The echinoderms of Aldabra and their habitats

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Synopsis

This first full account of the echinoderm fauna of Aldabra Atoll, western Indian Ocean, includes a description of the shallow-water habitats and two special ecological studies dealing with the microhabitats of the Ophiocomidae – the dominant family of coral-reef ophiuroids – and a comparison between the echinoderms of an exposed and a sheltered part of the shore. The remainder consists of an annotated fauna list, with details of habitats, colours in life, parasites, commensals and other observations on the individual species. It is based primarily on recent collections and observations by Sloan, but also takes account of previous work by others at the Royal Society's base on the atoll. Nearly 130 species are included, of which 20% are recorded for the first time from the islands of the western Indian Ocean (excluding the Mascarene Islands).

Introduction

Aldabra Atoll is a slightly elevated group of four main limestone islands which form a seaward rim with a maximum dimension of 34 km from east to west (see Fig. 1). It lies at 9°24′ S and 46°20′ E, some 650 km off the African mainland. With the exception of Assumption and Cosmoledo, Aldabra is isolated from all land by an oceanic basin. Its east and south seaward shores are the most exposed, being directly in the path of the SE trades, which blow constantly from April to November. During the other months more variable winds blow from the northwest. Detailed

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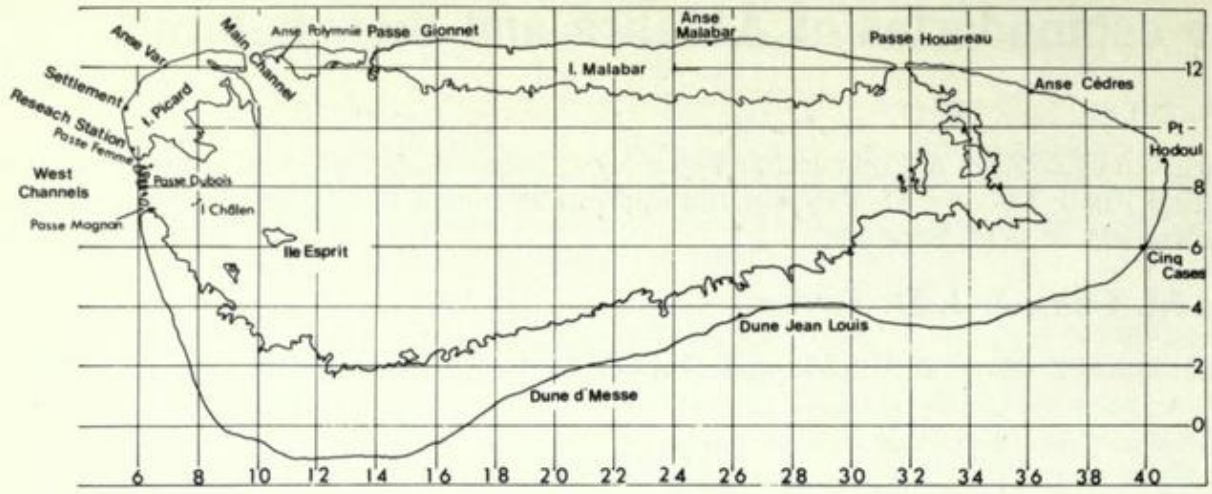


Fig. 1 Map of Aldabra showing localities mentioned in the text and the one kilometre square grid.

information on the climate, topography, tidal regime and many other aspects of Aldabra is available in Westoll & Stoddart (1971).

Collections of echinoderms from Aldabra were made during most phases of the Royal Society's Aldabra Expedition in 1967–1968, and between November 1977 and May 1978. Most of the collections have been deposited in the British Museum (Nat. Hist.). Thus there is sufficient material to warrant a report, as detailed reports on marine groups from this area are generally lacking. Zoogeographically Aldabra is somewhat isolated by being surrounded by the deep sea and comparisons between its echinoderm fauna and that of mainland Africa, the Mascarene Islands and Madagascar may be of interest.

This paper was initiated by one of us (N. A. S.) who made the observations, provided the photographs, the comparative study of two rocky shores and the section on ophiocomid microhabitats, as well as drawing up the systematic account after identification, or at least confirmation of identification, had been made by others. A. M. C. augmented the systematic account in some cases, confirmed or made all identifications except the majority of the holothurians, and supervised the literature references. J. D. T. provided the maps, some habitat information, and overall continuity of the habitat information. Dr F. W. E. Rowe identified most of the holothurians while on a study visit to London.

The ranges of 30 species are extended to the 'Islands of the western Indian Ocean' in the sense of Clark & Rowe (1971) (i.e. exclusive of the Mascarene Islands), plus a further nine species needing corroborative records. A new subspecies of *Ophiarachnella macracantha* is described and two subspecies of *Ophiolepis cincta* are recognized, prompting the revival of the long-synonymized name *O. garretti* Lyman, 1865.

The important study of Cherbonnier & Guille (1978) on the ophiuroids of Madagascar came to hand only after completion of the typescript of this paper but a few references to it have been inserted. It gives keys, descriptions, illustrations and habitat notes for a large proportion of the ophiuroid species now recorded from Aldabra.

Shallow water habitats of Aldabra

The general relationships of the major shallow water marine habitats are briefly described below and illustrated in Figs 1 & 2.

A nearly continuous land rim of Pleistocene limestones, breached in four places by narrow channels, surrounds a large shallow lagoon. On the seaward side of the Atoll the land is terminated by steep 4 m high cliffs, beyond which an intertidal or shallow sublittoral platform extends up to 450 m and ends abruptly at the steep seaward slope of the Atoll. The lagoon shoreline is extremely

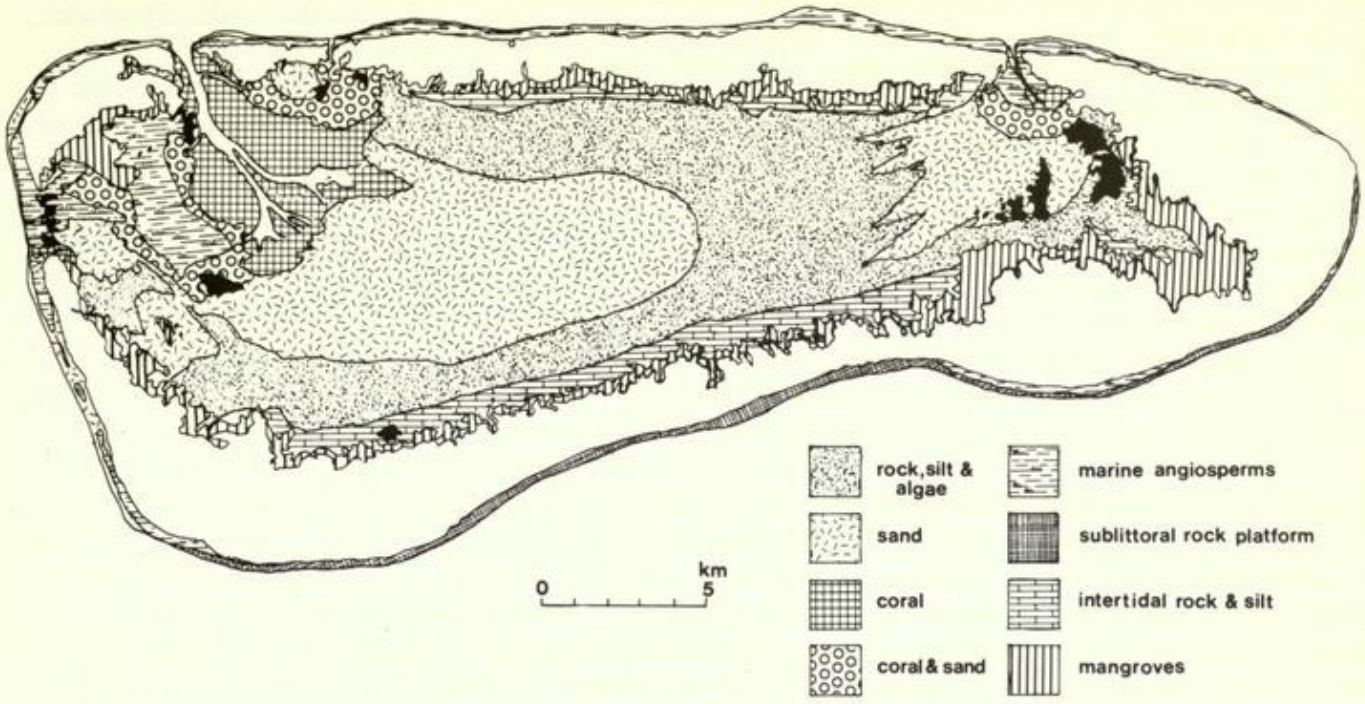


Fig. 2 Map of Aldabra showing the distribution of the major shallow water habitats.

irregular and almost completely fringed by mangroves growing upon rock or silty substrates. The rest of the lagoon is very shallow with a water depth rarely exceeding 5 m and with a rock bottom covered with a variable thickness of fine sands and silt. However, near the channels into the lagoon the hydrodynamics are much more complex and a mosaic of habitats is developed.

Seaward habitats

Most of the Atoll is fringed by intertidal cliffs which are ramp shaped on the exposed southerly and easterly shores but vertical or undercut at the more sheltered north and easterly sides. Subaerial, marine and biological erosion has produced severe dissection and topographic complexity on these cliffs and further details of the habitats may be found in Taylor (1971*a*) and Trudgill (1976). Along the only large intertidal beach on the Atoll, at the Settlement area on Ile Picard, there is an extensive development of beachrock over 1000 m long and 20–30 m wide. It occupies most of the upper eulittoral zone and the seaward dipping slabs of rock form a habitat for a diverse assemblage of echinoderms.

The base of the cliffs is continuous with the narrow seaward platform which virtually surrounds the Atoll; the platform is widest at the western and northern sides of the Atoll and narrowest in the east. At the western end where the platform is about 450 m wide it is mostly covered by a thin veneer of sediment and colonized by stands of marine grasses particularly *Thalassia* and *Thalassodendron*, but *Halodule* and *Cymodocea* also occur. The grasses grow upon medium grade sand, but cobbles and coral debris may be abundant. Small coral colonies may be common in the deeper parts of the platform, particularly *Millepora* and *Porites*. Large dune-like sand bodies migrate along the platform with the seasonal wind changes. Towards the seaward edge of the platform there is a belt about 30 m wide consisting of boulders and cobbles thrown up by wave action. The boulders rest upon calcareous algae covered rock or upon sand and rubble colonized by *Thalassodendron*. On the south and east shores the narrower platform is generally sediment free and colonized by an algal turf with *Laurencia*, *Dictyosphaera*, *Turbinaria*, *Cladophoropsis* and calcareous red algae.

