837. (Europe).

LUIDIA MACULATA Müller and Troschel 1842.

Luidia maculata Müller and Troschel 1842, p. 77.

Type locality. East Indies.

Distribution. South Australia: Flinders Island, 37 fathoms. New South Wales. Queensland: Fraser Island, 25–30 fathoms. Western Australia: Broome.

This seems distinct from the Flindersian *Luidia australiae* Döderlein. It has been recorded from the Dampierian and Peronian Regions. We have not specimens from the Flindersian Region which could be regarded as this species, although H. L. Clark (1916, p. 29), records it from Flinders Island, South Australia, 37 fathoms.

LUIDIA AUSTRALIAE Döderlein 1920.

Luidia australiae Döderlein 1920, p. 266.

Type locality. Fremantle, Western Australia.

Distribution. South Australia: Gulf St. Vincent, Kangaroo Island. Western Australia: Rottnest Island.

All Flindersian examples examined by us have seven arms, and differ characteristically from *Luidia maculata* in the paxillae on the distal part of the arm. Compared with *maculata*, *australiae* has the median paxillae larger of markedly unequal size, and the lateral paxillae less regular. Two large specimens recently taken at Sellicks Beach, one by H. M. Hale, Director of South Australian Museum, and one by Mrs. Dickensen:

1. Reg. No. K.429. Sellicks Beach, six fathoms, seven arms, R = 160 mm. Colour in life, variegated yellow and blackish.
2. Reg. No. K.563. Sellicks Beach, seven arms, R = 190 mm. Colour, variegated yellow and blackish (figured).

FAMILY ARCHASTERIDAE.

Genus ARCHASTER Müller and Troschel 1842.

Genotype: *Archaster typicus* Müller and Troschel 1842 (Indian Ocean). *Archaster hesperus* Müller and Troschel 1842, is recorded from Japan, and the third species described when the genus was introduced, namely *Archaster angulatus*, came from "Java; Isle de France".

ARCHASTER LAEVIS H. L. Clark 1939.

Archaster laevis H. L. Clark 1938, p. 75.

Type locality. Broome, Western Australia, 5-8 fathoms.

A large series of this species was forwarded from Fremantle, Western Australia, by Mr. H. Rossell, also two large examples were donated by Mr. W. R. Steadman. Specimens in this Museum were labelled "*Asterias angulatus*". *Archaster angulatus* Müller and Troschel is from Mauritius, and has been doubtfully recorded from Java, and the Philippine Islands. The distribution of *Archaster angulatus* (? = *mauritianus* Gray) is recorded by Sladen (1889, p. 123) as the Indian Ocean, with Mauritius as the metropolis. H. L. Clark (1938, p. 76), when describing *Archaster laevis* remarks "that this handsome *Archaster* is nearly related to *Archaster angulatus* admits of no doubt, but the smooth tessellated aboral surface caused by the crowded, truncate, prismatic granules of the paxillae gives it a very characteristic appearance, quite unlike that of any specimens of *angulatus* available for comparison".

Under the Museum registration K.49, nineteen specimens, taken in October, 1934, are entered. The species is apparently common in shallow water at Fremantle. Mr. Harold Rossell when forwarding them writes: "You will notice these stars are nearly all five-rayed, though occasionally a six-rayed specimen is found.

I noticed that out of about sixty stars of this species I only found two six-rayed, one of which I am sending in this parcel". The largest specimen has $R = 110$ mm., $r = 15$ mm., and maximum br. = 17 mm. at the disc. The smallest juvenile has $R = 45$ mm., $r = 9$ mm., and maximum br. = 10 mm. at the disc. The aboral surface is flat, but frequently the middle of the rays is actually sunken in dried specimens, giving it a channel-like effect up to the distal quarter of the ray. The six-rayed specimen has $R = 75$ mm., $r = 13$ mm., br. = 14 mm.

K.575 from Shark Island, Fremantle, two large specimens. The largest has $R = 125$ mm., $r = 27$ mm., br. = 17 mm.

So far we have no record of this species from South Australia. It is probably extralimital from the Dampierian Region.

FAMILY GONIASTERIDAE.

Genus NECTRIA Gray 1840.

Genotype: *Asterias ocellifera* Lamarck 1816 (Australian Seas).

NECTRIA MULTISPINA H. L. Clark 1928.

Nectria multispina H. L. Clark 1928, p. 375.

Holotype: Reg. No. K.50. Gulf St. Vincent, South Australia.

Distribution. South Australia: Gulf St. Vincent, Port Willunga, Marino, Spencer Gulf. Western Australia: Albany.

The species is probably equally as common as *Nectria ocellata* Perrier, in South Australia. A living specimen before us now is bright red with five obscure cream-coloured blotches situated on the disc, near the base of the arms; the tube feet are dark blood-red. This example, Reg. No. K.564, from Sellicks Beach (H. M. Hale), is typical; $R = 45$ mm.

Although *multispina* is regarded as distinct from *ocellata*, some specimens are difficult to separate.

NECTRIA OCELLATA Perrier 1876.

Nectria ocellata Perrier 1876, p. 4.

Type locality. Tasmania.

Distribution. South Australia: Gulf St. Vincent, Spencer Gulf, Granite Island, Kingston, Great Australian Bight, and taken by us from the reefs at Marino, Port Willunga, and Sellicks (all Gulf St. Vincent). Also recorded from Tasmania, Devonport. Bass Strait.

Genus PENTAGONASTER Gray 1840.

Genotype: *Pentagonaster pulchellus* Gray 1860 (New Zealand).

PENTAGONASTER DÜBENI Gray 1847.

Pentagonaster dübeni Gray 1847, p. 79.

Type locality. Western Australia.

Distribution. South Australia: Gulf St. Vincent, Spencer Gulf. Western Australia: Point Peron.

Genus NYMPHASTER Sladen 1885.

Genotype: *Nymphaster symbolicus* Sladen 1889 (Philippine Islands).

NYMPHASTER PENTAGONUS H. L. Clark 1916.

Nymphaster pentagonus H. L. Clark 1916, p. 36.

Type locality. Great Australian Bight, South Australia, 250 fathoms.

Genus TOSIA Gray 1840.

Genotype: *Tosia australis* Gray 1840 (Swan River, Western Australia).

TOSIA AUSTRALIS Gray 1840.

Tosia australis Gray 1840, p. 281.

Type locality. Swan River, Western Australia.

Distribution. South Australia: Gulf St. Vincent, Port Noarlunga (Miss I. Davies) [Adelaide University, No. 63], Port Willunga (W. M. Nielsen), Marino, Spencer Gulf, Kangaroo Island, Port Lincoln, Wallaroo. Victoria: Port Phillip, Westernport. Bass Strait: King Island. Tasmania: d'Entrecasteaux Channel. Western Australia: Lucky Bay, King George Sound.

The species is very common throughout the Flindersian Region. The colouration is variable. A specimen (Reg. No. K.566) from Marino has a five-rayed salmon-coloured star pattern in the middle, the interstices being light violet; the superomarginal plates are mottled light and dark violet, while the inferomarginals are lighter coloured; the underside is predominantly of a cream-coloured ground sparsely spotted with light violet-coloured plates irregularly disposed. This example is a juvenile, $R = 15$ mm., and $r = 10$ mm. The superomarginals are six on each side, the terminal ones being slightly larger; the inferomarginals number six corresponding with those above.

Reg. No. K.567, is a typical half grown specimen taken by one of us at Port Fairy, Victoria.

TOSIA ASTROLOGORUM Müller and Troschel 1842.

Astrogonium astrologorum Müller and Troschel 1842, p. 54.

Tosia australis var. *astrologorum* H. L. Clark 1928, p. 384.

Type locality. New Holland. We designate Port Willunga, South Australia.

Distribution. South Australia: Port Willunga, Port Noarlunga (Miss I. Davies) [Adelaide University No. 63a], Spencer Gulf. Victoria: Port Phillip. Tasmania: d'Entrecasteaux Channel, 5 fathoms. Western Australia.

This species is probably quite distinct from *Tosia australis*, and living adult specimens can be readily separated. It is characterized by the produced pointed rays, large distal superomarginal plates, and centrally elevated median superomarginals. Reg. No. K.568, from Marino, measures $R = 25$ mm., and $r = 16$ mm. Colour is predominantly dark violet. A specimen from Normanville, S.A., Nov., 1941, has orange and red maculations aborally, lighter coloured beneath; $R = 25$ mm. and $r = 17$ mm.

TOSIA GRANDIS Gray 1847.

Tosia grandis Gray 1847, p. 80.

Tosia aurata Gray 1847, p. 80.

Type locality. *T. grandis*, Western Australia; *T. aurata*, Australia.

Distribution. Western Australia. South Australia. Victoria: Port Phillip. Tasmania: Oyster Bay, 20–30 fathoms, d'Entrecasteaux Channel, 5 fathoms.

There seems little doubt but that *grandis* and *aurata* are one and the same species. Livingstone (1932, p. 373), when discussing the status of the two names wrote, "*T. aurata* Gray (valid)" and beneath, "*T. grandis* Gray (? synonym of *T. aurata* Gray)". However if the original descriptions are referred to it will be seen that *grandis* has line priority over *aurata*.

GENUS MEDIASTER Stimpson 1857.

Genotype: *Mediaster aequalis* Stimpson 1857 (Alaskan Peninsula to Panama).

MEDIASTER AUSTRALIENSIS H. L. Clark 1916.

Mediaster australiensis H. L. Clark 1916, p. 39.

Type locality. Flinders Island, Bass Strait, 40 fathoms.

Distribution. Bass Strait. Tasmania.

FAMILY OREASTERIDAE.

GENUS ASTERODISCUS Gray 1847.

Genotype: *Asterodiscus elegans* Gray 1847 (North-east China).

ASTERODISCUS TRUNCATUS Coleman 1911.

Asterodiscus truncatus Coleman 1911, p. 699.

Nectria ocellifera H. L. Clark 1909, p. 529 (non Lamarek).

Type locality. Botany Bay, New South Wales, 79–80 fathoms, sand and stones.

Distribution. South Australia: Great Australian Bight, 15 miles south of St. Francis Island, 30 fathoms. Bass Strait. Victoria. New South Wales. Western Australia: Western end of Bight, 90 fathoms.

FAMILY ANTHENEIDAE.

GENUS ANTHASTER Döderlein 1915.

Genotype: *Oreaster valvulatus* Müller and Troschel 1843 (South-west Australia).

ANTHASTER VALVULATUS Müller and Troschel 1843.

Oreaster valvulatus Müller and Troschel 1843, p. 115.

Type locality. South-west Australia.

Distribution. South Australia: Glenelg, Kangaroo Island, Althorpe Islands. Western Australia: Rottnest Island, Cottesloe.

FAMILY LINCKIIDAE.

Genus PSEUDOPHIDIASTER H. L. Clark 1916.

Genotype: *Pseudophidiaster rhysus* H. L. Clark 1916 (Great Australian Bight, 80-120 fathoms).

PSEUDOPHIDIASTER RHYSUS H. L. Clark 1916.

Pseudophidiaster rhysus H. L. Clark 1916, p. 55.*Type locality.* Great Australian Bight, 80-120 fathoms.*Distribution.* South Australia: Great Australian Bight. Bass Strait. Victoria: South of Gabo Island, 200 fathoms. Tasmania: Oyster Bay, 60 fathoms.