Lagoon and Channel habitats

Except for the mangrove fringe, much of the central lagoon presents a generally monotonous, uniform habitat. The water is very turbid and the shallow more or less silt covered bottom is

covered by sometimes extensive growths of algae; particularly common are *Halimeda*, *Cystoseira*, *Hydroclathrus*, *Sargassum* and *Caulerpa*, with abundant epilithic sponges.

However near the four lagoon channels, complex habitat mosaics are developed in response to the increased circulation produced by regular tidal flushing. Main Channel, the largest channel, has extensive and diverse coral growths along the edges of the channel and its complicated system of tributaries. More patchy habitats of sand and isolated coral colonies form an arc around the 'catchment' area and this habitat passes transitionally into that of the central lagoon, mentioned above. The smaller channel, Passe Houareau, has limited coral growth along its edges with more or less concentric arcs of marine grasses mixed sand and coral, and sandy habitats. Passe Gionnet, a small channel, has areas of coral, mixed coral and sand, and sand.

The greatest complexity of habitats is seen in the West Channels area where the land rim has been breached several times by narrow, shallow channels, only one of which, Passe Dubois, is deep enough to breach the seaward platform. Immediately within the lagoon behind the channels an extremely complex patchwork of habitats is developed in relation to the catchment of each of the minor channels. The main habitat types present include beds of marine angiosperms, particularly *Thalassia* and *Thalassodendron*, patches of abundant algae particularly *Gracilaria*, *Laurencia* and *Halimeda*, sand patches, mixed sand and coral habitats, and areas consisting of algally coated cobbles and boulders. Coral microatolls and growths of *Porites*, *Goniastrea*, *Pavona* and *Millepora* are common on the grass and sandy areas, whilst more extensive coral growth including *Millepora platyphylla*, branching *Porites* and *Goniastrea* occur within the channels.

Comparison between the echinoderm faunas of exposed and sheltered rocky shores

Exposed rocky shore near Point Hodoul (407–080)

This site was an extremely exposed shore in the form of an intertidal rock platform or bench which is described in more detail in Taylor (1971*a*). It projected about 65 m to the seaward from a small pocket sand beach and it was surrounded on the landward by an undercut limestone cliff. The rock platform was eroded quite smooth with numerous erosion pits, some of which contained sand retained by overlying trapped boulders. There were no boulders overlying the platform itself. This habitat sheltered an echinoderm fauna low in numbers but relatively high in species for this exposed shore. *Holothuria arenicola* was the most common holothurian and it occurred as infauna in the trapped sand, numbering up to three per pit. As cryptofauna under the boulders over the sand the following species: *Afrocucumis africana*, *Holothuria cinerascens*, *H. hilla*, *H. impatiens*, *H. leucospilota* and *H. pardalis*, *Echinoneus cyclostomus*, *Echinometra mathaei*, *Macrophiothrix longipeda* and *Ophiocoma scolopendrina* were fairly common, as was *Holothuria cinerascens* in larger crevices. The abundance of crevice-dwelling holothurians increased considerably while the numbers of *O. scolopendrina* diminished to seaward. Also in the lower eulittoral, small epibenthic *Actinopyga mauritiana* became more common in the rock pools. Some were only about 40 mm long, which is interesting as Bakus (1968) had difficulty in finding small specimens of this species on the Marshall Islands. Most noteworthy, however, were the great numbers of echinoids in burrows at the seaward end of the platform.

About 10 m landward from the low water spring level an escarpment about 60 cm high and 110 m long ran parallel with the water level. A strip along this escarpment 20 m wide on the landward and 10 m wide on the seaward side contained the area of highest echinoid and holothurian density. Fifty quadrats of 0·25 m^2 were sampled by random casting over the shoulder along this strip on each side of the escarpment and 25 vertically-orientated quadrats were sampled along the escarpment itself using random number tables. The results of the echinoid counts are listed in Table 1. The vertical escarpment face was dominated by the larger echinoid *Stomopneustes variolaris* while the horizontally-orientated burrows were usually filled with *Echinometra mathaei*. Table 2 shows the size differences of the burrows of these two species. Almost every burrow was occupied so the availability of burrows in this area could be a limiting factor affecting the population size of the echinoids. Their burrowing activities probably contribute to bioerosion on this

Table 1 Numbers of echinoids per 0·25 m² quadrat

	Echinoid counts	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	No. of quadrats sampled
Echinometra mathaei	above escarpment	30	12	2	6	–	–	–	–	–	–	–	–	–	–	–	50
Stomopneustes variolaris	above escarpment	46	3	–	–	1	–	–	–	–	–	–	–	–	–	–	50
E. mathaei	on escarpment	1	–	3	10	5	3	2	1	–	–	–	–	–	–	–	25
S. variolaris	on escarpment	–	–	1	4	3	3	–	5	1	3	3	1	–	–	1	25
E. mathaei	below escarpment	23	16	6	3	2	–	–	–	–	–	–	–	–	–	–	50
S. variolaris	below escarpment	45	2	2	1	–	–	–	–	–	–	–	–	–	–	–	50

Table 2 Sizes of echinoid burrows.

	No. of burrows	Mean depth (mm)	S.D.	Mean diameter (mm)	S.D.
Echinometra mathaei	40	67·4	5·1	39·7	3·4
Stomopneustes variolaris	40	117·0	8·5	85·5	7·0

shore (Taylor, 1971*a*; Trudgill, 1976). The echinoids remain permanently in their burrows which trap wave-transported drift algae and sea grasses.

There were two holothurian species, *Afrocucumis africana* and especially *Holothuria cinerascens*, which were common in this very pock-marked habitat. Up to 15 *H. cinerascens* were found tightly packed in a single vacant *S. variolaris* burrow and individuals were usually found wherever crevice or overhang spaces were available. *A. africana* was restricted to the smaller crevices although the two species were sometimes found together. Both these species are passive suspension feeders that trap suspended food on their sticky tentacles. The holothurians and the echinoids did not, however, coexist in the same burrows. The *E. mathaei* from the exposed south coast were larger than anywhere else on the atoll. Similarly, Khamala (1971) in Kenya and Russo (1977) in Hawaii both reported that *Echinometra mathaei* from areas of the strongest wave action were the largest. Interestingly, there were no *Echinostrephus molaris* in the lower eulittoral here although they were present on more sheltered seaward shores of the west and north coasts.

In summary, this exposed shore was dominated by echinoids in the lower eulittoral although two species of holothurians were quite common. A small population of six holothurians, two echinoids and only two ophiuroids occurred in the mid and upper eulittoral. The conspicuous dearth of ophiuroids in this habitat is noteworthy and is probably due to the exposed nature of this rocky shore.

Sheltered rocky shore on Ile Picard (056–100)

This shore consisted of a series of eroding slabs of beach-rock in the upper eulittoral with a sandy beach to the landward side and a grass pool to seaward. This area is described in detail in Taylor (1971, 1976) and Sloan (in press). There were boulders overlying intact bedrock here, unlike the exposed shore, probably because of the less violent wave action. These boulders provided shelter for cryptofauna and numerous holothurians occurred under them. The most common species were the suspension feeder *Afrocucumis africana* and the four deposit feeders, *Polycheira rufescens*, *Holothuria parva*, *H. impatiens* and *H. leucospilota*. The first three of these species were quite common and detailed information on the distribution and abundance of this fauna is provided in Sloan (in press). Other uncommon holothurians from the beach-rock were *H. cinerascens*, *H. atra*, *H. rigida*, *H. arenicola* and *H. moebii*. Echinoids were rare in this area and a total

Table 3 Published data on ophiocomid microhabitats, including those of three species from the tropical West Atlantic

Species	Author(s)	Notes
Ophiocoma brevipes	H. L. Clark (1921)	Mer, Murray Islands, Torres Strait: on sand under coral
	H. L. Clark (1946)	Murray Islands and Lord Howe Island; noted a crevice-dwelling habit and a tendency of individuals to fold their arms closely around the disc
	Devaney (1967)	Hawaii; under boulders overlying sand in which they were partially buried. Not found on coarse gravel or cobble
	Taylor (1968)	Mahé, Seychelles: 'abundant' on grass beds under coral boulders and in the bases of living coral
	Taylor & Lewis (1970)	
	Taylor (1971*b*)	Diego Garcia, Chagos Islands: crevice dwelling on seaward platforms, in *Thalassodendron* beds, 'abundant' on lagoon platforms covered by *Thalassodendron* and coral heads
	Chartock (1972)	Eniwetok Atoll, Marshall Islands: in the lower eulittoral under coral in small crevices and 'firmly set' boulders of the algal ridge, up to 2 per m^2 in 'optimum' habitat
	Devaney (1974)	Southeastern Polynesia: 'a rather specific habitat' under coral heads and boulders over sand on reef flats, usually 1 or 2 per boulder, most numerous under coral heads; may partially bury themselves in the sand
Ophiocoma doederleini	Chartock (1972)	Eniwetok Atoll: most common species of the *brevipes* subgroup (*O. brevipes*, *O. dentata*, *O. doederleini*), under 'firmly placed' boulders and coral heads overlying gravel and detritus, rarely more than 1 per boulder and up to 1 per m^2
	Devaney (1974)	SE Polynesia: on 'relatively clean' sand under boulders at a depth of 1–10 m. Note: Both Chartock (1972) and Devaney (1974) mention the similarity between the microhabitats of *O. doederleini* and *O. dentata*
Ophiocoma erinaceus	H. L. Clark (1921)	Torres Strait: 'very common' in heads of *Pocillopora*, *Acropora* and *Seriatopora* but not common on the sand under these heads, a 'more active species than *O. scolopendrina*' in its behaviour when disturbed. Stressed the 'complete separation of habitat' between *O. erinaceus* and *O. scolopendrina*
	H. L. Clark (1946)	Torres Strait, Murray Islands and Lord Howe Island: mentioned this species as being 'so frequently confused' with *O. scolopendrina*, often found in 'dead and dying' coral heads
	Balinsky (1957)	Inhaca Island, off Mozambique: considered a 'rare' species in coral in some shores, but common on 'more tropical' reefs in that area
	Taylor (1968)	Mahé: 'less common' than *O. scolopendrina* and *O. brevipes* on grass beds and 'more abundant' in reef edges, fronts and algal ridges
	Taylor & Lewis (1970)	
	Taylor (1971*b*)	Diego Garcia: common cryptofauna on seaward platform and the algal ridge
	Fishelson (1971)	Gulf of Aqaba: probably some confusion here between *O. erinaceus* and *O. scolopendrina*; (p. 126) crevice fauna in extended intertidal beach-rock plates densities of 150–200 per m^2 were recorded, on limited beach-rock the population is compressed into a band 'along the *Tetracleta* colonies'. (p. 131) names this species as using the feeding methods well described for *O. scolopendrina*

	Chartock (1972)	Eniwetok Atoll: the most abundant and widespread *Ophiocoma* species, maximum densities in heads of *Heliopora coerulea* of 6 per 0·002 m^3 (or 6×10^3 per m^3), also found in *Pocillopora* heads and occasionally in *Acropora* and *Millepora*, most numerous in proximal region of the coral heads. Heads of 0·01 m^3 frequently had 15 *O. erinaceus* present in crevice habitats, up to 5 per m^2
	Devaney (1974)	SE Polynesia: in live and dead coral heads like *Acropora* and *Pocillopora* and under boulders, less common on sandy and more common on more solid substrates
	Hughes (1977)	Jeddah, Saudi Arabia: 'replaces' *O. scolopendrina* to the seaward on reef flats
Ophiocoma pica	H. L. Clark (1921)	Torres Strait and Lord Howe Island: not common; coral head infauna like *O. erinaceus*
	H. L. Clark (1946)	Torres Strait: not common, 'very secretive habitats' in coral heads
	Balinsky (1957)	Inhaca Island: seen only on 'more tropical' reef at Ponta Torres
	Devaney (1970)	Hawaiian Islands and others in that area: most common in heads of *Pocillopora meandrina* var. *nobilis*, smaller specimens very common in coral whereas larger individuals can be found under boulders, coral rubble and living coral
	Chartock (1972)	Eniwetok Atoll: common in living and dead *Heliopora coerulea*, but preferred *Pocillopora elegans*, and occasionally under rocks and in crevices. Less common than *O. erinaceus* in coral heads, and tended to occupy the distal areas of coral heads in contrast to *O. erinaceus*
	Devaney (1974)	SE Polynesia: confirmed strong association with *P. meandrina* and suggested that young may settle in these heads preferentially, adults may be found under coral and in 'non coral' habitats
Ophiocoma pusilla	Balinsky (1957)	Inhaca Island; a 'rare' member of the coral infauna but more common on the 'more tropical' reefs and in dead coral heads
	Devaney (1970)	Eniwetok and SE Polynesia; in shallow sublittoral areas occurs as coral infauna, in both live and dead coral and under coral rubble, 'confined to the shallow sublittoral zone within a coral substratum'
	Devaney (1974)	SE Polynesia: a specimen from Hawaii on black coral *Antipathes* from 70 m, generally found in shallow areas in or under live or dead coral
Ophiocoma scolopendrina	H. L. Clark (1921)	Torres Strait: very common 'occupies a restricted and peculiar habitat near high-water mark' as crevice fauna, first descriptions of the characteristic 'swaying arms' of this species at the air–water interface during a flood tide and suggested at least a respiratory function if not a feeding function for this
	Balinsky (1957)	Inhaca Island: 'abounds' under algal mat at the fringe of *Cymodocea* (*Thalassodendron*) beds on sand flats
	Magnus (1967)	Egyptian and other tidal Red Sea coasts: as crevice fauna on sheltered rocky shores between middle and low tides, up to 50 per m^2. The first worker to describe in detail the unique feeding methods of this species at the air–water interface during flood tides
	Devaney (1970)	General distribution: confirms 'restricted littoral habitat' of this species
	Taylor & Lewis (1970)	Mahé: 'abundant' under coral boulders and in the bases of living corals, possible confusion here with *O. erinaceus*

Species	Author(s)	Notes
	Fishelson (1971)	Gulf of Aqaba: see above for *O. erinaceus*, there could be some confusion between these two species here
	Taylor (1971*b*)	Diego Garcia Atoll: on seaward platform, 'abundant' in crevices of the algal ridge, abundant on lagoon platforms covered with *Thalassodendron* and coral heads, could be confused with *O. erinaceus* here
	Chartock (1972)	Eniwetok Atoll: 'upper intertidal zone' as crevice fauna on rocky shores sheltered from 'intense surf', up to 100 per m^2 but 20 per m^2 more common
	Devaney (1974)	SE Polynesia: in coral rubble and coarse sand in the intertidal zone on reef flats and barrier reef platforms, densities of up to 50 per m^2
	Hughes (1977)	Jeddah: 'abundant under loose stones on the higher intertidal of reef flats'
Ophiocoma valenciae	Balinsky (1957)	Inhaca Island; not common in algal mat of the fringe of *Cymodocea* (*Thalassodendron*) beds, found once among coral, rare as cryptofauna under rocks of lower eulittoral but common in a 'more tropical' reef area
	Taylor (1968)	Mahé: common on grass beds and 'sand and cobble ridges' seaward of grass beds
Ophiarthrum elegans	H. L. Clark (1921)	Green Island, Queensland: 'very common . . . under rocks and coral fragments on the reef flats'
	Devaney (1974)	SE Polynesia: in live coral and under coral and rubble, 'common under coral colonies on white sand' along with *O. dentata* and *O. doederleini*
Ophiomastix caryophyllata	H. L. Clark (1921)	Torres Strait: 'quite common in dead portions of coral colonies on the . . . reef flat'
Ophiocoma echinata	Kissling & Taylor (1977)	Florida keys: turbulent reef flats, areas with ample rubble cryptohabitat and a coarse substrate
Ophiocoma pumila	Kissling & Taylor (1977)	Florida keys: as for *O. echinata* above
Ophiocoma wendti	Kissling & Taylor (1977)	Florida keys: as for *O. echinata* and *pumila* but less common and not so strongly correlated with turbulent areas [Abundance of the last three species increases with the amount of local 'sub-rubble' shelter]

of eight individuals of the following species were found; *Echinoneus cyclostomus*, *Eucidaris metularia*, *Tripneustes gratilla* and *Echinothrix calamaris*. *Ophiocoma scolopendrina*, the only ophiuroid in this area, occurred in great numbers, especially under boulders over rubble at the seaward end of the beach-rock, see site 1 in Table 4.

The difference in the echinoderm fauna between the exposed and sheltered beach-rock sites is noteworthy although the latter site occupied only the upper eulittoral which the former occupied both the upper and lower eulittoral. Firstly, there was the predominance of deposit-feeding holothurians over suspension-feeding ones on the sheltered shore. Although *Afrocucumis africana* was the most common species on the sheltered shore in terms of numbers, this small species was greatly overshadowed in relation to total holothurian biomass and *H. cincerascens* was rare (only three found). Secondly, echinoids were much less common on the sheltered shore, although they are not generally well adapted to life in the upper eulittoral. (For instance, *Stomopneustes variolaris* was not present on the sheltered shore.) There was no comparable dominance by echinoids in the lower eulittoral of the whole seaward platform of the sheltered shore of the west coast although echinoids, at least six species, were more common under the boulders of the lower eulittoral overlying sandy gravel than in the upper eulittoral overlying the bedrock. Finally, ophiuroids were much more abundant on the sheltered rocky shore. Also their species diversity, at least ten species, increased in the lower, non-rocky, eulittoral of the sheltered shore platform. Ophiuroids, being less robust in construction compared to echinoids and holothurians, find exposed wave-washed shores less amenable habitats.

The few species able to exploit successfully the rigorous conditions of the exposed shore clearly find it a productive environment. The two echinoids make their own cryptohabitat by burrowing while the two holothurians exploit crevice space and vacant burrows. There are no appreciable quantities of deposited food but plenty of suspended material is made available by wave action. The relative lack of cryptohabitat on the vigorously scoured exposed shore compared to the boulder-strewn sheltered shore is an important factor in the establishment of a deposit-feeding holothurian cryptofauna on the sheltered shore.

Ophiocomid microhabitats on Aldabra

The most prominent family of shallow-water tropical ophiuroids is the Ophiocomidae and one of its genera, *Ophiocoma* Agassiz, 1836, dominates among coral reef ophiuroids (A. M. Clark, 1976*b*). All ophiocomids are cryptic and live in crevices, in or under boulders and coral heads, and at the bases of sea grasses and algae. They can be present in great numbers and dominate the local echinoderm cryptofauna and indeed all the cryptofauna. With the exception of Chartock's (1972) study of 'niche separation' among seven *Ophiocoma* species from Eniwetak Atoll, Marshall Islands, observations on the ecology of this important group are scattered and generally anecdotal. Some interesting recent observations on ophiocomid microhabitats from the literature, starting with H. L. Clark's (1921) Torres Strait paper, are listed in Table 3. These will be compared with recent findings on the Aldabran ophiocomid species.

Table 4 lists a quantitative assessment of the microhabitats of Aldabran ophiocomids from the eulittoral and shallow sublittoral. Deeper areas were not sampled extensively as they were much less productive. The microhabitats sampled were:

1. (056–100) An upper eulittoral site where the slabs of beach-rock overlying rubble had been eroded from a band of intact beach-rock to the landward. These loose slabs remained immersed throughout neap tides since a seaward pool, formed by a further seaward sand bar, could not completely drain during these tides. The sand bar, however, was quite mobile, so the size and depth of this pool, and therefore the immersion time of slab-over-rubble microhabitat, was quite variable. The slabs were measured, drawn to scale on graph paper, the cut-out weighed, and thus their area calculated. The ophiuroids under these slabs were identified and counted. They were also weighed moist but free of excess water and debris.