FAMILY ASTEROPIDAE.

Genus PETRICIA Gray 1847.

Genotype: *Asterias vernicina* Lamarek 1816 = *Petricia punctata* Gray 1847 (Southern Australia).

PETRICIA VERNICINA Lamarek 1816.

Asterias vernicina Lamarek 1816, p. 554.*Petricia punctata* Gray 1847.*Type locality.* South Australia ("les mers Australes?" Lamarek).*Distribution.* South Australia: Twenty specimens from Port Willunga (Reg. No. K.539) are typical; Port Noarlunga (Adelaide University, Reg. No. 143) taken by Miss I. Davies, preserved in glycerine has retained the dark red colour so typical of the living specimens; Cape Jervis (G. Pattison), taken alive under a rock at half tide mark, November, 1941, R = 52 mm., r = 24 mm., br = 44 mm., thickness in centre (living) 16 mm., tapering only slightly to 12 mm. at end of arms; colour, a blend of scarlet, orange and yellow; a kind of skin covered the entire animal, so highly coloured that the collector's hands were stained; aboral surface lumpy and uneven. The species is also recorded from Spencer Gulf.

PETRICIA OBESA H. L. Clark 1923.

Petricia obesa H. L. Clark 1923, p. 241.*Type locality.* Western Australia.*Distribution.* Western Australia: Bunkers Bay, Point Peron.

Order SPINULOSA.

FAMILY ASTERINIDAE.

Genus ASTERINA Nardo 1834.

Genotype: *Asterias minuta* Nardo 1834 = *Asterias gibbosa* Perrier. (Europe).

ASTERINA ATYPHOIDA H. L. Clark 1916.

Asterina atypoida H. L. Clark 1916, p. 57.

Type locality. Fifteen miles north-west of Cape Jervis, South Australia, 17 fathoms.

Distribution. South Australia: Gulf St. Vincent, Spencer Gulf, Backstairs Passage, Troubridge Shoal, Cape Marsden, The Pages, Kangaroo Island.

ASTERINA SCOBINATA Livingstone 1933.

Asterina scobinata Livingstone 1933, p. 1.

Type locality. Tasmania.

Distribution. Tasmania: Hobart, Eagle Hawk Neck, Wynyard. The species may be extralimital from the Peronian, Maugean subregion. It has been recorded in the Flindersian at Wynyard, north-western Tasmania. The exact type locality in Tasmania is not given by Livingstone in the original description. We have not taken it in South Australia.

GENUS PATIRIELLA Verrill 1913.

Genotype: *Asterina regularis* Verrill (New Zealand and Australia).

PATIRIELLA CALCAR Lamarek 1816.

Asterias calcar Lamarek 1816, p. 557.

Type locality. King George Sound, Western Australia.

Distribution. South Australia: Guichen Bay, Encounter Bay, Gulf St. Vincent, Spencer Gulf, Kangaroo Island. Western Australia. Tasmania: Hobart. New South Wales.

This is a common intertidal species in New South Wales, and it is very common in South Australia above low tide mark at Port Willunga, Sellicks, Marino, and Cape Jervis on rocky reefs.

South Australian specimens above are orange coloured ground, and olive green on the rays; underside cream coloured except the tips of the rays which are tinged with olive green. A typical series of ten from Cape de Couedie, Kangaroo Island (Reg. No. K.569), average $R = 50$ mm. All South Australian specimens of this common Asteroid which we have examined, numbering hundreds, have eight rays and are of the typical green colour. A large example from Guichen Bay (K.108) has $R = 60$ mm.

PATIRIELLA GUNNII Gray 1840.

Asterina gunnii Gray 1840, p. 289.

Type locality. Tasmania (Van Diemens Land, Gray).

Distribution. South Australia: Gulf St. Vincent, Spencer Gulf, Port Lincoln, Kangaroo Island, St. Francis Island. Western Australia.

This species is common on reefs in both Gulfs, and is just as common on the open ocean reefs, too. We have taken it at Reevesby Island, and on the local reefs at Port Willunga, Marino, and Sellicks. It lives at about low tide mark, and the aboral surface is a dark purple colour in life, sometimes grading into cream orally towards the middle. We have taken specimens of this colour at Marino (K.570).

PATIRIELLA EXIGUA Lamarck 1816.

Asterias exigua Lamarck 1816, p. 554.

Type locality. Indian Ocean (Lamarck records, habites les mers d'Amerique).

Distribution. South Australia: Gulf St. Vincent, Spencer Gulf, Kangaroo Island. Tasmania. New South Wales. North Australia. Lord Howe Island. Also Cape of Good Hope and East Indies.

In February, 1926, Messrs. Hale and Tindale took 47 specimens of this species at Kingscote, Kangaroo Island (K.118). These serve to give a good idea of the South Australian form. Mr. Hale describes the living star as very plentiful and blue in colour (somewhat like *gunnii*). The average of these specimens has $R = 10$ mm., and $r = 8$ mm. All have the characteristic bare, smooth area, in the actinal interradii. The radial extent of this area varies somewhat but averages 3-5 mm. in radial extent. Forty-five specimens have five rays and two have four rays. The species has been recorded from the Atlantic, Pacific, and Indian Oceans, and the Eastern Archipelago. Whether the South Australian examples are conspecific with those from other parts of the world remains to be seen.

PATIRIELLA BREVISPIA H. L. Clark 1938.

Patiriella brevispia H. L. Clark 1938, p. 166.

Type locality. Bunbury, Kombana Bay, 5-8 fathoms. Western Australia.

Distribution. South Australia: Port Willunga. Western Australia: Bunbury.

PATIRIELLA INORNATA Livingstone 1933.

Patiriella inornata Livingstone 1933, p. 17.

Type locality. Western Australia.

Distribution. Western Australia.

Livingstone does not say from what part of Western Australia his holotype comes. There are no other records known of this species.

GENUS PARASTERINA Fisher 1908.

Genotype: *Patiria crassa* Gray 1840 (Indian Ocean).

PARASTERINA TROUGHTONI Livingstone 1934.

Parasterina trougtoni Livingstone 1934, p. 179.

Type locality. Albany, Western Australia.

Distribution. Western Australia, three examples in all.

PARASTERINA OCCIDENTALIS H. L. Clark 1938.

Parasterina occidentalis H. L. Clark 1938, p. 180.

Type locality. From a small cavern under a big rock at Point Peron, Western Australia.

Distribution. Western Australia: Shag Rocks (Penguin Island), Fremantle, Cottesloe, Garden Island.

A well defined species inhabiting the western end of the Flindersian Region. We have not taken it in South Australia.

Genus *ASTERINOPSIS* Verrill 1913.Genotype: *Asterias penicillaris* Lamarck 1816 (? Red Sea).*ASTERINOPSIS GRANDIS* H. L. Clark 1928.*Nepanthia grandis* H. L. Clark 1928, p. 393.

Holotype: Reg. No. K.152. Gulf St. Vincent and Spencer Gulf, South Australia.

Distribution. South Australia: Gulf St. Vincent, Spencer Gulf, Tumby Bay.

This species is not uncommon in Spencer Gulf and the Great Australian Bight. The holotype was dredged by Verco in South Australian waters, but the exact locality is not given. The words "S.A. coast, Verco" appear on the label. Paratypes are labelled "Spencer Gulf". Of ten juveniles from Spencer Gulf, only one is six-rayed; of Clarks' 26 specimens, three are six-rayed. The colour in life is reddish-orange.

ASTERINOPSIS ROSEA H. L. Clark 1938.*Paranepanthia rosea* H. L. Clark 1938, p. 161.*Type locality.* North-east corner of Rottnest Island, Western Australia.*Distribution.* Western Australia.

The generic location of this and the preceding species is questionable. H. L. Clark (1938), placed *grandis* in *Paranepanthia* Fisher, but that is probably a synonym of *Asterinopsis*. Unfortunately, *Asterinopsis* is based on *penicillaris*, a species of doubtful validity. We have, however, accepted *Asterinopsis* for the present.

FAMILY ECHINASTERIDAE.

Genus *ECHINASTER* Müller and Troschel 1842.Genotype: *Echinaster spinosus* Müller and Troschel 1842, p. 22 (North America).*ECHINASTER ARCYSTATUS* H. L. Clark 1914.*Echinaster arcystatus* H. L. Clark 1914, p. 148.*Type locality.* South-western Australia.*Distribution.* South Australia: Gulf St. Vincent. Western Australia.

We have never taken this species in South Australia, though more extensive collecting may result in its discovery. A typical, though juvenile, specimen in the Museum collection labelled "S.A.?" measures $R = 70$ mm., $r = 15$ mm., $br. = 17$ mm. The only authentic record of this species from South Australia is that mentioned by H. L. Clark (1918, p. 395), "Between Backstairs Passage and the Pages, dredged in 25 fathoms. Field Naturalist Expedition, April, 1888".

ECHINASTER GLOMERATUS H. L. Clark 1916.*Echinaster glomeratus* H. L. Clark 1916, p. 62.*Echinaster glomeratus extremus* H. L. Clark 1928, p. 396.*Type locality.* Kangaroo Island, South Australia.*Distribution.* South Australia: Gulf St. Vincent, Kangaroo Island.

The variety *extremus* H. L. Clark (1928) (Holotype: K.156, Gulf St. Vincent), is a well preserved dried specimen showing prominent heaps of spinelets which

tend to give it a slightly different appearance from *glomeratus*. A close examination of specimens has convinced us that the varietal name is not required, and they all represent one species. The grouped spinelets of both *glomeratus* and its variety *extremus* suggest that the species should be placed in the following genus *Henricia*. More Australian material must be examined, however, before a definite decision can be given.

Genus *HENRICIA* Gray 1840.

Genotype: *Henricia oculata* Gray 1840 = *Asterias sanguinolenta* O. F. Müller 1776. (North Atlantic, both sides).

HENRICIA HYADESI Perrier 1891.

Cribella hyadesi Perrier 1891, p. K100.

Type locality. Southern South America.

Distribution. Western Australia: Great Australian Bight, 80–150 fathoms. Victoria: Gabo Island, 200 fathoms. Bass Strait: Babel Island, 50–60 fathoms. Tasmania: East of Maria Island, 78 fathoms.

We have not yet seen a specimen of this deep-water species from South Australia.

Genus *PLECTASTER* Sladen 1889.

Genotype: *Echinaster decanus* Müller and Troschel 1843 (New Holland).

PLECTASTER DECANUS Müller and Troschel, 1843.

Echinaster decanus Müller and Troschel 1843, p. 114.

Type locality. We designate Port Jackson, New South Wales.

Distribution. South Australia: Gulf St. Vincent, Spencer Gulf. Western Australia: Western end of the Great Australian Bight, 33° 15' S. × 126° 22' 15" E., 90 fathoms.

The first figure of this peculiar species was given by H. L. Clark (1916, p. 66), pl. xxvi, figs. 1 and 2, from a specimen taken at Port Jackson, New South Wales. As it is desirable to designate type localities, wherever possible, we thus cite Port Jackson (Müller and Troschel merely indicated "New Holland"). The species inhabits the Peronian Region, and the Flindersian to the western end of the Great Australian Bight. A large specimen from Gulf St. Vincent, K.157, has the following measurements: R = 130 mm. in the longest ray and 115 mm. in the shortest, with corresponding br = 28 mm. and 21 mm., also r = 30 mm. The species does not appear to be common in South Australia.