2. (054–091) A lower eulittoral site consisting of a dense stand of *Thalassodendron ciliatum* (For-

Table 4 Microhabitats and weights of species of ophiocomids on Aldabra

Habitat	Number of Boulders(*) Coral heads(Δ)	Total area m²(†) m³(‡)	Mean number of ophiuroids per boulder(*), m²(†), coral head (Δ) *Ophiocoma brevipes*	*O. doederleini*	*O. erinaceus*	*O. pica*	*O. pusilla*	*O. scolopendrina*	*O. valenciae*	*Ophiomastix caryo-phyllata*	*O. koehleri*	*O. venosa*	*Ophiarthrum elegans*	Totals
1	32*	6·1†	0	0	0	0	0	10·25* / 53·50†	0	0	0	0	0	10·25* / 53·50†
2	62*	–	0·76*	1·38*	0·56*	0·02*	0·68*	0	0	0	0	0	0	3·40*
3	100*	–	2·74*	0·24*	0·04*	0	0·46*	0	0·02*	0	0	0	0	3·50*
4	100*	–	0·08*	0·04*	1·84*	0·06*	0·68*	0	0	0	0	0	0	2·70*
5	–	10·00†	0	0	0	0	0	0·41†	121·80†	0	0	0	0	122·21†
6	45Δ	19·29†	0·22Δ	2·87Δ	4·91Δ	1·00Δ	3·07Δ	0	0·04Δ	6·80Δ	0·02Δ	0·22Δ	0·76Δ	19·91Δ / 46·3†
7	40Δ	1·60‡	0	0·08Δ	7·03Δ	0·40Δ	0·70Δ	0	0·18Δ	1·62Δ	0	0	0	10·28Δ
8	40Δ	0·60‡	0	0	1·63Δ	0	0·15Δ	0	0	0·13Δ	0	0	0	1·91Δ

	Ophiocoma brevipes	*O. doederleini*	*O. erinaceus*	*O. pica*	*O. pusilla*	*O. scolopendrina*	*O. valenciae*	*Ophiomastix caryo-phyllata*	*O. koehleri*	*O. venosa*	*Ophiarthrum elegans*
Sample size	208	227	1200	108	360	975	1218	376	1	10	34
Mean wt(g)	1·42	2·78	4·33	2·45	0·18	4·55	2·53	2·18	4·02	10·78	4·98

skaal) on a wave-washed platform with occasional erosional pits filled with boulders. Ophiuroids were common on the platform only under the occasional boulder and rubble patches that overlay sandy gravel and some small rubble. The sea-grass root mat was very strong indeed and thus maintained the integrity of this habit. To landward the platform consisted of mixed stands of *Thalassia* on sandy, higher profile areas and *Thalassodendron* on rubble and in depressions with standing water – as far as the sandy beach.

3. (054–091) A very sandy site adjacent at the lower eulittoral to site (2). This is an area of numerous boulders where the sea-grass, probably *Thalassodendron*, although reduced to a worn stubble, still provided the substrate with some degree of stability. Under the boulders was fairly fine white sand. The reduced state of the sea-grass could be due to gradual inundation by sand as, to the landward, there was a large sand bar bordering sand flats with little sea-grass to prevent erosion of the substrate during rough weather. Ophiuroids were present only as cryptofauna.

4. (054–091) An area on the other side of site (2) of firmly placed boulders over coarse rubble with some trapped sand. The boulders were 'cemented' together with deposited gravel in irregular groups that contributed a marked third dimension to this habitat, unlike sites (2) and (3) above. To landward a *Thalassodendron* platform was present, being elevated on an approximately 25 cm escarpment. Ophiuroids were present only as cryptofauna.

5. (065–090) This lagoon habitat, a short distance from the northernmost western channel, was a sand flat covered with a dense stand of *Thalassia hemprichii* (Ehrenb.) with abundant algal *Halimeda* sp. and *Gracilaria* sp. (see Hughes & Gamble, 1977, p. 336). The *Thalassia* formed a substrate for a considerable epiphytic algal mat. This area drained for up to 3 h after low tide but never completely dried out as there was always a residual 2–3 cm of standing water present. Interestingly, on slightly higher sandy substrates in this area that drained fully at low tide, there was sea-grass but much less algae present and a greatly reduced epifauna. Ophiuroids were present as cryptofauna at the bases of the sea-grass and under or in the algae.

The next three microhabitats come from the same area. This was another lagoon habitat (068–083) adjacent to Passe Dubois of the West Channels. It consisted of discrete patches of coral heads in a matrix of dense sea-grasses, mostly *Thalassodendron* and some *Thalassia*. This was a sublittoral habitat as a residual 10–15 cm of water was present at the lowest ebb of the tide. The ophiuroids here were either in or under the three types of coral head microhabitat.

6. Microatolls of *Porites lobata* Dana up to 1·20 m in diameter. It should be noted, however, that other potentially microatoll forming *Porites* species occur on Aldabra (Rosen, pers. comm.). They are *P.* sp. cf. *P. luta* Edwards and Solander, *P. australiensis* Vaughn, and *P. somaliensis* Gravier. The microatolls formed a cryptic microhabitat covering sandy gravel.

7. Coral heads of *Porites nigrescens* Dana of up to 55 kg. Ophiuroids occurred here mainly as infauna.

8. Coral heads of *Millepora exacea* Forskaal of up to 7·60 kg. Ophiuroids occurred almost completely as infauna. The relatively small heads of this hydrocoral had much smaller interstitial spaces than *P. nigrescens* above. Although relatively barren of ophiocomids, this was a production microhabitat for ophiotrichids such as *Ophiothrix* (*Keystonea*) *propinqua*.

General distribution notes on these ophiocomid species around the whole of Aldabra are given in the systematic account. All the species were most common on the more sheltered shores like the seaward platforms of the coast and lagoon flats, so their microhabitats were examined in these areas. The only ophiocomid excluded here is the diminutive *Ophiocomella sexradia*, since estimates of its abundance are unreliable due to sampling error.

Ophiocoma brevipes: This relatively small species was most common at site 3 where it occurred partly buried in sand under boulders in the lower eulittoral. Up to 14 specimens were found under one boulder, compared with a population of only two per m^2 in Chartock's (1972) optimum habitat. This is the most sand-loving *Ophiocoma* species on Aldabra, as well as in other parts of

its range, as listed in Table 3. Interestingly, *O. brevipes* was uncommon both under microatolls over sandy substrates in the shallow sublittoral of the lagoon (site 6) and also relatively rare throughout the sublittoral, regardless of substrate.

Ophiocoma scolopendrina: This species is widely reported as common in the upper eulittoral of rocky shores throughout its range. Aldabra is no exception, the species occurring in crevices or under boulders in large numbers in the Ile Picard beach-rock at site 1. This was the only ophiuroid present in an upper eulittoral habitat and was only rarely found in the lower eulittoral or the sublittoral.

Ophiocoma valenciae: Like *O. scolopendrina*, this species was very particular, abundant in its chosen habitat and rare elsewhere. *O. valenciae* dominated at site 5 on the sheltered grass flats in the bases of sea-grass covered with algal mat and standing water throughout low tide. It was rarely found elsewhere in the eulittoral or the sublittoral. In 1968 Taylor reported that this species was common in areas seaward of grass beds as well as in the grass beds themselves.

Ophiocoma doederleini: In the lower eulittoral this species was abundant on coarser substrates such as gravel or rubble under boulders but even more numerous, however, in the shallow sublittoral under the microatolls at site 6. There are few positive records from the literature because of confusion with *O. dentata* (formerly *insularia*) but the two references do list a similar microhabitat of sandy gravel under boulders in shallow water. Unlike the findings of Chartock (1972) on Eniwetok, on Aldabra this species is much less solitary, up to 16 specimens being found under a single microatoll.

Ophiocoma erinaceus: A large species and the most ubiquitous ophiocomid in the lower eulittoral and shallow sublittoral. In the lower eulittoral it dominated under boulders in the most rocky habitat, site 4. It was common under the microatolls and abundant as coral head infauna in site 7 (*P. nigrescens*) and indeed in all corals with large interstitial spaces. This species is well known in the literature as coral head infauna and cryptofauna under boulders, although less mention is made of its marked preference for rocky rather than sandy substrates. Also, there has been some confusion between it in the past and the upper eulittoral rocky shore species *O. scolopendrina*.

Ophiocoma pica: Not a common species on Aldabra where it was generally restricted to the shallow sublittoral in association with coral. Fairly common in heads of *P. nigrescens* but abundant under the microatolls in site 6; reported in the literature as coral head infauna rather than cryptofauna. Devaney (1970) noted that larger specimens could be found as cryptofauna and this is also true on Aldabra.

Ophiocoma pusilla: This little species is suspected to be more common than appears from Table 2. Being small and highly active when disturbed makes thorough collecting difficult. On Aldabra *O. pusilla* is rather an ubiquitous species in the lower eulittoral, although less common on the sandy substrates. Therefore it was not confined to the shallow sublittoral, as Devaney (1970) reported it to be at Eniwetok and S.E. Polynesia. In the sublittoral of Aldabra it was abundant under the microatolls, although present also as coral head infauna.

Ophiomastix caryophyllata: The dominant ophiocomid under the microatolls at site 6 and common also as coral head infauna. This rather fragile species is interesting as it could be an important competitor with *Ophiocoma* species in coral microhabitats in the shallow sublittoral of Aldabra. Restricted to the sublittoral and reported elsewhere as a dead coral infauna species.

Ophiomastix koehleri: The only specimen was found under a microatoll. Probably a sublittoral species but this requires confirmation from other areas.

Ophiomastix venosa: The largest ophiocomid on Aldabra. Basically restricted to the sublittoral although occasionally found under rubble in standing water, like *Ophiarthrum elegans* below, in the eulittoral of seaward platforms. It was collected particularly under microatolls at site 6 although it could not be considered a common species. No references were found to the habitats of this species.

Ophiarthrum elegans: A fairly common species whose sublittoral microhabitat compares with the two references in Table 3. It was most common at site 6 under the microatolls but uncommon as coral head infauna.

The greatest diversity of ophiocomids and indeed ophiuroids as a whole was under the sublittoral microatolls in the lagoon at site 6. The area is one of persistent tidal currents providing quantities of suspended food yet it is sheltered from disruptive wave action. The patches of coral heads were surrounded by grass beds in which the ophiuroids could perhaps forage at night while protected from predatory fish like wrasses.

The success of *Ophiocoma* species throughout the tropics could be related to their robust form and adaptability. They can occupy less benign eulittoral microhabitats as well as the sublittoral ones from which other related genera are excluded. Indeed, no other ophiuroid genus, of any family, is so well represented on tropical eulittoral shores. Having the resilience to cope with the rigours of eulittoral existence may have enhanced the competitive ability of *Ophiocoma* species in the shallow sublittoral, although *Ophiomastix*, as a successful specialist in this area, must be contended with. The monopolization by *O. scolopendrina* and *O. valenciae* of their particularly rigorous microhabitats is clearly a highly successful strategy. Temperature tolerance, up to 40 °C for *O. scolopendrina* (Chartock, 1972), at low tide at midday would be an essential prerequisite for life in both these microhabitats. A tolerance to lowered salinity due to periodic tropical downpours would also be important. Both species belong to different morphological subgroups of *Ophiocoma* (Devaney, 1970) so that the evolutionary potential to withstand physiological stress is perhaps a characteristic of the genus as a whole. Interestingly, *O. anaglyptica* Ely, a member of the *scolopendrina* subgroup, dominates under dead coral and rubble in the algal ridge (sublittoral fringe) of seaward platforms at Eniwetok Atoll to the virtual exclusion of other ophiuroids (Chartock, 1972). It was present in its preferred area at densities of up to 150 per m^2 (240 g per m^2).

Kohn (1971) suggested that co-occurring non-predatory tropical marine invertebrates are more likely to have a specialized microhabitat than specialized food type, as do predatory gastropods. Chartock (1972) supported this hypothesis through his observations on the seven *Ophiocoma* species at Eniwetok Atoll. He found that the ophiuroids were 'apparently non-selective' general detritus feeders with significantly different microhabitat specializations. In this present study, each of the *Ophiocoma* species demonstrated appreciable differences in their microhabitat or combination of microhabitat choices. It seems likely that on Aldabra, like Eniwetok, the availability of and competition for suitable cryptic microhabitats influences the presence of ophiocomids.

Associates of *Ophiocoma* species

A wide range of macroscopic animals occur in association with species of ophiocomids, some recorded from the present collection and others from the literature. References to those found with Indo-West Pacific species of *Ophiocoma* are given in Table 5.

Systematic account

It should be mentioned that only three ophiuroid species out of the 41 listed in Hughes & Gamble (1977) can be confirmed by us. Their specimens were incinerated to obtain the ash-free dry masses to estimate biomass per metre^2 for each species. They do, however, cite Dr F. W. E. Rowe as having checked their holothurian identifications.

Dr R. N. Hughes has kindly supplied us with an unpublished appendix upon which the paper of Hughes & Gamble is based, while Dr W. F. Humphreys has also made available to us his Aldabra specimens and an unpublished list of preliminary identifications of them made in 1971. His contribution has added ten confirmed species new to the fauna of Aldabra.

Throughout this account, references are kept to a minimum by citing major works when possible, such as Clark & Rowe (1971) or Rowe & Doty (1977), from which the original species descriptions can be traced. After these citations there are in some cases biological references to the species. These are included as an indication of the available biological information.

Table 5 Associates of Indo-west Pacific *Ophiocoma* species

Host species	Associate species		Locality	Authority
Ophiocoma anaglyptica	*Hololepidella nigropunctata* (Horst)*	– polychaete	Eniwetok, Marshall Is.	Devaney (1967)
O. brevipes	*H. nigropunctata*		Hawaiian Is.	Devaney (1967)
	H. minuta (Potts) (*H.= nigropunctata*)*		Solomon Is.	Gibbs (1969, 1971)
	H. nigropunctata		Aldabra	This paper
	Gyptis sp.	– polychaete	Aldabra	This paper
O. dentata	*H. nigropunctata*		Hawaiian Is.	Devaney (1967)
(as *O. insularia* Lyman)	*H. minuta* (*= H. nigropunctata*)		Solomon Is.	Gibbs (1969, 1971)
	H. nigropunctata		Northern Great Barrier Reef	Gibbs *et al.* (1976)
	Halicarcinus orientalis Sakai	– crab	Japan	Takeda *et al.* (1976)
O. doederleini	*Hololepidella nigropunctata*		Marquesa Is., Polynesia	Devaney (1974)
	H. nigropunctata		Aldabra	This paper
	Anoplodactylus ophiurophilus Stock	– pycnogonid	Aldabra	Sloan (1979)
O. erinaceus	*H. nigropunctata*		Hawaiian Is.	Devaney (1967)
	A. ophiurophilus		Aldabra	Sloan (1979)
O. pica	*A. ophiurophilus*		Aldabra	Sloan (1979)
O. scolopendrina	*Gyptis ophiocomae* Storck & Niggeman		Red Sea	James & Pearse (1969)

* Gibbs (1969) proposed synonymizing *Hololepidella nigropunctata* (Horst) [in Devaney (1967)] with *H. minuta* Potts but later, Gibbs (1971) suggested that the name *H. minuta* should be discarded owing to taxonomic problems and the use of *H. nigropunctata* is preferable.

Class CRINOIDEA

COMASTERIDAE

Comanthus sp. juv.
One specimen taken from within the coral frame-work on a patch reef in the Main Channel lagoon drainage system (104–110).

MARIAMETRIDAE

Lamprometra klunzingeri (Hartlaub, 1890)
See: A. H. Clark, 1941 : 527; A. M. Clark, 1972 : 102.
One specimen; taken during daytime from under a coral overhang 25–30 m deep off the research station beach (053–091).
Range extended from East Africa and Madagascar.

Stephanometra indica (Smith, 1876)
See: A. H. Clark, 1941 : 436; A. M. Clark, 1972 : 107.
During daytime specimens were collected from under overhangs of patch reefs in the Main Channel drainage system (104–110), under coral heads on the lagoon grass flats near the West Channels (068–083), in Passe Dubois (060–080), 25–30 m deep off the research station (053–091), and commonly on rubble at the entrance of Passe Houareau (316–122).

COLOBOMETRIDAE

Oligometra serripinna (Carpenter, 1881)
See: A. H. Clark, 1947 : 216; A. M. Clark, 1972 : 129.
One specimen taken from under rubble in Passe du Bois (060–080).

ANTEDONIDAE

Dorometra mauritiana (A. H. Clark, 1911)
See: A. H. & A. M. Clark, 1967 : 69; A. M. Clark, 1972 : 141.
Abundant in the coral frame-work on patch reefs, especially *Acropora* patches in the Main Channel drainage system (104–110) and (120–080) during the daytime.
Colour in life: uniform pale green, mauve, orange or purple.
Range extended from the Mascarene Islands.

Subclass ASTEROIDEA

ASTROPECTINIDAE

Astropecten polyacanthus phragmorus Fisher, 1913
See: A. M. Clark, 1974 : 433.
Only reported by Hughes & Gamble (1977) (as *A. phragmorus*) and listed as coming from the east side of Passe Houareau (318–118). We think that this specimen was more likely to be *A. polyacanthus*, recorded below.

Astropecten polyacanthus Müller & Troschel, 1842
See: Fisher, 1919 : 63; A. M. Clark & Rowe, 1971 : 44.
One found washed up on West Point (056–106) (R = 59 mm) and another from sand patch in the West Channels (060–070 to 060–090) (R = 56 mm).

GONIASTERIDAE

Stellaster sp. juv.
One specimen from algae (*Gracilaria* & *Laurencia*) on *Thalassia* in the West Channels (060–070 to 060–090).

OREASTERIDAE

Culcita schmideliana (Retzius, 1805)
See: Jangoux, 1973*a* : 18; Thomassin, 1976 : 51 (feeding and ecology).

Juvenile (R = 12–15 mm) and subadult (R = 33 & 34·5 mm) found in the lower eulittoral under coral rubble on the seaward platforms of the west (054–091) and north (140–125) (241–127) coasts. Adult forms (R = 44 & 48 mm) found under rubble in standing water in the depression of the Anse Malabar cliff base (241–127).

Colour in life of juveniles: medium green with occasional orange blotches, subadults pale orange and adults pale green with rich blue spines.

Protoreaster lincki (de Blainville, 1834)
See: Jangoux, 1973*a* : 23; Thomassin, 1976 : 51 (feeding & ecology).
Interestingly, all were juveniles (mean R = 28·2 mm for the eight specimens) washed up on the sandy beach in front of the research station (054–091). The animals must have come from the seaward grass flats although intensive searching among the grass beds failed to yield specimens.

Colour in life: cryptic mottled blue-green, in contrast to the adult colour of red on pink or pinkish-grey ground.

OPHIDIASTERIDAE

Dactylosaster cylindricus (Lamarck, 1816) Fig. 4
See: H. L. Clark, 1921 : 85.
Two specimens (R = 54 & 57·5 mm) found under boulders over coarse rubble in the lower eulittoral off the research station (054–091).

Colour in life: the shiny skin uniform burgundy.

Fromia milleporella (Lamarck, 1816)
See: H. L. Clark, 1921 : 40; Marsh, 1977 : 257.
One specimen (R = 25 mm) found on coral at 15 m depth off the research station (052–091).

Colour in life: deep purple above, much paler below.

Range extended from the Mascarene Islands, East Africa and Madagascar.

Leiaster sp. juv.
One specimen from algal mat on *Thalassia* in West Channels (060–070 to 060–090).

Linckia guildingi Gray, 1840
See: H. L. Clark, 1921 : 67.
Six specimens (mean R = 33 mm) taken from *Porites* and *Goniastrea* microatolls in Passe Houareau (316–120).

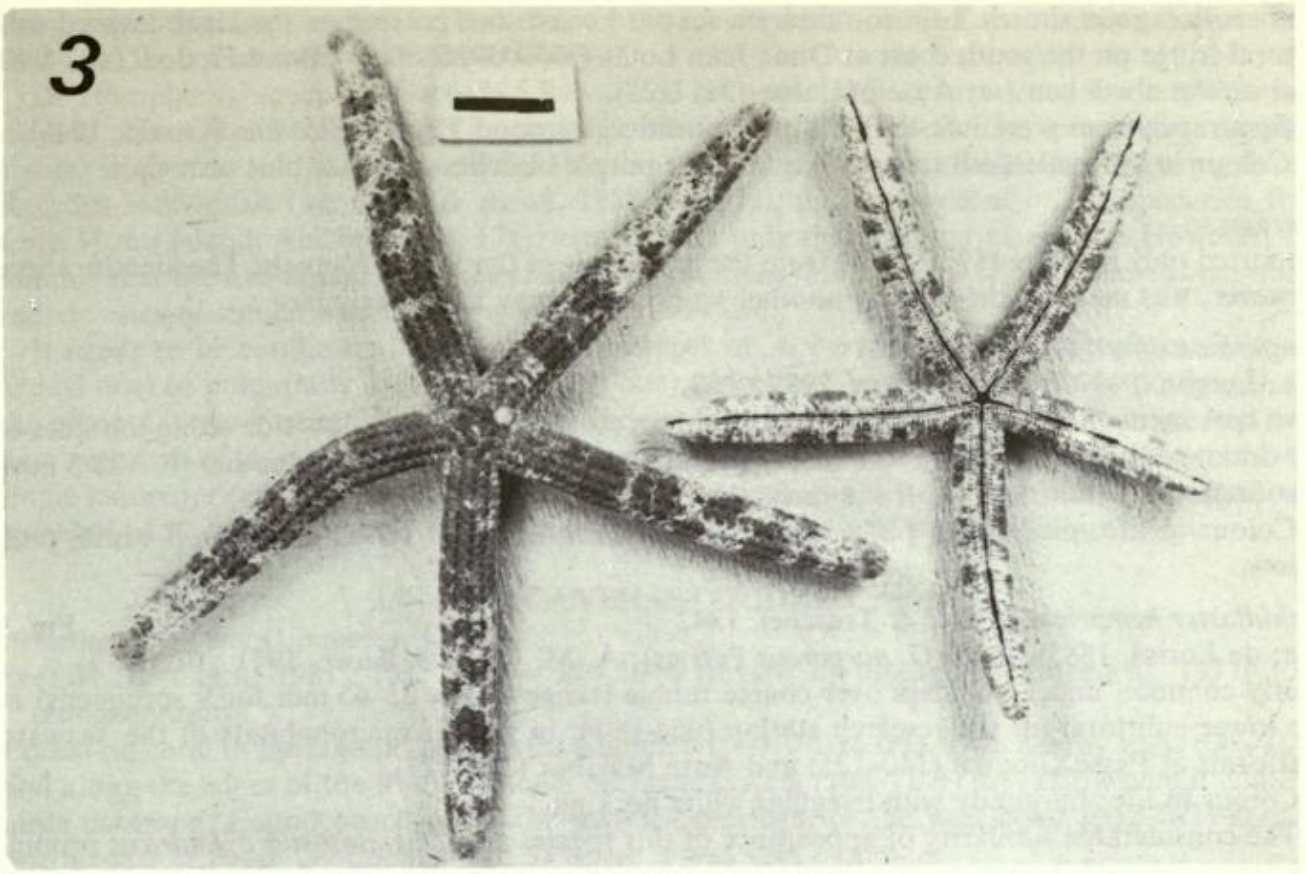
BMNH records (unpublished, see A. M. Clark & Rowe, 1971 : 36) include specimens from Curieuse, Platte and Moyenne Is of the Seychelles.