FAMILY ZOROASTERIDAE.

Genus *ZOROASTER* Wyville-Thomson 1873.

Genotype: *Zoroaster fulgens* Wyville-Thomson 1873 (Farøe Channel).

ZOROASTER MACRACANTHA H. L. Clark 1916.

Zoroaster macracantha H. L. Clark 1916, p. 68.

Type locality. Great Australian Bight, 129° 28' E., 250–450 fathoms.

FAMILY ASTERIIDAE.

Genus ALLOSTICHAETER Verrill 1914.

Genotype: *Asteracanthion polyplax* Müller and Troschel 1844 (Australia and New Zealand).

ALLOSTICHAETER POLYPLAX Müller and Troschel 1844.

Asteracanthion polyplax Müller and Troschel 1844, p. 178.*Type locality.* Australia. We designate Port Willunga, South Australia.*Distribution.* South Australia: Port Willunga, Coobowie, Tumby Bay, Guichen Bay, "between Troubridge Light and Backstairs Passage" (H. L. Clark). We have taken it at Marino and Sellicks Reefs. Also recorded from Tasmania, Victoria. Western Australia. New South Wales. New Zealand.

Specimens examined by us provide the following information:

K.166. Yorke Peninsula, R = 33 mm., r = 5 mm. Rays 7.

K.167. Gulf St. Vincent, R = 20 mm., r = 4 mm. Rays 8.

K.173. Gulf St. Vincent, R = 32 mm., r = 5 mm. Rays 7.

K.168. Spencer Gulf, R = 22 mm., r = 5 mm. Rays 8.

ALLOSTICHAETER REGULARIS H. L. Clark 1928.

Allostichaster regularis H. L. Clark 1928, p. 400.

Holotype: Reg. No. K.169. Gulf St. Vincent, South Australia.

Distribution. South Australia: Gulf St. Vincent, Spencer Gulf.

A juvenile star, K.170, from Gulf St. Vincent, appears to be this species. This specimen measures R = 10 mm., r = 2 mm., br. = 2 mm. Rays 5.

Genus SMILASTERIAS Sladen, 1889.

Genotype: *Asterias scalprifera* Sladen 1889. (Kerguelen, Marion and Heard Islands, 50–150 fathoms).These localities and depths cover the two species, *scalprifera* (type) and *triremis* of the genus.

SMILASTERIAS IRREGULARIS H. L. Clark 1928.

Smilasterias irregularis H. L. Clark 1928, p. 402.

Holotype: Reg. No. K.171. Spencer Gulf, South Australia.

Distribution. Spencer Gulf.The holotype is unique and so far we have not taken further examples. The species is doubtfully placed in *Smilasterias*, but more material might decide its ultimate generic location. Compared with the genotype of this genus (*S. scalprifera*) the principal differences may be summarized as follows:*S. scalprifera.* Inferomarginal spines three or four set very obliquely on the plate; adambulacral plates triplacanthid.*S. irregularis.* Inferomarginal spines two, flat, square cut, side by side, or placed slightly obliquely; adambulacral plates diplacanthid.

Genus COSCINASTERIAS Verrill 1867.

Genotype: *Coscinasterias muricata* Verrill = *C. calamaria* Gray (Australia; Indian Ocean).

COSCINASTERIAS CALAMARIA Gray 1840.

Asterias calamaria Gray 1840, p. 179.

Coscinasterias muricata Verrill.

Type locality. Australia (? South Australia).

Distribution. South Australia: Kangaroo Island 28 fathoms, Althorpe Island, Port Vincent, Port Willunga, Cape Jervis, Black Point, Largs Bay, Grange. Western Australia. Tasmania. New South Wales.

This common large sea-star is frequently taken on the South Australian reefs. Specimens taken by us have been chiefly at Cape Jervis, and at the entrance of and just outside Gulf St. Vincent. It has been taken alive down to 28 fathoms, but is often found washed off the shallow shore reefs.

We have examined the following examples:

K.572. Cape Jervis. August, 1941. Colour: brown ground, with extensive blue maculations, spines bright blue at the bases, grading to brownish yellow at the tips. Rays 11. $R = 135$ mm., $r = 30$ mm., $br. = 22$ mm. maximum.

K.2. Encounter Bay. September 25, 1935. Colouration similar to K.572. Rays 11. $R = 150$ mm., $r = 25$ mm., $br = 30$ mm.

K.546. Gulf St. Vincent. 10 Rays.

K.573. Port Myponga. April 27, 1923. Rays 11. $R = 260$ mm., $r = 35$ mm., $br. = 36$ mm.

K.574. Sellicks. July 18, 1937. Rays 11. Colouration similar to K.572. $R = 200$ mm., $r = 25$ mm., $br. = 30$ mm.

K.4. Kangaroo Island. September, 1935. Juvenile. $R = 90$ mm., $r = 20$ mm., $br. = 15$ mm.

COSCINASTERIAS DUBIA H. L. Clark 1909.

Coscinasterias dubia H. L. Clark 1909, p. 532.

Type locality. Botany Bay, New South Wales, 20-23 fathoms.

Distribution. South Australia: Southern coast. Victoria. Bass Strait. Tasmania.

We have never seen specimens of this species from South or Western Australia.

Genus UNIOPHORA Gray 1840.

Genotype: *Uniophora globifera* Gray 1840 = *Asterias granifera* Lamarck 1816 (South Seas).

UNIOPHORA GRANIFERA Lamarck 1816.

Asterias granifera Lamarck 1816, p. 560.

Uniophora globifera Gray 1840, p. 288.

Type locality. South Seas.

Distribution. South Australia: Gulf St. Vincent. New South Wales: Bottle and Glass Rocks, Port Jackson.

H. L. Clark, during his collecting trip, did not take this species in either South Australia or Western Australia but found it at Port Jackson, New South Wales.

We have found but one South Australian record:

K.175. Glenelg. Typical, though not adult example. Deep reddish-brown. Rays 5. Longest $R = 47$ mm., br. = 14 mm., shortest $R = 25$ mm., br. = 9 mm., $r = 7$ to 15 mm. This is apparently far less common in South Australia than *Uniophora multispina*.

UNIOPHORA GYMNONOTA H. L. Clark 1928.

Uniophora gymnonota H. L. Clark 1928, p. 405.

Holotype: Reg. No. K.179. Backstairs Passage near The Pages, 25 fathoms.

Distribution. South Australia: Gulf St. Vincent, Spencer Gulf.

The largest specimen from South Australia has $R = 75$ mm. We have not taken further examples of this peculiar smooth sea-star.

UNIOPHORA MULTISPINA H. L. Clark 1928.

Uniophora multispina H. L. Clark 1928, p. 407.

Holotype: Reg. No. K.184. Henley Beach, South Australia.

Distribution. South Australia: Port Adelaide River, Henley Beach.

This species is fairly common on the beaches of Gulf St. Vincent where we have taken it at Port Willunga, Sellicks, Marino, and Christie's Beach.

K.520 from Semaphore (South Australia), a large specimen collected by H. M. Hale, June, 1923, after storms. $R = 100$ mm., $r = 20$ mm., br. = 30 mm. maximum.

UNIOPHORA OBESA H. L. Clark 1928.

Uniophora obesa H. L. Clark 1928, p. 409.

Holotype: Reg. No. K.190. Eastern Cove, Kangaroo Island, South Australia.

UNIOPHORA SINUSOIDA Perrier 1875.

Asteria sinusoida Perrier 1875, p. 338.

Type locality. Hobart, Tasmania.

Distribution. South Australia: Gulf St. Vincent, Spencer Gulf.

UNIOPHORA UNISERIALIS H. L. Clark 1928.

Uniophora uniserialis H. L. Clark 1928, p. 413.

Holotype: Reg. No. K.193. Gulf St. Vincent, South Australia.

Distribution. South Australia: Gulf St. Vincent, Spencer Gulf.

UNIOPHORA NUDA Perrier 1875.

Asterias nuda Perrier 1875, p. 335.

Type locality. Port Lincoln, South Australia.

H. L. Clark (1928, p. 417), points out that Perrier gives "Port Lincoln (détroit de Torres)" as the type locality of *A. nuda*, which probably means Port Lincoln, South Australia, as there is no Port Lincoln in the Torres Strait region of Northern Australia. Also, no representative of family *Asteriidae* occurs on the northern coast of Australia.

Clark's key definitely separates this species from *U. gymnonota*; the latter has the pedicellariae rare or wanting, except on the inner end of the oral plates. *U. nuda* has the pedicellariae numerous both in the ambulacral furrow and external to the adambulacral spines (Perrier).

UNIOPHORA FUNGIFERA Perrier 1875.

Asterias fungifera Perrier 1875, p. 337.

Type locality. Australia. (? Southern Australia).

This species was recorded vaguely as from Australia, and for reasons similar to those given in the case of *Uniophora nuda*, we suggest that the type locality is probably somewhere in the Flindersian Region. Again the key given by H. L. Clark (1928, p. 415), shows this species as quite distinct from others of the genus. Briefly, the distinguishing features are here quoted so that the species may be recognized when it is taken, as most likely it will be now that a number of enthusiasts are collecting hereabout: Large, straight pedicellariae rare or wanting, except on inner end of oral plates. Dorsal spines conspicuously capitate, globose, or funiform, the dorsal spines crowded.

In his "Echinoderms from Australia", H. L. Clark (1938, p. 196) records only one species, *granifera*, taken during his extensive and valuable personal investigations in Australia. It appears, however, that off the South Australian coast alone, there must be at least eight species of *Uniophora*.

UNIOPHORA DYSCRITA H. L. Clark 1923.

Uniophora dyscrita H. L. Clark 1923, p. 244.

Type locality. Western Australia.

CLASS OPHIUROIDEA

Order PHRYNOPHIURIDA.

FAMILY OPHIOMYXIDAE.

Genus OPHIOMYXA Müller and Troschel 1842.

Genotype: *Ophiomyxa pentagona* Müller and Troschel 1842.

OPHIOMYXA AUSTRALIS Lütken 1869.

Ophiomyxa australis Lütken 1869, p. 45.

Type locality. Australia.

Distribution. South Australia: Gulf St. Vincent, Spencer Gulf, Salt Creek, Coobowie, Port Willunga, Port Vincent, Tumby Bay, Kingston 30 fathoms. Tasmania. New South Wales: Wollongong, 55-56 fathoms.

Genus OPHIOCREAS Lyman.

OPHIOCREAS SIBOGAE Koehler 1904.

Ophiocreas sibogae Koehler 1904, p. 165.

Type locality. Indian Ocean.

Distribution. Great Australian Bight 200–300 fathoms. Bass Strait: Flinders Island 80–300 fathoms.

Colour of holotype is given as reddish-purple-violet. The cotype is uniformly yellow, and the Australian "Endeavour" specimens are described by H. L. Clark (1916) as reddish flesh-colour with a more or less heavy purple cast.

FAMILY GORGONOCEPHALIDAE.

Genus ASTROCONUS Döderlein 1911.

Genotype: *Astrophyton australe* Verrill 1876 (Australia).

ASTROCONUS AUSTRALIS Verrill 1876.

Astrophyton australe Verrill 1876, p. 74.

Distribution. South Australia: Gulf St. Vincent, Spencer Gulf, Encounter Bay, Edithburgh, Flinders Island 37 fathoms, St. Francis Island 30 fathoms, Cape Wiles 75 fathoms, Sanders Bank (Kangaroo Island) 28 fathoms, Kingston 30 fathoms, off Murray River Mouth 17 fathoms. Victoria. Tasmania: Devonport, Launceston, east coast Tasmania. Bass Strait: King Island.

ASTROCONUS PULCHER H. L. Clark 1939.

Astroconus pulcher H. L. Clark 1939, p. 207.

Holotype: Reg. No. K.561. Cape Dutton, South Australia, 20 fathoms in crayfish pot.

ASTROCONUS OCCIDENTALIS H. L. Clark 1938.

Astroconus occidentalis H. L. Clark 1938, p. 205.

Type locality. Fremantle, Western Australia.

Genus CONOCLADUS H. L. Clark.

Genotype: *Conocladus oxyconus* H. L. Clark 1909 (Eastern and South Australia).

CONOCLADUS OXYCONUS H. L. Clark 1909.

Conocladus oxyconus H. L. Clark 1909, p. 132.

Type locality. Port Jackson, New South Wales.

Distribution. South Australia: Cape Wiles. New South Wales.

Genus ASTROBOA Döderlein.

ASTROBOA ERNAE Döderlein 1911.

Astroboa ernae Döderlein 1911, p. 82.

Type locality. Western Australia.

Distribution. South Australia: Kangaroo Island, Edithburgh, Victor Harbour. Western Australia.

FAMILY TRICHAsterIDAE.

Genus EURYALE Lamarck 1816.

Genotype: *Euryale verrucosum* Lamarck 1816 (Indian Ocean).

EURYALE EUOPLA H. L. Clark 1938.

Euryale euopla H. L. Clark 1938, p. 203.*Type locality.* Bald Island, Albany, Western Australia.

FAMILY OPHIACANTHIDAE.

Genus OPHIACANTHA Müller and Troschel 1842.

Genotype: *Ophiacantha setosa* Müller and Troschel 1842.

OPHIACANTHA HETEROTYLA H. L. Clark 1909.

Ophiacantha heterotyla H. L. Clark 1909.*Type locality.* Port Hacking, New South Wales, 22–38 fathoms, sand.*Distribution.* Between Devonport and Launceston, Tasmania. New South Wales: Port Hacking, Crookhaven River 11–15 fathoms sand to rock, Wata Mooli 54–59 fathoms mud.

OPHIACANTHA BRACHYGNATHA H. L. Clark 1928.

Ophiacantha brachygnatha H. L. Clark 1928, p. 420.

Holotype: Reg. No. K.208, Spencer Gulf, South Australia.

Distribution. Spencer Gulf and Gulf St. Vincent.

OPHIACANTHA CLAVIGERA Koehler 1907.

Ophiacantha clavigera Koehler 1907, p. 247.*Type locality.* Bunbury, Western Australia.*Distribution.* Western Australia: Bunbury, Fremantle, Broome.

Genus OPHIOCOMINA Koehler.

OPHIOCOMINA AUSTRALIS H. L. Clark 1928.

Ophiocomina australis H. L. Clark 1928, p. 422.

Holotype: Reg. No. K.211, Spencer Gulf, South Australia.

Distribution. South Australia: Troubridge Island, Backstairs Passage, Port Vincent.

Order GNATHOPHIURIDA.**FAMILY AMPHIURIDAE.**

Genus **AMPHIURA** Forbes 1845.

AMPHIURA TRISACANTHA H. L. Clark 1928.

Amphiura trisacantha H. L. Clark 1928, p. 425.

Holotype: Reg. No. K.212, Spencer Gulf, South Australia.

AMPHIURA CONSTRICTA Lyman 1879.

Amphiura constricta Lyman 1879, p. 22.

Type locality. Port Jackson, New South Wales.

Distribution. All round Australia and Tasmania.

AMPHIURA MICROSOMA H. L. Clark 1915.

Amphiura microsoma H. L. Clark 1915, p. 228.

Type locality. Murray Islands, Great Barrier Reef.

Distribution. Western Australia: Rottnest Island, Broome.

AMPHIURA NANNODES H. L. Clark 1938.

Amphiura nannodes H. L. Clark 1938, p. 230.

Type locality. Rottnest Island, Western Australia.

Genus **AMPHIODIA** Verrill.

AMPHIODIA OCHROLEUCA Brock 1888.

Amphiura ochroleuca Brock 1888, p. 484.

Amphiodia mesopoma H. L. Clark 1915, p. 247 (Torres Strait).

Distribution. South Australia: Gulf St. Vincent, Spencer Gulf. Victoria: Westernport. Western Australia: Torres Strait.

Genus **AMPHIPOLIS**.

AMPHIPOLIS SQUAMATA Delle Chiaje 1828.

Asterias squamata Delle Chiaje 1828, p. 74.

Distribution. South Australia: Port Willunga. All round Australia.

Genus **OPHIACTIS** Lütken 1856 (1857).

Genotype: *Ophiocoma ballii* Thompson 1840.

OPHIACTIS RESILIENS Lyman 1879.

Ophiactis resiliens Lyman 1879, p. 36.

Distribution. South Australia: Cape Martin 21 fathoms, Kingston 30 fathoms. Western Australia: Rottnest Island. Victoria. New South Wales.

OPHIACTIS TRICOLOR H. L. Clark 1928.

Ophiactis tricolor H. L. Clark 1928, p. 427.

Holotype: Reg. No. K.213, Spencer Gulf, South Australia.

Distribution. South Australia: Gulf St. Vincent, Spencer Gulf, Cape Borda 40 fathoms.

OPHIACTIS LAEVIS H. L. Clark 1938.

Ophiactis laevis H. L. Clark, 1938, p. 268.

Type locality. Bunbury, Western Australia, 5-8 fathoms.

FAMILY OPHIOTHRICIDAE.

Genus OPHIOTHRIX Müller and Troschel 1842.

Genotype: *Asterias fragilis* Abilg 1789 (Europe).

OPHIOTHRIX ALBOSTRIATA H. L. Clark 1928.

Ophiothrix albostriata H. L. Clark 1928.

Holotype: Reg. No. K.215, Great Australian Bight.

OPHIOTHRIX CAESPITOSA Lyman 1879.

Ophiothrix caespitosa Lyman 1879, p. 53.

Ophiothrix acestra H. L. Clark 1909, p. 544.

Distribution. South Australia: Gulf St. Vincent, Troubridge Island, Backstairs Passage, Spencer Gulf, Kingston 30 fathoms, Sanders Bank (Kangaroo Island) 28 fathoms, Cape Jervis 17 fathoms. Western Australia: Bunbury, Fremantle, Rottnest Island. New South Wales. Queensland.

OPHIOTHRIX HYMENACANTHA H. L. Clark 1928.

Ophiothrix hymenacantha H. L. Clark 1928, p. 431.

Holotype: Reg. No. K.217, Great Australian Bight.

OPHIOTHRIX FUMARIA Müller and Troschel 1842.

Ophiothrix fumaria Müller and Troschel 1842, p. 113.

Ophiothrix spongicola Stimpson 1855, p. 385.

Type locality. Port Jackson, New South Wales.

Distribution. South Australia: Cape Jervis, Gulf St. Vincent, Troubridge Shoal, Backstairs Passage, Tumby Bay. The species is known to range from Abrolhos Islands on the west coast of Australia, along the whole southern coast, to Broken Bay, New South Wales.

OPHIOTHRIX LINEOCAERULEA H. L. Clark 1928.

Ophiothrix lineocaerulea H. L. Clark 1928, p. 432.

Holotype: Reg. No. K. 218. Spencer Gulf, South Australia.

Order CHILOPHIURIDA.**FAMILY OPHIOCHITONIDAE.**

Genus OPHIONEREIS Lütken.

OPHIONEREIS SCHAYERI Müller and Troschel 1844.

Ophiolepis schayeri Müller and Troschel 1844, p. 182.

Ophionereis porrecta H. L. Clark 1923, p. 247. (Abrolhos Islands, Western Australia).

Distribution. South Australia: Spencer Gulf, Gulf St. Vincent, Tumby Bay, Port Willunga. Western Australia: Abrolhos Islands. Tasmania: between Devonport and Launceston.

OPHIONEREIS SEMONI Döderlein 1896.

Ophiotriton semoni Döderlein 1896, p. 288.

Distribution. South Australia: Spencer Gulf, Gulf St. Vincent. Queensland: Torres Strait, Cairns.

FAMILY OPHIOCOMIDAE.

Genus OPHIOCOMA Agassiz.

OPHIOCOMA CANALICULATA Lütken 1869.

Ophiocoma canaliculata Lütken 1869, pp. 46, 99.

Distribution. South Australia: Edithburgh, Gulf St. Vincent, Spencer Gulf.

OPHIOCOMA CANALICULATA PULCHRA H. L. Clark 1928.

Ophiocoma canaliculata var. *pulchra* H. L. Clark 1928, p. 439.

Holotype: Reg. No. K.241. Spencer Gulf, South Australia.

FAMILY OPHIODERMATIDAE

Genus OPHIURODON Matsumoto.

OPHIURODON OPACUM H. L. Clark 1928.

Ophiurodon opacum H. L. Clark 1928, p. 440.

Holotype: Reg. No. K.243, Gulf St. Vincent, South Australia.

Distribution. South Australia: Port Vincent, Gulf St. Vincent.

Genus PECTINURA Forbes.

PECTINURA ARENOSA Lyman 1879.

Pectinura arenosa Lyman 1879, p. 48.

Distribution. South Australia: Gulf St. Vincent, Spencer Gulf, Tumby Bay, Ardrossan, Troubridge Island, Backstairs Passage.

PECTINURA ASSIMILIS Bell 1888.

Ophiopeza assimilis Bell 1888, p. 282.

Distribution. South Australia: Tumby Bay, Gulf St. Vincent, Spencer Gulf.

Genus OPHIARACHNELLA Ljungman.

OPHIARACHNELLA RAMSAYI Bell 1888.

Pectinura ramsayi Bell 1888, p. 281.

Type locality. Port Jackson, New South Wales.

Distribution. South Australia: Gulf St. Vincent, Spencer Gulf, Queenscliff (Kangaroo Island), Edithburgh. Western Australia: Rottnest Island, Fremantle. New South Wales.

FAMILY OPHIOLEPIDIDAE.

Genus AMPHIOPHIURA Matsumoto.

AMPHIOPHIURA COLLETA H. L. Clark 1916.

Amphiophiura colletta H. L. Clark 1916, p. 93.

Type locality. East of Babel Island, Bass Strait, 60-80 fathoms.

Distribution. South Australia: Gulf St. Vincent. Bass Strait.

Genus OPHIURA Lamarck 1816.

OPHIURA KINBERGI Ljungman 1866.

Ophiura kinbergi Ljungman 1866, p. 166.

Distribution. South Australia: Gulf St. Vincent, Spencer Gulf. Victoria: Port Phillip. New South Wales: Port Jackson.

OPHIURA OOPLEX H. L. Clark 1911.

Ophiosten ooplex H. L. Clark 1911, p. 99.