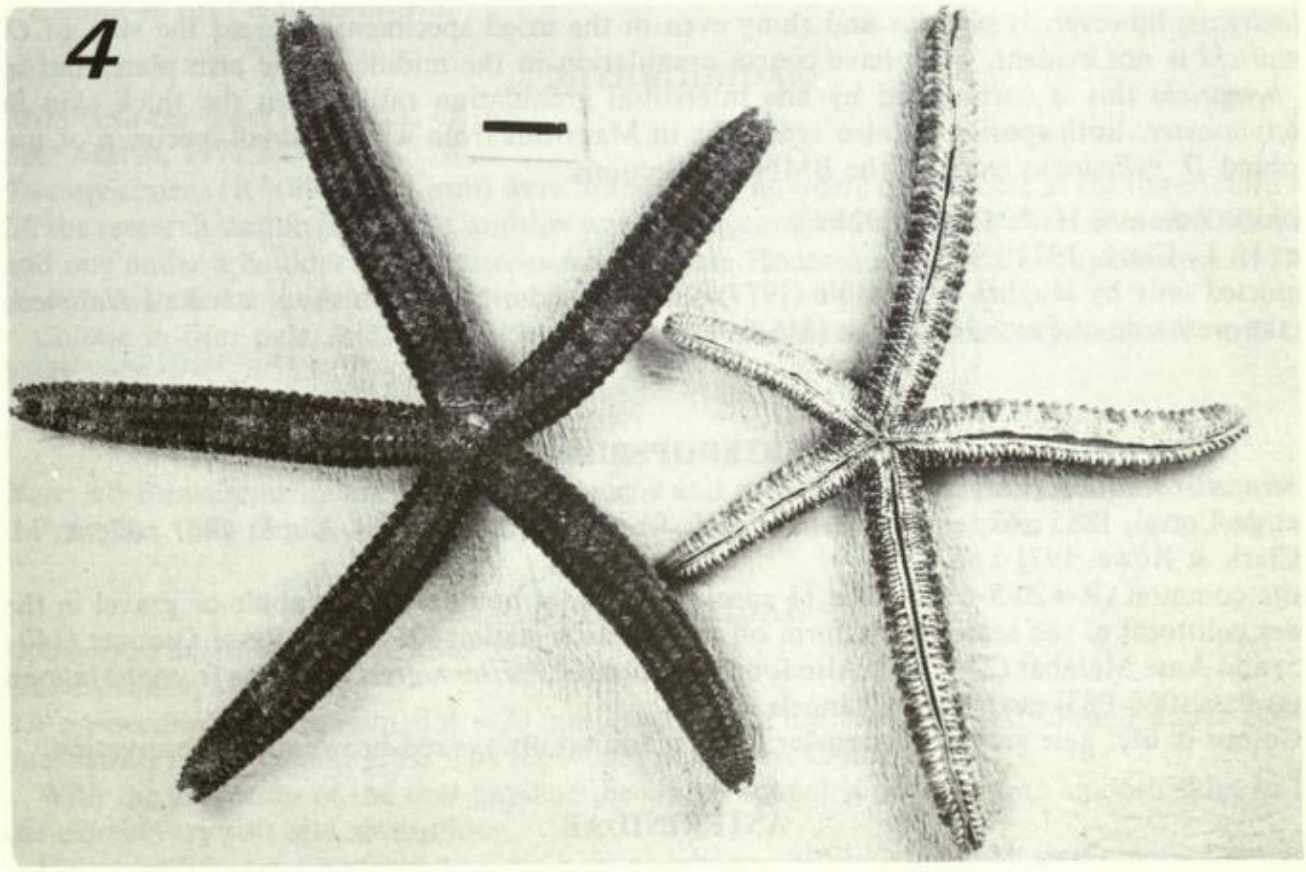
Linckia laevigata (Linnaeus, 1758)
See: Jangoux, 1973*a* : 29; Laxton, 1974 : 47 (feeding & ecology); Yamaguchi, 1977*a* : 13 (growth, reproduction, population structure).
Two specimens (R = 161, 169 mm) taken from coral flats in the Main Channel drainage system in the lagoon (108–120) where it was fairly common.

Colour in life: uniform light blue; no other colour forms as seen at Palau (Marsh, 1977) were observed.

Hughes & Gamble (1977) list this species but their specimen came from grass beds in Passe Houareau (316–120) and we think it may instead have been *L. multifora*.

Linckia multifora (Lamarck, 1816)
See: Jangoux, 1973*a* : 32; Rideout, 1978 : 287 (asexual reproduction).
Abundant on coral rubble and sand among patch reefs in the Main Channel drainage system of the lagoon (120–080). One particular patch reef which consisted mostly of *Acropora acuminata* Verrill, a species new to Aldabra (B. Rosen, pers. comm.), had densities of 2–3 *L. multifora* per m² (R = 114 mm maximum). In the same habitat were found extreme densities of the holothurian *Stichopus chloronotus* Brandt of up to 12 per m², although their usual density was around 2 per m². Elsewhere in the lagoon *L. multifora* was found under boulders around Ile Esprit (114–063), beneath *Porites* and *Goniastrea* microatolls in Passe Houareau (316–120), among algae in north





Figs 3, 4 *Ophidiaster hemprichi* Müller & Troschel and *Dactylosaster cylindricus* (Lamarck), each viewed from above and below. (Scale = 10 mm.)

and south lagoon shores. Less common on seaward coasts but present on the algal covered sublittoral fringe on the south coast at Dune Jean Louis (275–039) and near Point Hodoul (407–080) and on the north coast at Anse Malabar (241–127).

Some specimens were infested with the parasitic gastropod *Thyca crystallina* (Gould, 1846).

Colour in life: pale flesh tone with numerous purple blotches and pale blue arm tips.

Nardoa sp.

Reported only by Price (1971 : 169) from the grass beds of the West Channels. The identification, however, was made in the field by another worker and may not be reliable.

Neoferdina offreti (Koehler, 1910)

See: Jangoux, 1973*b* : 778; Marsh, 1977 : 263.

Two specimens (R = 25·5 & 31 mm) were found on coral 1·0 m deep at low tide along the sides of the drainage channels of Main Channel in the lagoon (104–119) (108–120); another (R = 28·5 mm) was found on coral in 15 m off the research station (052–091).

Colour in life: disc centre pink, some plates with large violet spots, the rest off-white, pink below.

Ophidiaster hemprichi Müller & Troschel, 1842 Fig. 3

See: de Loriol, 1885: 22 (as *O. purpureus* Perrier); A. M. Clark & Rowe, 1971 : 61.

Fairly common under boulders over coarse rubble (range of R = 23–45 mm for 9 specimens) at the lower eulittoral off the research station (054–091); in similar microhabitats of the seaward platforms at Passe Gionnet (140–125) and Anse Malabar (241–127).

Colour in life: burgundy with irregular white flecking.

The considerable similarity of appearance of this species and *Dactylosaster cylindricus* prompted a suspicion that the two may represent growth stages of a single species. The skin of *D. cylindricus*, however, is obvious and shiny even in the dried specimens whereas the skin of *O. hemprichi* is not evident. Both have coarse granulation in the middle of the arm plates but in *O. hemprichi* this is surrounded by fine interstitial granulation rather than the thick skin of *Dactylosaster*. Both species are also sympatric in Mauritius from which a small specimen of undoubted *D. cylindricus* exists in the BMNH collections.

Tamaria lithosora H. L. Clark, 1921

See: H. L. Clark, 1921 : 90.

Reported only by Hughes & Gamble (1977). Listed as coming from a thick stand of *Halimeda* on the west side of Passe Houareau (316–119).

ASTEROPSEIDAE

Asteropsis carinifera (Lamarck, 1816)

See: de Loriol, 1885 : 67 (as *Gymnasteria carinifera* (Lamarck)); A. M. Clark, 1967 : 37; A. M. Clark & Rowe, 1971 : 65.

Quite common (R = 20·5–68 mm for 11 specimens) under boulders over rubble or gravel in the lower eulittoral of the seaward platform off the research station (054–091), Passe Gionnet (140–125) and Anse Malabar (241–127). Also found in heads of *Porites nigrescens* Dana from the lagoon grass flats (068–083) near West Channels.

Colour in life: pale grey with irregular green marking; always red-brown after preservation.

ASTERINIDAE

Asterina burtoni Gray, 1840

See: James & Pearse, 1969 : 84; A. M. Clark & Rowe, 1971 : 68; Achituv, 1969 : 329 (reproduction & distribution).

Fairly common (R = 3–13 mm for 7 specimens) in heads of *Porites* and *Acropora* in the lagoon (068–083, 120–080, 115–067). Individuals with 6–7 arms were the most common. Also recorded from the bases of *Thalassia* on lagoon grass flats (063–089), associated with the algal mat on the

sea-grass of this area, and under boulders on the seaward platform off the research station (054–091) and West Channels (060–070 to 060–090).

Dr Humphreys' specimens include 5 five-armed ones and 25 fissiparous multiradiate or newly-divided ones with up to 8, usually 7 arms. The maximum R is 7·5 mm. The spinelet form appears similar in the two lots of specimens, the abactinal ones slightly more elongate and tapering than in Red Sea individuals (see Clark & Rowe, 1971, fig. 17a), more like those of the specimen from Lord Howe Island, Australia (fig. 17g), usually with only three points at the tip. However, it is notable that the five-armed specimens have no more than three furrow spines, whereas the multiradiate ones of similar size have four or sometimes five.