Type locality. Japan.

Distribution. South Australia: Gulf St. Vincent, Spencer Gulf. Also Japan.

Genus OPHIOMUSIUM Lyman 1869.

OPHIOMUSIUM ANISACANTHUM H. L. Clark 1928.

Ophiomusium anisacanthum H. L. Clark 1928, p. 446.

Holotype: Reg. No. K.254, Gulf St. Vincent, and Spencer Gulf, South Australia.

OPHIOMUSIUM APORUM H. L. Clark 1928.

Ophiomusium aporum H. L. Clark 1928, p. 447.

Holotype: Reg. No. K.255, Gulf St. Vincent and Spencer Gulf, South Australia.

OPHIOMUSIUM SIMPLEX AUSTRALE H. L. Clark 1928.

Ophiomusium simplex var. *australe* H. L. Clark 1928, p. 449.

Holotype: Reg. No. K.256, Spencer Gulf, South Australia.

Genus OPHIOZONELLA Matsumoto.

OPHIOZONELLA ELEVATA H. L. Clark 1911.

Ophiozona elevata H. L. Clark 1911, p. 31.

Type locality. Japan.

Distribution. South Australia: Spencer Gulf, Gulf St. Vincent. Also Japan.

Genus OPHIOCROSSOTA H. L. Clark 1928.

Genotype: *Ophiocrossota heteracantha* H. L. Clark 1928, p. 450.

OPHIOCROSSOTA HETERACANTHA H. L. Clark 1928.

Ophiocrossota heteracantha H. L. Clark 1928, p. 451.

Holotype: Reg. No. K.258, Gulf St. Vincent, and Spencer Gulf, South Australia.

CLASS ECHINOIDEA

Order CIDADARIDA.

FAMILY CIDARIDAE.

Genus PHYLLACANTHUS Brandt 1835.

Genotype: *Cidarites dubia* Brandt 1835.

The genotype is known only from the Bonin Islands. Four of the six species in the genus are known only from Australia, and the remaining one, *imperialis*, occurs all over the Indo-Pacific.

PHYLLACANTHUS IRREGULARIS Mortensen 1928.

Phyllacanthus irregularis Mortensen 1928, p. 74.

Type locality. Fremantle, Western Australia.

Distribution. Western Australia: Fremantle to Bremer Bay.

PHYLLACANTHUS IRREGULARIS KIMBERI subsp. nov.

Pl. xii. Fig. 1 and 2.

Holotype: Reg. No. K.576. Port Willunga, South Australia.

Distribution. South Australia: Port Willunga, Levens Beach, d'Estree Bay (Kangaroo Island), Halletts Cove.

Test large and round, flattened above and below; horizontal diameter 115 mm., vertical diameter 75 mm. Primary spines short, 53 mm. in length, about half the horizontal diameter of test, comparatively slender, fusiform, tapering to the rounded tip, maximum diameter 6.5 mm.; colour of spines dark purplish-violet with an indistinct white band about one-third of the length from the tip; sculpture of fine granules forming into fine ridges from about the position of the white band to the tip. The secondary spines are a little wider at the tip than those of *irregularis*, and have distinct brownish colouration, although there are traces of the dark purplish colour seen in the primaries. The apical system generally resembles that of *irregularis*, but the genital pores are comparatively smaller and closer to the edge, while the tubercles along the inner edge of the genital plates are comparatively smaller and more numerous, though still larger than those of the rest of the genital plates. The formation is intermediate between that of *parvispina* and *irregularis*, but the ambulaeral spines are pointed and resemble those of *irregularis* and not *parvispina*. In most other respects the subspecies resembles the typical Western Australian *irregularis*. We key the differences:

- a. A series of larger spines along the inner edge of the genital plate; spines on apical system pointed; marginal ambulaeral tubercles irregular.
 - b. Primary spines about six times as long as wide; tubercles along the inner edge of genital plates conspicuously larger, numbering about five; genital pores large, not close to the edge of the genital plates *irregularis*.
 - bb. Primary spines about eight times as long as wide; tubercles along the inner edge of genital plates slightly larger, numbering about eight; genital pores large, not close to the edge of the genital plates *irregularis kimberi*.
- aa. No larger spines along the inner edge of the genital plates; spines on apical system broad; marginal ambulaeral tubercles very regular *parvispina*.

A specimen of this subspecies was taken some years ago by W. J. Kimber at Port Willunga, which H. L. Clark (1938, p. 373) suspected as being different from the typical south-western Australian *Phyllacanthus irregularis* Mortensen 1928. Dr. Mortensen examined the specimen (H. L. Clark 1938, p. 373) and suggested it might be a variety of the Peronian *Phyllacanthus parvispina*.

We regard *parvispina* as a distinct species from *irregularis*, but have decided to give *kimberi* subspecific status only, for the present.

The following are some of the South Australian specimens in the South Australian Museum:

- K.552. Levens Beach, Yorke Peninsula, April, 1936. Height 50 mm., diameter 80 mm. Primary spines 48 mm.
- K.551. Levens Beach. Height 48 mm., diameter 70 mm. Primary spines 43 mm. Primaries encrusted with *Bryozoa*.
- K.577. D'Estree Bay, Kangaroo Island. Height 75 mm., diameter 110 mm. Primary spines 55 mm.
- K.8. Christie's Beach. January 8, 1931. Height 53 mm., diameter 80 mm. Primary spines 45 mm.
- K.553. Levens Beach, Yorke Peninsula, April, 1936. Height 54 mm., diameter 85 mm. Primary spines 45 mm.

Two bare tests from South Australia, K.286, in the Museum collection and labelled *Prionocidaris bispinosa* Agassiz, are not that species but are juvenile *Phyllacanthus irregularis kimberi*.

A perfect large living specimen has been taken, since the above was written, on January 25, 1942, at Port Willunga, first reef south, at low tide. More recently a juvenile specimen was taken by G. Buick at Little Gorge, Normanville.

Genus ADELCIDARIS nov.

Genotype: *Cidarites tubaria* Lamarek 1816 (Australia).

H. L. Clark (1938, p. 369) points out that the genotype of *Goniocidaris*, *Cidarites geranoides* Lamarek 1816 (East Indies), is probably unidentifiable. It certainly has nothing to do with *tubaria* and does not belong to the family *Cidaridae*, since the figures of *geranoides* show gills which are lacking in the species of this family. In order to clear up the matter we have introduced a new genus for the Australian species *tubaria impressa*, and the New Zealand *umbraculum*, while leaving *geranoides* with its genus *Goniocidaris* Agassiz and Desor (1846) for future attention.

Briefly, the new genus may be described as follows: Test stout, primary spines large, primary tubercles perforate; ambulacra wide; median interambulacral areas conspicuously bare and sunken, especially at angles of coronal. Otherwise typical of the family *Cidaridae*.

ADELCIDARIS IMPRESSA Koehler 1926.

Goniocidaris impressa Koehler 1926, p. 24.

Distribution. South Australia: Grange, Kingston 30 fathoms, Cape Marsden 17 fathoms, St. Francis Island 35 fathoms. Tasmania: Port Davey 88 fathoms, Rocky Point, also East Coast Tasmania. Queensland: Port Curtis (Zool. Dept., Adelaide University).

Mortensen (1928, pp. 162-163) adopts the name *tubaria* var. *impressa* (Koehler), for the form related to *tubaria*, but having less elaborate primary spines, more extensive tuberculation, leaving scarcely more than the admedian part of the horizontal sutures bare, in both ambulacral and interambulacral areas, therefore no continuous sunk median line, but only isolated grooves, in a conspicuous ladder-like arrangement; apical system with genital and ocular plates more completely (than *tubaria*) covered with tubercles of uniform size; female genital pores larger. The species is common in Tasmania, but compared with the occurrence of *tubaria* it is much rarer in South Australia.

Two typical specimens (K.269) have both the primary and secondary spines notably more slender.

ADELCIDARIS TUBARIA Lamarek 1816.

Cidarites tubaria Lamarek 1816, p. 57.

Type locality. Australia. (Habite les mers de la Nouvelle Hollande).

Distribution. South Australia: Kingston 30 fathoms, Cape Marsden 17 fathoms, St. Francis Island 35 fathoms, Normanville beach, Henley, Queenscliffe (Kangaroo Island), Cape Jaffa 90 fathoms.

At Normanville, 2nd November, 1941, we took twenty typical living specimens of this species on the beach at low tide. Naked test brownish; primary spines cream, thorns and ridges violet, base of spine also collar and milled ring deep red; secondary spines cream to yellow.

Order DIADEMATOIDA.**Suborder CAMARODONTA.****FAMILY TEMNOPLEURIDAE.**

Genus GENOCIDARIS A. Agassiz 1869.

Genotype: *Genocidaris maculata* A. Agassiz 1869 (West Indies).

GENOCIDARIS INCERTA H. L. Clark 1928.

Genocidaris incerta H. L. Clark 1928, p. 457.

Holotype. Reg. No. 293. Cape Jaffa, South Australia, 300 fathoms.

Distribution. South Australia: Cape Borda, Cape Jaffa, Beachport, all from 60–300 fathoms.

It may presently be shown that this species represents a new genus. We certainly doubt the correctness of its location in *Genocidaris*.

Genus TEMNOPLEURUS L. Agassiz 1841.

Genotype: *Cidaris toreumatica* Leske 1778. (China Seas, Japan, India).

TEMNOPLEURUS MICHAELSENI Döderlein 1914.

Salmacis michaelсени Döderlein 1914, p. 454.

Temnopleurus australis H. L. Clark 1928, p. 458 (Reg. No. K.298).

Type locality. South-western Australia.

Distribution. South Australia: Gulf St. Vincent, Spencer Gulf, Port Lincoln, Wallaroo, Yankalilla Bay, Backstairs Passage, Troubridge Shoal. Western Australia: Cottesloe Beach, Fremantle, Rottnest 3–22 fathoms, Bunbury.

The type locality of *T. australis* Clark, is Port Lincoln, South Australia. On examining our specimens we are inclined to think that there are subspecific differences present, and the South Australian form might take the name *Temnopleurus michaelсени australis* H. L. Clark (1928).

Genus MICROCYPHUS Agassiz and Desor 1846.

Genotype: *Microcyphus maculatus* Agassiz and Desor 1846. (Mauritius and Andaman Islands).

MICROCYPHUS ANNULATUS Mortensen 1904.

Microcyphus annulatus Mortensen 1904B, p. 101.

Type locality. Port Phillip, Victoria.

Distribution. South Australia: Investigator Strait, Gulf St. Vincent, Spencer Gulf. Bass Strait: off East Moncoeur Island. Victoria. Tasmania: east coast. Dredgings to 40 fathoms.

MICROCYPHUS COMPSUS H. L. Clark 1912.

Microcyphus compsus H. L. Clark 1912, p. 322.

Microcyphus elegans Mortensen 1904B, p. 100, preoccupied.

Type locality. Port Phillip, Victoria (*M. elegans*).

Distribution. South Australia: Gulf St. Vincent, Spencer Gulf, Cape Borda (Kangaroo Island), Cape Jaffa, Backstairs Passage, down to 60 fathoms. Victoria: Port Phillip.

MICROCYPHUS PULCHELLUS H. L. Clark 1928.

Microcyphus pulchellus H. L. Clark 1928, p. 462.

Holotype: Reg. No. K.340. Spencer Gulf, South Australia. This is known only from the holotype.

MICROCYPHUS ZIGZAG Agassiz and Desor 1846.

Microcyphus zigzag Agassiz and Desor 1846, p. 358.

Type locality. Port Phillip, Victoria.

Distribution. South Australia: Backstairs Passage 23 fathoms. Victoria: Port Phillip. Bass Strait.

A juvenile specimen is the only record of the species from South Australia.

Genus TEMNOTREMA A. Agassiz 1863.

Genotype: *Temnotrema sculpta* A. Agassiz 1863. (Japan and Korea).

TEMNOTREMA NOTIUM H. L. Clark 1938.

Temnotrema notium H. L. Clark 1938, p. 387.

Type locality. King George Sound, Western Australia.

Genus AMBLYPNEUSTES L. Agassiz 1841.

Genotype: *Echinus griseus* Blainville 1825 = *Echinus ovum* Lamarck 1816 (Australia).

There is some difficulty in identifying the species of this complex assemblage, so the following distinguishing features may be of assistance:

1. Primary spines bright red; test dark, height about 0.9 of the horizontal diameter *formosus*.
2. Primary spines pink, purple, lavender, or green; test light, pale brown, or dirty white, height about 0.95 of the horizontal diameter *pallidus*.
3. Primary spines dirty white; test greenish, height and diameter about equal. *ovum*.
4. Primary spines, dull green or brown, whitish at the tip; test dull green or brown, height about 0.8 of the horizontal diameter *pachistus*.
5. Primaries pale brown, dull pale red, or cream; test somewhat flattened, height about 0.7 of the horizontal diameter *grandis*.
6. Primary spines green or brown; test brown, height about 0.9 of the horizontal diameter *leucoglobus*.

We doubt the specific differences in some of the species, particularly those of *ovum* and *leucoglobus*. These two may be the same species or only geographical subspecies.

AMBLYPNEUSTES FORMOSUS Valenciennes 1846.

Amblypneustes formosus Valenciennes 1846, pl. ii, fig. 2.

Type locality. Bass Strait.

Distribution. South Australia: Gulf St. Vincent, Spencer Gulf, Bass Strait, Victoria. Tasmania. Western Australia. This is the rarest *Amblypneustes* species in South Australia.

AMBLYPNEUSTES PALLIDUS Lamarek 1816.

Echinus pallidus Lamarek 1816, p. 48.

Type locality. We designate Encounter Bay, South Australia.

Distribution. Port Willunga, South Australia, to the Abrolhos Islands, Western Australia. Very common all along the South Australian coast.

Numerous specimens were taken at Normanville, S.A., thrown up on the beach.

AMBLYPNEUSTES OVUM Lamarek 1816.

Echinus ovum Lamarek 1816, p. 48.

Type locality. Australia. We designate Encounter Bay, South Australia.

Distribution. South Australia: Port Willunga, all round Yorke Peninsula, Spencer Gulf, Encounter Bay, Cape Jervis, Robe, Port McDonnell, Port Lincoln, Outer Harbour, Henley Beach, Glenelg, Sellicks. Bass Strait. Tasmania. Victoria. Western Australia. The commonest sea-urchin in South Australia.

AMBLYPNEUSTES PACHISTUS H. L. Clark 1912.

Amblypneustes pachistus H. L. Clark 1912, p. 327.

Type locality. Western Port, Victoria.

Distribution. South Australia: Gulf St. Vincent, Port Willunga, Spencer Gulf, Kingston, down to 30 fathoms. Bass Strait: Flinders Island. Victoria. Tasmania: east coast. New South Wales: Clarence River.

The characteristic colouration of the species is a pale brown test when dry, more nearly olive when moist; small spines, pale cream or whitish; large spines, deep olive-green or greenish-brown, more or less extensively tipped with whitish. This is essentially the colouration of the holotype.

AMBLYPNEUSTES GRANDIS H. L. Clark 1912.

Amblypneustes grandis H. L. Clark 1912, p. 329.

Type locality. Southern Australia.

Distribution. South Australia: Gulf St. Vincent, Cape Marsden 17 fathoms. Victoria. Western Australia. Bass Strait: Flinders Island. New South Wales. In colouration there is considerable diversity.

AMBLYPNEUSTES LEUCOGLOBUS Döderlein 1914.

Amblypneustes leucoglobus Döderlein 1914, p. 463.

Type locality. Geraldton, Western Australia.

Distribution. Western Australia: Rottnest, Bunbury, Geraldton, Fremantle. Has not so far been definitely recognized from South Australia. Some specimens taken seem very close to this species.

Genus HOLOPNEUSTES Agassiz and Desor 1846.

Genotype: *Holopneustes porosissimus* Agassiz and Desor 1846, p. 364. (Southern and Eastern Australia).

HOLOPNEUSTES INFLATUS A. Agassiz 1872.

Holopneustes inflatus A. Agassiz 1872, p. 56.

Holopneustes purpurescens A. Agassiz 1873, pl. viiic. figs. 5 and 6.

Type locality. Southern Australia.

Distribution. South Australia: Port Willunga. Victoria: Port Phillip Heads, Warrnambool. New South Wales: Port Jackson. Tasmania. Western Australia: Rottnest, Fremantle.

HOLOPNEUSTES POROSISSIMUS Agassiz and Desor 1846.

Holopneustes porosissimus Agassiz and Desor 1846, p. 364.

Type locality. We designate Port Phillip Heads, Victoria.

Distribution. South Australia: Port Adelaide, Cape Marsden. Victoria: Port Phillip Heads, Warrnambool. Western Australia: Cape Leeuwin, Ellen Brook, Fremantle.

FAMILY ECHINIDAE.

Genus PSEUDECHINUS Mortensen 1903.

Genotype: *Echinus albocinctus* Hutton 1882. (New Zealand).

PSEUDECHINUS HESPERUS H. L. Clark 1938.

Pseudechinus hesperus H. L. Clark 1938, p. 395.

Type locality. Rottnest Island, Western Australia.

Holotype unique.

FAMILY STRONGYLOCENTROTIDAE.

Genus PACHYCENTROTUS H. L. Clark 1912.

Genotype: *Sphaerechinus australiae* A. Agassiz 1872. (Victoria and Tasmania).

PACHYCENTROTUS AUSTRALIAE A. Agassiz 1872.

Sphaerechinus australiae A. Agassiz 1872, p. 55.

Type locality. Port Phillip, Victoria.

Distribution. South Australia: Port Willunga, Kangaroo Island, Gulf St. Vincent, Spencer Gulf. Tasmania. Bass Strait. Victoria: Port Phillip.

Genus HELIOCIDARIS Agassiz and Desor 1846.

Genotype: *Echinus omalostoma* Valenciennes 1846 = *Echinus tuberculatus* Lamarck 1816. (Australia).

Apparently there are two species in South Australia. *H. erythrogramma* is the common New South Wales, but rarer South Australian species, in which the primary spines are comparatively long and the colour light-green.

HELIOCIDARIS ERYTHROGRAMMA Valenciennes 1846.

Echinus erythrogramma Valenciennes 1846, pl. vii, fig. 1.

Type locality. We designate Port Jackson, New South Wales.

Distribution. South Australia: Wallaroo Bay 15 fathoms, Investigator Strait 14 fathoms, Outer Harbour, Marino, Port Willunga, Christie's Beach, Sellicks,

Cape Jervis, Encounter Bay, Kingston, Robe, Port McDonnell, Port Lincoln (common). Western Australia to the Abrolhos Islands. Victoria. Tasmania. New South Wales: Port Stephens southward.

The species ranges through the entire Peronian and Flindersian Regions.

In several hundred specimens of *Heliocidaris* examined by us at Marino, we have noticed that the typical light-green primary spined species is less common than the next, *armigera*.

The following are no more than local variants:

Heliocidaris erythrogramma parvispina H. L. Clark 1938, p. 404. Point Peron. Western Australia.

Heliocidaris hartmeyer Döderlein 1914, p. 475. Shark Bay, Western Australia.

Heliocidaris meridionalis Döderlein 1914, p. 479. South Australia.

HELIOCIDARIS ARMIGERA A. Agassiz 1872.

Strongylocentrotus armiger A. Agassiz 1872, p. 55.

Type locality. Swan River, Western Australia.

Distribution. South Australia: Marino, Port Willunga, Christie's Beach, Glenelg, Encounter Bay, off Semaphore 6 fathoms, Robe, Wool Bay, Levens, Hardwicke Bay, Salt Creek. Western Australia: Swan River.

This species, with its short stout brown or purple spines, is quite common in South Australia at Port Willunga and Marino Reefs, in crevices and on the under-surface of rocks just below low water mark. It is much commoner here than *erythrogramma*.

HELIOCIDARIS TUBERCULATA Lamarck 1816.

Echinus tuberculatus Larmack 1816, p. 50.

Type locality. Australia.

Distribution. Victoria: Port Phillip Heads. New South Wales: Sydney. Lord Howe Island. Kermadec Islands.

Apparently this species is uncommon in Australia. H. L. Clark did not take it during his collecting trip here, and we have seen no signs of it in South Australia. Clark describes it as very common at Lord Howe Island. It appears to be as variable as *Heliocidaris erythrogramma*, if not in colour, in the relative size and proportions of the primary spines. The species may enter the eastern edge of the Flindersian Region but does not reach South Australia.

Order EXOCYCLODIA.

Suborder CLYPEASTRINA.

FAMILY CLYPEASTRIDAE.

Genus CLYPEASTER Lamarck 1801.

Genotype: *Echinus rosaceus* Linné 1758. (West Indies).

CLYPEASTER AUSTRALASIAE Gray 1851.

Echinanthus australasiae Gray 1851, p. 34.

Type locality. Brisbane Water, New South Wales.

Distribution. Victoria: Port Phillip. New South Wales. Queensland. Bass Strait.

CLYPEASTER TELURUS H. L. Clark 1914.

Clypeaster telurus H. L. Clark 1914A, p. 166.

Type locality. Fremantle to Geraldton, Western Australia.

Distribution. Western Australia: Rottnest Island, Fremantle, Geraldton. Queensland.

GENUS HESPERASTER H. L. Clark 1938.

Genotype: *Hesperaster arachnoides* H. L. Clark 1938. (Western Flindersian).

HESPERASTER ARACHNOIDES H. L. Clark 1938.

Hesperaster arachnoides H. L. Clark 1938, p. 411.

Type locality. Rottnest Island, Western Australia, 10–12 fathoms.

Distribution. Western Australia: Rottnest, Cape Leeuwin, Fremantle.

HESPERASTER CRASSUS H. L. Clark, 1938.

Hesperaster crassus H. L. Clark 1938, p. 413.

Type locality. Rottnest Island, Western Australia. Quaternary deposit near salt lake.

FAMILY ARACHNOIDIDAE.

GENUS AMMOTROPHUS H. L. Clark 1928.

Genotype: *Ammotrophus cyclius* H. L. Clark 1928, p. 471. (South Australia).

AMMOTROPHUS CYCLIUS H. L. Clark 1928.

Ammotrophus cyclius H. L. Clark, 1928, p. 471.

Holotype. Reg. No. K.401. Gulf St. Vincent, South Australia, 10 fathoms.