It needs to be emphasized that the two syntypes of *A. burtoni* are either fissiparous (the six-armed one) or potentially so (the five-armed one), since both have multiple madreporites. Use of the name *A. wega* Perrier for fissiparous Red Sea specimens is therefore untenable since that must be a synonym of *A. burtoni*. If any second name should be needed for five-armed specimens with single madreporites from this area having squat abactinal spinelets (as opposed to the attenuated spinelets of *A. burtoni cepheus* Müller & Troschel), then a new name must be proposed.

ACANTHASTERIDAE

Acanthaster planci (Linnaeus, 1758)

See: H. L. Clark, 1921 : 101; Sale *et al.*, 1976 (review of biology); Yamaguchi, 1977*b* : 283 (zoogeography).

Found on coral in the lagoon from: West Channels (060–070 to 060–090), nearby grass (068–023), and along the edges of the Main Channel drainage system (104–110) (108–120) where it could be quite common. Found on coral off the seaward platform of the west coast (052–091) and the north coast at Passe Gionnet (140–125) where it was very common.

Colour in life: reddish-brown.

MITHRODIIDAE

Mithrodia clavigera (Lamarck, 1816)

See: Marsh, 1977 : 276.

Two specimens (R = 89·5 & 91 mm) were found under boulders over rubble at the lower eulittoral off the research station (054–091), another was among coral and sponge in Passe Femme (060–087), and one under a boulder in *Thalassodendron* in Passe Houareau (316–120). Unpublished BMNH records included a specimen from Mahé, Seychelles.

Colour in life: pale flesh tone with large brick-red patches, especially proximally, arm tips black.

Subclass OPHIUROIDEA

Note: all measurements are of dried specimens and thus the discs in particular are likely to be smaller than they would be in life. Abbreviations: d.d. = disc diameter; a.l. = arm length.

OPHIOMYXIDAE

Ophiomyxa australis Lütken, 1869 Figs 5, 6

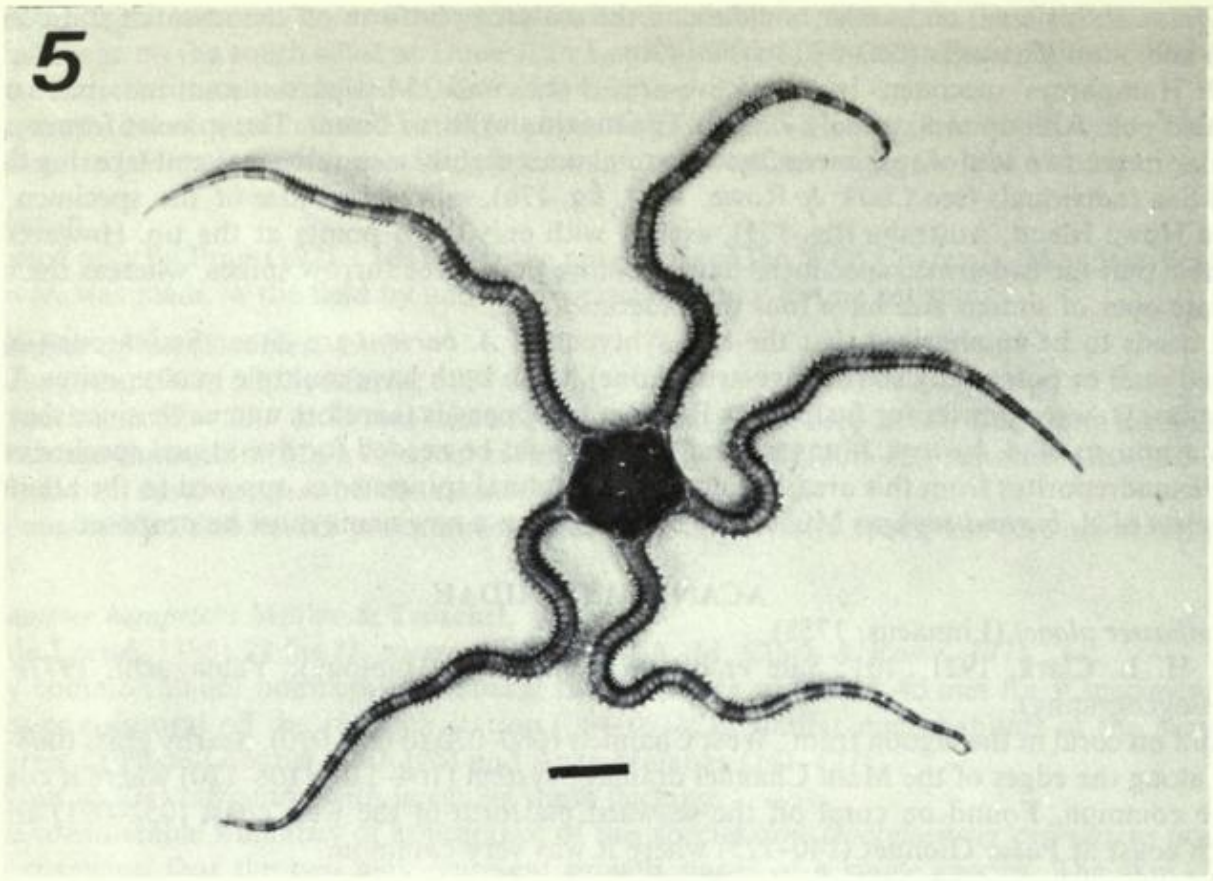
See: Devaney, 1974 : 115.

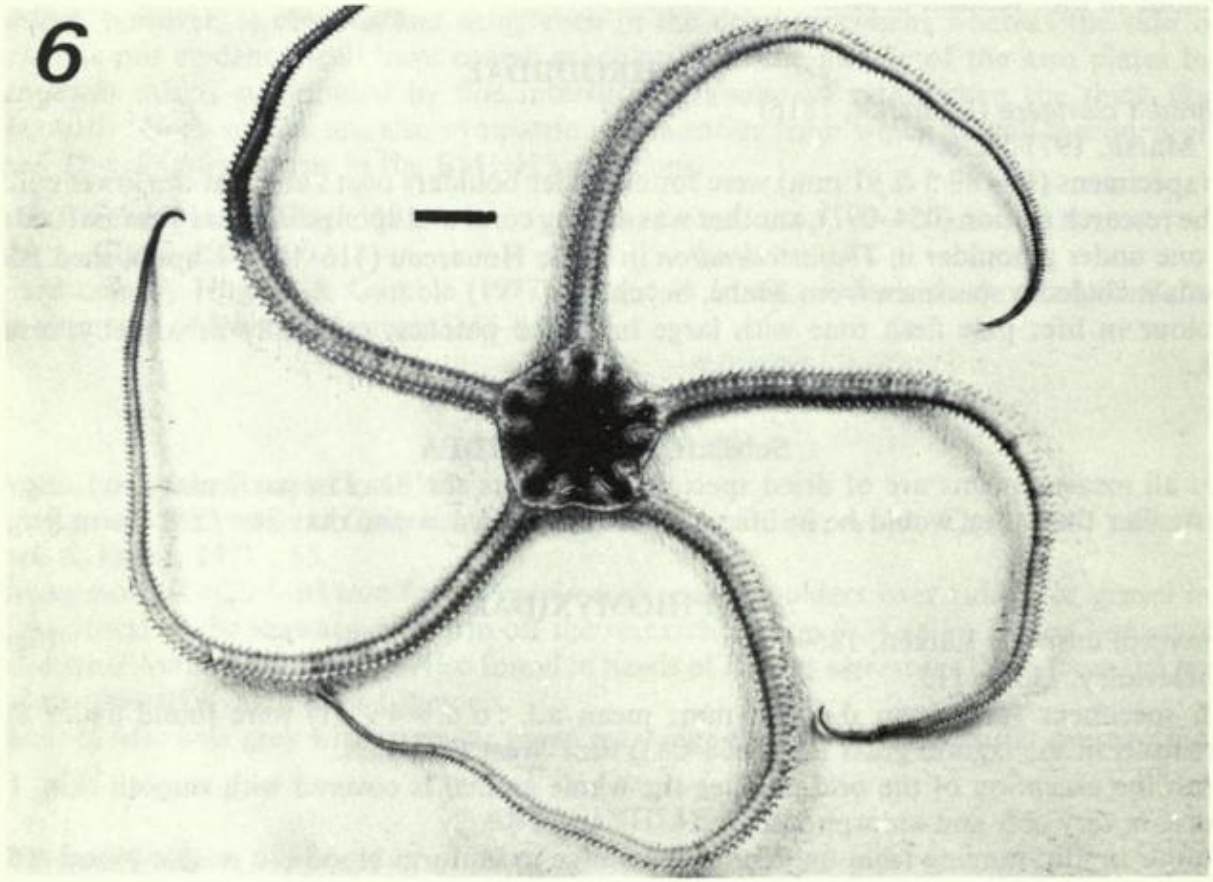
All 6 specimens (maximum d.d. = 23 mm; mean a.l. : d.d. = 4·9 : 1) were found under *Porites* microatolls in the lagoon grass flats (068–083) near West Channels.

With the exception of the oral papillae the whole animal is covered with smooth skin. In life the disc is very soft and amorphous.

Colour in life: ranging from uniform light orange to uniform blood-red to disc blood-red with arms distally banded with yellow, in fact similar to that of two specimens collected by Dr M. Yamaguchi from Palau, Caroline Islands (BMNH reg. nos. 1975.11.25.45, 46).

One Aldabra specimen had on its disc an undescribed parasitic gastropod species of the genus *Hemiliostraca* Pilsbry, 1917 (A. Warén, in preparation). This is the first recorded host for this group of Eulimacea.





Figs 5, 6 *Ophiomyxa australis* Lütken, red specimen with banded arms and uniform orange-coloured specimen. (Scale = 10 mm.)

AMPHIURIDAE

Amphiodia (*Amphiodia*) *dividua* Mortensen, 1933
See: Mortensen, 1933 : 176; Cherbonnier & Guille, 1978 : 92–93, fig. 41.
Taken from under, as well as in, coral alongside and at the bottom of Passe Dubois (060–080).
Range extended from the Mascarene Islands and Madagascar.

Amphioplus (*Amphioplus*) *impressus* (Ljungman, 1867)
See: A. M. Clark, 1970 : 63; Cherbonnier & Guille, 1978 : 60–62, fig. 23.
Coral crypto- and infauna along both sides of Passe Dubois from *Thalassodendron* flats.
Range extended from Madagascar and the western Pacific.

Amphioplus (*Lymanella*) *hastatus* (Ljungman, 1867)
See: H. L. Clark, 1939 : 75; A. M. Clark & Rowe, 1971 : 102.
Reported by Hughes & Gamble (1977) only. Listed as coming from grass flats in the lagoon (063–089) near West Channels.
If correct, this would extend the range from East Africa and Madagascar.