Distribution. South Australia: Gulf St. Vincent, Spencer Gulf, Encounter Bay.

The specimens dredged by Vercò in Gulf St. Vincent and Spencer Gulf were, in all probability, taken at the following depths: Gulf St. Vincent 10 fathoms; Spencer Gulf 15 fathoms.

K.578, Vercò, Beachport 25 fathoms, December 26, 1905, two specimens, recently picked from the mixed material of the Vercò dredgings, extend the range of this rare species to the south-east of South Australia. Test 42 mm. \times 42 mm. \times 6 mm. high for the larger, and 30 mm. \times 30 mm. \times 3 mm. high for the smaller of the two.

A specimen of this species from Robe (No. 787, Zoological Museum, Adelaide University) is the largest recorded, measuring 73 mm. \times 73 mm. \times 10 mm. high; petals 22 mm. long \times 13 mm. wide in the average; periproct centre 9 mm. from posterior margin of test, 5 mm. long and 3 mm. wide. The test is bare, all the spines are missing.

AMMOTROPHUS PLATYTERUS H. L. Clark 1928.

Ammotrophus platyterus H. L. Clark 1928, p. 474.

Holotype. Reg. No. K.477. Gulf St. Vincent, South Australia. The specimen described as holotype still remains unique.

FAMILY LAGANIDAE.

Genus PERONELLA Gray 1855.

Genotype: *Laganum peronii* L. Agassiz 1841. (Peronian and Flindersian Regions).

PERONELLA PERONII L. Agassiz 1841.

Laganum peronii L. Agassiz 1841, p. 123.*Type locality.* Western Australia? (Habite les mers de l'Inde).*Distribution.* South Australia: Gulf St. Vincent, Spencer Gulf, Beachport to 200 fathoms, Cape Borda 62 fathoms, Point Marsden 17 fathoms, American River 8 fathoms, Yankalilla Bay, Neptune Islands, Investigator Strait, Backstairs Passage 22 fathoms, Cape Jaffa 90 fathoms, Yorke Peninsula, Port Lincoln, and Normanville. Western Australia: Great Australian Bight 60 miles west of Eucla. Victoria. Tasmania. New South Wales. Queensland.A recent addition (K.579) from Wallaroo, South Australia, measures 17 mm. \times 15 mm. \times 3 mm.

PERONELLA LESUEURI L. Agassiz 1841.

Laganum lesueuri L. Agassiz 1841, p. 116.*Type locality.* Western Australia.The species was recorded from Fremantle and Albany by Döderlein (1914, p. 490) and by H. L. Clark (1938, p. 418). The specimen K.403 recorded by H. L. Clark (1928, p. 475) from unknown locality, is labelled "S.A.?" It is common in the Banksian and Dampierian Regions. Two large examples from Yorke Peninsula, South Australia (K.421), are in the Museum Collection and we have carefully compared them with a perfect specimen from Broome and find them identical. The larger measures 103 mm. \times 90 mm. \times 12 mm., and the smaller 98 mm. \times 90 mm. \times 10 mm.

FAMILY FIBULARIIDAE.

Genus ECHINOCYAMUS Leske 1778.

Genotype: *Echinocyamus angulosus* Leske 1778 = *Echinus minutus* Pallas 1774. (England, Mediterranean, North Sea).

ECHINOCYAMUS PLATYTATUS H. L. Clark 1914.

Echinocyamus platytatus H. L. Clark 1914B, p. 63.*Type locality.* Victoria.*Distribution.* South Australia: 12-200 fathoms, Cape Jaffa, Beachport, Backstairs Passage, St. Francis Island, Gulf St. Vincent. Western Australia: King George Sound 12-25 fathoms, Hopetoun beach. Tasmania: Devonport, Launceston.

Genus FIBULARIA Lamarck 1816.

Genotype: *Fibularia trigona* Lamarck 1816 = *Echinocyamus craniolaris* Leske 1778. (Gulf of Suez; Maldive Islands, North Mole).

FIBULARIA VOLVA Agassiz and Desor 1847.

Fibularia volva Agassiz and Desor 1847, p. 142.*Type locality.* Red Sea.*Distribution.* Western Australia: Albany, Broome. North Australia: west of Torres Strait, 28 fathoms. Madras: Gulf of Manaar. Korea.

FIBULARIA PLATEIA H. L. Clark 1928.

Fibularia plateia H. L. Clark 1928, p. 477.

Holotype: Reg. No. K.448. Wallaroo Bay, South Australia, 15 fathoms.

Distribution. South Australia: Beachport, Backstairs Passage, Newland Head, Wallaroo Bay, Gulf St. Vincent, St. Francis Island, Cape Borda, Cape Jaffa, Neptune Islands, depths from 15–130 fathoms. Western Australia: Bunbury, 22 fathoms.

FIBULARIA CRANIOLARIS Leske 1778.

Echinocyamus craniolaris Leske 1778, p. 150.

Fibularia trigona Lamarek 1816.

Type locality. Gulf of Suez.

Distribution. South Australia: Yankalilla Bay, Investigator Strait, Backstairs Passage, Point Marsden (Kangaroo Island), Gulf St. Vincent, Neptune Islands, Spencer Gulf, depths from 17–25 fathoms. Western Australia: King George Sound, 12–25 fathoms.

There are some hundreds of specimens in the South Australian Museum Collection ranging from Encounter Bay, South Australia, to King George Sound, Western Australia. Great differences in general shape and size are presented, although the principal specific characters are constant. The species must have a wide distribution, as the British Museum specimens are recorded as from Gulf of Suez, also Maldiv Islands, North Mole. There does not appear to be any record of the species from any other Australian Region.

Suborder NUCLEOLITINA.

FAMILY NUCLEOLITIDAE.

Genus APATOPYGUS Hawkins 1920.

(Genotype: *Nucleolites recens* Milne-Edwards 1836, pl. xiv, fig. 3. (New Zealand).)

APATOPYGUS OCCIDENTALIS H. L. Clark 1938.

Apatopygus occidentalis H. L. Clark 1938, p. 497: non *Apatopygus recens* Milne-Edwards 1836, pl. xiv, fig. 3.

Type locality. Between Rottnest Island and Fremantle, Western Australia.

Distribution. Western Australia: Rottnest Island, Bunbury 22 fathoms.

H. L. Clark (1928, p. 479) referred to the remarkable occurrence at Bunbury of a species of *Apatopygus*, and doubtfully recorded it as *A. recens*, a New Zealand species and the only living representative of the genus, although there are Australian Tertiary species. He remarked on the differences noted in the pedicellariae of the Western Australian specimen. Later, Clark (1938, p. 497) described a second specimen of this different Australian species from "between Rottnest Island and Fremantle, in ten fathoms", and named it *Apatopygus occidentalis*, noting that Verco's Bunbury specimen also belonged to that species. Verco's specimen, K.478, is now before us and we note that it is considerably smaller than the holotype. The characteristic features of the species are in complete agreement with Clark's description.

Suborder SPATANGINA.**FAMILY HEMIASTERIDAE.**Genus *PROTENASTER* Pomel 1883.Genotype: *Desoria australis* Gray 1851. (Australia).*PROTENASTER AUSTRALIS* Gray 1851.*Desoria australis* Gray 1851, p. 132.*Type Locality.* Flinders Island, Bass Strait, Tasmania.*Distribution.* South Australia: Murat Bay. Tasmania. Western Australia: Ellen Brook.

A specimen in the South Australian Museum (K.479) from Ellen Brook, Western Australia, is typical of the species, and a further broken juvenile specimen from the same locality is probably that species. An excellent example (K.580) from Murat Bay (Verco) extends the distribution of this species into South Australia.

Genus *MOIRA* A. Agassiz 1872.Genotype: *Spatangus atropos* Lamarck 1816.*MOIRA STYGIA* L. Agassiz 1872.*Moiria stygia* L. Agassiz 1872, p. 58.*Type locality.* Mediterranean.*Distribution.* South Australia; Port Willunga, Port Noarlunga, Sellick's Beach (Zool. Mus., Adelaide University), Kangaroo Island. Western Australia: Broome. Suez. Red Sea. Andaman Islands.

This *Moiria* species is known from only a few specimens. The only record from the Flindersian Region mentioned by H. L. Clark (1938, p. 433) is a bare test taken by W. J. Kimber at Port Willunga. Clark remarks "that *Moiria* should occur on the southern coast of Australia is certainly astonishing. This record extends the range of the species (and of the genus too) fully 1400 miles, more than half of which is an extension to the south".

We have the following specimens at the Museum:

K.581. Two partly bare tests, typical; measurements, 50 mm. \times 43 mm. \times 35 mm.; and 45 mm. \times 35 mm. \times 30 mm.; colour pale brown; spines remaining posteriorly are whitish. Port Noarlunga, on the beach.

K.515. One bare bleached test, typical; measurements, 47 mm. \times 35 mm. \times 35 mm. South Australia.

K.514. Two partly bare tests, typical; measurements, 45 mm. \times 35 mm. \times 30 mm.; and 35 mm. \times 30 mm. \times 25 mm.; colour bleached white; spines in the posterior slit pale brown. South Australia.

K.555. It was taken at Penneshaw, Kangaroo Island, by the Rev. H. A. Gunter. Length 60 mm., width 45 mm., height 40 mm., being the largest recorded. The test is yellowish white, the spines pale brown, very dense and bristle-like.

- No. 715. Zoological Museum, Adelaide University. Two typical specimens, dried test, taken by Prof. Harvey Johnston at Sellick's Beach, South Australia, October, 1928.
- No. 24. Zoological Museum, Adelaide University. Two well preserved specimens in alcohol from Moreton Bay, Queensland; tests and bristles are white, evidently from fading.

FAMILY SPATANGIDAE.

Genus EUPATAGUS Agassiz and Desor 1847.

Genotype: *Eupatagus valenciennesii* Agassiz and Desor 1847. (Australia).

EUPATAGUS VALENCIENNESII Agassiz and Desor 1847.

Eupatagus valenciennesii Agassiz and Desor 1847, p. 9.

Type locality. Australia. (Nouvelle Hollande).

Distribution. Victoria: Port Phillip. Bass Strait: Flinders Island. Tasmania: Port Dalrymple. New South Wales: Port Jackson.

The species does not appear to occur in South Australia, and only enters the eastern end of the Flindersian Region from the Peronian.

Genus GONIMARETIA H. L. Clark 1917.

Genotype: *Gonimaretia tylota* H. L. Clark 1917, p. 241. (Kei Islands, between New Guinea and Timor).

GONIMARETIA INTERRUPTA Studer 1880.

Type locality. Western Australia, 30 fathoms.

The single specimen, K.513, before us, is the one referred to by H. L. Clark (1928, p. 480). There is little doubt that this is one of Verco's specimen and therefore came from South Australia or Western Australia.

Genus ECHINOCARDIUM Gray 1825.

Genotype: *Spatangus pusillus* Leske 1778 = *Echinus cordatus* Pennant 1777, p. 69. (Europe, Korea, Australia, Tasmania, New Zealand).

ECHINOCARDIUM CORDATUM Pennant 1777.

Echinus cordatus Pennant 1777, p. 69.

Echinocardium australe Gray 1825.

Type locality. Europe.

Distribution. World wide. South Australia: Port Willunga, American River, Warooka, Yankalilla Bay, St. Francis Island 20 fathoms, Gulf St. Vincent, Spencer Gulf. Bass Strait: Flinders Island. Tasmania. Victoria: Port Phillip. Western Australia: Fremantle, Rottnest Island.

No one appears to have succeeded in separating the southern hemisphere form (*E. australe* Gray 1825) from *E. cordatum*. It seems surprising that this variable species should occur all over the world.

FAMILY BRISSIDAE.

Genus *BRISSUS* Leske 1778.Genotype: *Spatangus brissus unicolor* Leske 1778.*BRISSUS LATECARINATUS* Leske 1778.*Spatangus brissus* var. *latecarinatus* Leske 1778, p. 185.*Type locality.* Red Sea?*Distribution.* South Australia, North Australia, Lord Howe Island, Red Sea, Mauritius, Solomon Islands, Madras, Philippine Islands, Japan, Hawaiian Islands, Samoa.

In the British Museum is a specimen labelled "Adelaide", and H. L. Clark (1925, p. 20) queries the correctness of the locality. A fine bare test from Port Lincoln (No. 347, Zoological Museum, Adelaide University), confirms the occurrence of this species in South Australia. Length 78 mm., breadth 62 mm., height 40 mm. There are black spots on the posterior half of the dorsum, indicating the position of the large globiferous pedicellariae, while the general colour of the test is pale brown dorsally and white on the ventral, although it is, of course, somewhat bleached. Compared with a test from New Hebrides, the South Australian specimen is very close in every detail.

CLASS HOLOTHUROIDEA

Order ACTINOPODA.

FAMILY HOLOTHURIDAE.

Genus *HOLOTHURIA* Linné 1758.Genotype: *Holothuria tremula* Gunnerus (Cosmopolitan).*HOLOTHURIA HARTMEYERI* Erwe 1913.*Holothuria hartmeyeri* Erwe 1913, p. 383.*Type locality.* Oyster Bay, Albany, Western Australia.*Distribution.* Flindersian.*HOLOTHURIA FUSCOCINEREA* Jäger 1833.*Holothuria fuscocinerea* Jäger 1833.*Type locality.* Indo-Pacific.*Distribution.* South Australia.

This species was taken in great numbers at Glenelg on July 5 and September 24, 1942, following unusually heavy storms.

HOLOTHURIA VAGABUNDA Selenka.*Holothuria vagabunda* Selenka.

Genus *STICHOPUS* Semper 1868.

Genotype: *Stichopus variegatus* Semper 1868. (Flindersian).

STICHOPUS LUDWIGI Erwe 1913.

Stichopus ludwigi Erwe 1913, p. 388.

Type locality. South-western Australia.

Distribution. South Australia. Western Australia.

FAMILY DENDROCHIROTAE.

Genus *CUCUMARIA* Blainville 1830.

CUCUMARIA SQUAMATA Ludwig 1898.

Cucumaria squamata Ludwig 1898.

Distribution. South Australia: Encounter Bay.

CUCUMARIA INCONSPICUA Bell 1887.

Cucumaria inconspicua Bell 1887, p. 532.

Type locality. Port Phillip Heads, Victoria.

Distribution. South Australia. Victoria.

CUCUMARIA STRIATA Joshua and Creed 1914.

Cucumaria striata Joshua and Creed 1914, p. 18.

Type locality. Great Australian Bight.

Distribution. South Australia.

CUCUMARIA MUTANS Joshua 1914.

Cucumaria mutans Joshua 1914.

Type locality. Port Phillip, Victoria.

Distribution. Victoria: Western Port and general. South Australia: Gulf St. Vincent. Western Australia: Bunkers Bay, Cottesloe Beach.

Genus *PSEUDOCUCUMIS*.

PSEUDOCUCUMIS BICOLUMNATUS Dendy.

Pseudocucumis bicolumnatus Dendy.

Type locality. New Zealand.

Distribution. South Australia. New Zealand.

Genus *LIPOTRAPEZA* H. L. Clark 1938.

Genotype: *Phyllophorus vestiens* Joshua 1914. (Flindersian).

LIPOTRAPEZA VENTRIPES Joshua and Creed 1914.

Phyllophorus ventripes Joshua and Creed 1914, p. 19.

Type locality. Gulf St. Vincent, South Australia.

Distribution. South Australia.

LIPOTRAPEZA VESTIENS Joshua 1914.

Phyllophorus vestiens Joshua 1914, p. 5.

Type locality. Port Phillip Bay, Victoria.

Distribution. Victoria (general). This species apparently enters the Flindersian Region at Western Port Bay.

Genus THYONE Oken 1815.

THYONE VERCOI Joshua and Creed 1914.

Thyone vercoi Joshua and Creed 1914, p. 19.

Holotype: Reg. No. K.517. Gulf St. Vincent, South Australia.

Distribution. South Australia.

THYONE NIGRA Joshua and Creed 1914.

Thyone nigra Joshua and Creed 1914, p. 20.

Type locality. Gulf St. Vincent, South Australia.

Distribution. South Australia.

Genus COLOCHIRUS.

COLOCHIRUS DOLIOLUM Pallas.

Colochirus doliolum Pallas.

Distribution. Flindersian Region.

COLOCHIRUS QUADRANGULARIS Lesson.

Colochirus quadrangularis Lesson.

Distribution. Great Australian Bight.

FAMILY SYNAPTIDAE.

Genus TROCHODOTA Ludwig 1892.

Genotype: *Chirodota studeri* Ludwig 1892 = *Holothuria (Fistularia) purpurea* Lesson 1830. (New Zealand, South America, Bay of Naples, Southern Australia).

TROCHODOTA ALLANI Joshua 1912.

Taeniogyrus allani Joshua 1912.

Type locality. New Zealand.

Distribution. South Australia: Kangaroo Island. Victoria: Port Phillip, Western Port Bay, Corio Bay.

FAMILY MOLPADIIDAE.

Genus CAUDINA Stimpson 1853.

Genotype: *Chirodota arenata* Gould 1841. (America).

CAUDINA CHILENSIS J. Müller.

Caudina chilensis J. Müller.

Distribution. South Australia.

CLASS CRINOIDEA

Order ARTICULATA.

FAMILY COMATULIDAE.

Genus COMATULA Lamarck 1816.

Genotype: *Comatula solaris* Lamarck 1816. (Australian Seas).

COMATULA SOLARIS Lamarck 1816.

Comatula solaris Lamarck 1816, p. 533.*Type locality.* Australian Seas.*Distribution.* North Australia. Western Australia. Queensland. The species is recorded from East Wallaby Island and Long Island, in the Abrolhos group, Western Australia by H. L. Clark, and is therefore probably extralimital in the extreme west of the Flindersian Region.

Genus COMATULELLA.

COMATULELLA BRACHIOLATA Lamarck 1816.

Comatula brachiolata Lamarck 1816, p. 535.*Type locality.* ? Atlantic Ocean (in error). South Australia.*Distribution.* South Australia: Gulf St. Vincent, Spencer Gulf. Western Australia: Koombana Bay 14·5–18 metres rocky bottom, King George Sound. Victoria: Port Phillip. This species is confined to southern and south-western Australia.

Genus COMANTHUS A. H. Clark 1908.

Genotype: *Alecto parvicirra* J. Müller 1841, p. 145.*Distribution of genus.* Madagascar, Mauritius, Australia, Fiji, Southern Japan, China etc., Ceylon.

COMANTHUS PARVICIRRA J. Müller 1841.

Alecto parvicirra J. Müller 1841, p. 185.*Type locality.* ? We designate Indian Ocean.*Distribution.* Western Australia: Between Fremantle and Geraldton, Abrolhos, Cape Joubert, Cape Baudin. The species is very variable and is very widely distributed in the Indian Ocean and south-west Pacific.

COMANTHUS TRICHOPTERA J. Müller 1846.

Comatula trichoptera J. Müller 1846, p. 178.*Type locality.* King George Sound, Western Australia.*Distribution.* South Australia: Encounter Bay, Spencer Gulf, Tumby Bay, Gulf St. Vincent.

FAMILY THALASSOMETRIDAE.

Genus *PTILOMETRA* A. H. Clark 1907.Genotype: *Comatula macronema* J. Müller 1846.*PTILOMETRA MACRONEMA* J. Müller 1846.*Comatula macronema* J. Müller 1846, p. 179.*Type locality.* King George Sound, Western Australia.*Distribution.* South Australia: Great Australian Bight about 131° E., Flinders Island, Kangaroo Island, Kingston, Encounter Bay, Gulf St. Vincent, Spencer Gulf, Althorpe Island. Western Australia: Dirk Hartog Island 7 fathoms, King George Sound. Victoria: Port Phillip.

FAMILY ANTEDONIDAE.

Genus *COMPSOMETRA* A. H. Clark 1908.Genotype: *Antedon loveni* Bell 1882 = *Antedon pumila* Bell 1884. (Australia, etc.).*COMPSOMETRA INCOMMODA* Bell 1888.*Antedon incommoda* Bell 1888A, p. 404.*Type locality.* Port Phillip, Victoria.*Distribution.* South Australia: Flinders Island 37 fathoms. Victoria. Also recorded from Port Jackson, New South Wales, as *Compsometra lacertosa*.Genus *EUANTEDON* A. H. Clark.Genotype: *Antedon moluccana* A. H. Clark 1912. (Tahiti, Moluccas, China, Australia).*EUANTEDON PAUCICIRRA* H. L. Clark 1928.*Euantedon paucicirra* H. L. Clark 1928, p. 369.

Holotype: Reg. No. K.37, Gulf St. Vincent, South Australia.

Distribution. This species occurs on the reef at Marino, South Australia.

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EXPLANATION OF PLATE.

Plate xii.

1. *Phyllacanthus irregularis kimberi* subsp. nov., oral view, $\times 0.5$. 2. *Phyllacanthus irregularis kimberi* subsp. nov., lateral view, $\times 0.5$.

IDIELLANA, A NEW NAME FOR THE PREOCCUPIED GENUS *IDIELLA* STECHOW

(COELENTERATA—FAMILY SERTULARIIDAE)

BY BERNARD C. COTTON AND FRANK K. GODFREY.

THE genus *Idiella* Brauer and Bergenstamm 1890, Denkschr. Acad. Wiss. Wien, 56 (1), 154, was first used for a genus of Diptera in the Insecta.

Idiella Stechow 1919, Zool. Jahrb., Syst., 42, 106, was introduced as a new name for *Idia* Lamouroux 1816, Hist. Polyp., 199 preoccupied by *Idia* Huebner 1809, Erste. Zutr., 5; Zutr. Samml. Exot. Schmett., 1, pl. xxiii, a genus of the Lepidoptera. *Idiella* Stechow 1919 is therefore not available so we introduce the name *Idiellana* for the genus belonging to the family Sertulariidae in the Phylum Coelenterata.

Idiellana is represented in the Flindersian Region, Southern Australia, by *I. pristis* Lamouroux, a species recorded from Victoria and south-western Australia. We make this correction here as we are preparing an annotated list of certain Southern Australian Invertebrates which we hope to publish this year in Publication No. 3 of the Malacological Society of South Australia.



1942. "Echinodermata of the Flindersian Region Southern Australia." *Records of the South Australian Museum* 7, 193–234.

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