Amphioplus (*Lymanella*) *integer* (Ljungman, 1867)
See: Balinsky, 1957 : 11; Cherbonnier & Guille, 1978 : 86–87, fig. 38.
Coral crypto- and infauna along the edges of Passe Dubois (060–080) in the *Thalassodendron* flats
Range extended from East Africa and Madagascar.

Amphipholis squamata (Delle Chiaje, 1829)
See: Devaney, 1974 : 125; Hughes & Gamble, 1977 : 335 (microhabitat information).
Mentioned in Hughes & Gamble (1977) as coming from numerous sites and listed in their appendix from Passe Houareau (315–118) (319–119), the seaward platform off West Channels (056–090), in the lagoon (060–089) near West Channels and the seaward platform of Anse Malabar (241–127). Particularly abundant in sheltered muddy habitats and associated with dense algal turf on sea-grass in sheltered habitats of these areas. Also found in the sediments of land-enclosed tidal pools at the eastern end of Ile Malabar (297–118) and Ile Picard (059–094).
We agree with Hughes & Gamble (1977) on the abundance of this ubiquitous little species of sheltered shores.

Amphiura (*Amphiura*) *inhacensis* Balinsky, 1957
See: Balinsky, 1957 : 11.
Infauna taken from boulders and dead coral heads in the lower eulittoral off the Settlement (055–108).
Range extended from Inhaca Island, southern Mozambique.

OPHIACTIDAE

Ophiactis picteti (de Loriol, 1893*a*)
See: A. M. Clark & Rowe, 1971 : 104; Cherbonnier & Guille, 1978 : 123–125, fig. 56.
Associated with sponge in the bases of heads of *Porites nigrescens* and *Millepora exacea* Forskaal from lagoon grass flats (068–083) near West Channels. Common in dead coral boulders at the seaward end of Passe Dubois (060–080); d.d. up to 6·1 mm.
Colour in life: disc uniformly brown or with irregular brown markings on white, arms banded white and brown with some dark spots on the white bands, ventrally the disc and arms white.
This is an extension of range from Madagascar and from Amboina, Indonesia – the type locality. Additionally, several specimens from Watamu, southern Kenya and the Pemba Channel, Tanzania, collected by W. F. Humphreys, are referable to this species. These, with the Aldabra specimens, were initially determined as *Ophiactis hemiteles* H. L. Clark (type locality Torres Strait) following Balinsky's record from Inhaca, Mozambique. However, the presence of only six, rarely seven, arm spines at d.d. 5 mm, rather than seven or eight and the markedly truncated form of all but the uppermost spine, with the tip more or less bihamulate, does not agree with H. L. Clark's description of the spines of *hemiteles* as sharp. Also these specimens from the western Indian Ocean all have a narrow median distal lobe to the oral shields, which H. L. Clark describes as simply elliptical in *hemiteles*.

In the key given in Clark & Rowe, 1971, *O. picteti* (with *O. sinensis* Mortensen) and *O. hemiteles* were poorly distinguished by the adoral shields being relatively large and interradially contiguous only in *hemiteles*, the shields of *picteti* being obscured by skin. In the present specimens the skin is sufficiently transparent to show the limits of the shields, which are rather variable in extent interradially; even in the same specimen some may be contiguous while others are not. Nor is the relative arm length reliable in distinction. The arms were broken in the holotypes of both species. The estimates of their length against d.d. were given as $\times 8$ for *hemiteles* and $\times 6$ for *picteti* but de Loriol noted that his estimate of the arm length was very approximate. The arms are broken in most of the present specimens but a small one has a.l. 33 mm, d.d. 3·5 mm, a ratio of 9·4/1; in another of similar size it is 8·4/1. One unusual feature that they show is a pair of slight longitudinal grooves on each ventral arm plate, just as in de Loriol's fig. 2b (1893*a*) from the holotype of *O. picteti*. This character in conjunction with the blunt arm spines supports recognition of the Aldabra and East African material as *O. picteti* rather than *O. hemiteles* and is in accord with the identification by Cherbonnier & Guille (1978) of a malagasy specimen as *O. picteti*.

It may be noted that preserved specimens with the colour muted have considerable resemblance to the occasional five-armed specimen of *Ophiactis savignyi*, especially in the relatively large radial shields, two distal oral papillae each side of the jaw, elliptical dorsal arm plates and truncated rugose arm spines, also the light-coloured patch on the distal part of each pair of radial shields. However, the absence of the small median distal lobe on the dorsal arm plates (so characteristic of *O. savignyi*) and the isolation of the scales in the skin of the central part of the disc in specimens of *O. picteti* of d.d. more than *c.* 4·5 mm, should serve to distinguish them.

Ophiactis savignyi Müller & Troschel, 1842
See: Balinsky, 1957 : 14; A. M. Clark & Rowe, 1971 : 103.
Commonly found associated with sponge in the bases of heads of *P. nigrescens* and *M. exacea* from lagoon grass flats (068–083) near West Channels, extremely common on sponge on rubble in the central intake of the land-enclosed tidal pool on Ile Picard (059–094), common in the interstices of *Halimeda* in Passe Houareau (316–114), in algal mat and sea-grass bases in lagoon grass beds (063–089) near West Channels. A. l. max. = 15 mm; a.l. : d.d. = 4·7 : 1.

Colour in life: basically green, disc with fairly regular light and dark green markings, arms banded with light and dark green, ventrally disc and arms white with some distal green banding on the arms.

Ophiactis versicolor H. L. Clark, 1939
See: A. M. Clark, 1967 : 43 (as *Ophiactis carnea* but as *O. versicolor* in footnote).
Taken from coral along the edge of Passe Dubois (060–080) where it occurred as both coral crypto- and infauna.

Range extended from East Africa, Madagascar and the Mascarene Islands.

OPHIOTRICHIDAE

Macrophiothrix demessa (Lyman, 1861)
See: Devaney, 1974 : 139.
Occasionally found in or under *Porites* heads or microatolls in the lagoon grass flats (068–083) near the West Channels. D.d. max. = 12·5 mm; a.l. : d.d. = 11 : 1.

Colour in life very variable but not spotted like *M. longipeda* below.

Macrophiothrix longipeda (Lamarck, 1816)
See: Devaney, 1974 : 140.
Usually found as solitary individuals under boulders and coral heads over sand or sandy gravel with their arms extended upward along crevices in the covering rock or coral. Found in the lower eulittoral of wasted platforms off the research station (054–091), Anse Malabar (241–127) and near Pt Hodoul (407–080). Occurs sublittorally off the research station (052–091), in lagoon grass flats (068–083) near West Channels, Main Channel drainage area (108–120), and in Passe Houareau (316–119) associated with *Halimeda* besides coral heads and boulders. As growth proceeds, the

arm length increases in relation to the disc diameter, e.g. d.d. max. = 9·5 mm, a.l. : d.d. = *c.* 18 : 1; d.d. 17 mm, a.l. : d.d = 27 : 1.

Colour in life: bluish with dark blue spots, the spinose disc with large spotted radial shields, ventrally lighter blue with dark spots.

Ophiothrix (*Keystonea*) *propinqua* Lyman, 1861
See: Balinsky, 1957 : 21; A. M. Clark & Rowe, 1971 : 107.
Exceedingly common in coral heads with small interstitial spaces like *Millepora exacea* in the lagoon grass flats (068–083) near the West Channels. Also abundant in dead coral boulders as well as live coral in the West Channels (060–070 to 060–090), Main Channel drainage system (108–120), and Passe Houareau (316–120). D.d. max. = 8 mm, a.l. : d.d. = 8 : 1.

Colour in life: very variable as noted by Balinsky (1957) but overall dark bluish with darker arm banding.

Ophiothrix trilineata Lütken, 1869
See: Balinsky, 1957 : 30; Devaney, 1974 : 150.
Fairly common in heads of *Millepora* and *Porites* from lagoon grass flats (068–083) near West Channels, in coral in the Main Channel drainage system (108–120) of the lagoon and in coral along Passe Houareau (316–120). D.d. max. = 8 mm; a.l. : d.d. = 5 : 1.

Colour in life: disc always dark blue, arms basically blue or green with five characteristic median lines alternating white and dark blue; arm spines glassy, reddish and sometimes with a dark line, ventrally white overall.

Ophiothrix (*Acanthophiothrix*) *purpurea* von Martens, 1867
See: Devaney, 1974 : 141.
Commonly found epizoic on *Millepora tenera* Boschma from 5 to 30 m on the sides of Passe Dubois (160–180), along Main Channel drainage system of the lagoon (104–110), at 15–30 m off the research station (052–091), at 10–30 m off Passe Gionnet (140–125) and along Passe Houareau (316–120). D.d. max. = 7 mm; a.l. : d.d. = 9·5 : 1. Very delicate and difficult to collect intact. Much more common at night (Humphreys, pers. comm.).

Colour in life: disc patterned in red, arms dark red with narrow red median line outlined in white, arm spines red, ventrally lighter red with a dark median line along the arms.

Ophiothela tigris Lyman, 1871 Fig. 7
See: A. M. Clark & Rowe, 1971 : 116; A. M. Clark, 1976*a* : 111 (epizoic habits).
Epizoic on the stinging hydroid *Aglaophenia cupressina* Lamouroux, 1816 from the coral flats in the Main Channel drainage system of the lagoon (104–110); also found on heads of *P. nigrescens* and *M. exacea* in the lagoon grass flats (068–083) and near West Channels on coral along Passe Houareau (316–120). D.d. max. = 7 mm; a.l. : d.d. = *c.* 3·5 : 1 but relative arm length very variable.

Colour in life: disc rich green but centrally with pattern of black and yellow concentric markings within pentagonal outline, arms uniform green but spines distally white and proximally blue, ventral colour light blue overall.

OPHIOCOMIDAE

A more detailed account of the microhabitats of this family on Aldabra is given earlier (pp. 89–93), also a table summarizing the known associates of *Ophiocoma* species.

Ophiarthrum elegans Peters, 1851
See: H. L. Clark, 1921 : 139; Devaney, 1974 : 150.
Occurs in pools at the bases of *Thalassodendron* in rubble on the seaward platforms of the west (058–091) and north (241–127) coasts, under rubble in the lower eulittoral of these seaward platforms, under coral over sandy gravel in the lagoon grass flats (068–083) near West Channels, along Main Channel drainage system (108–120) and along Passe Houareau (316–120). D.d. max. = 22 mm; a.l. : d.d. = 4·5–9·5 : 1, the arms extremely variable in length.

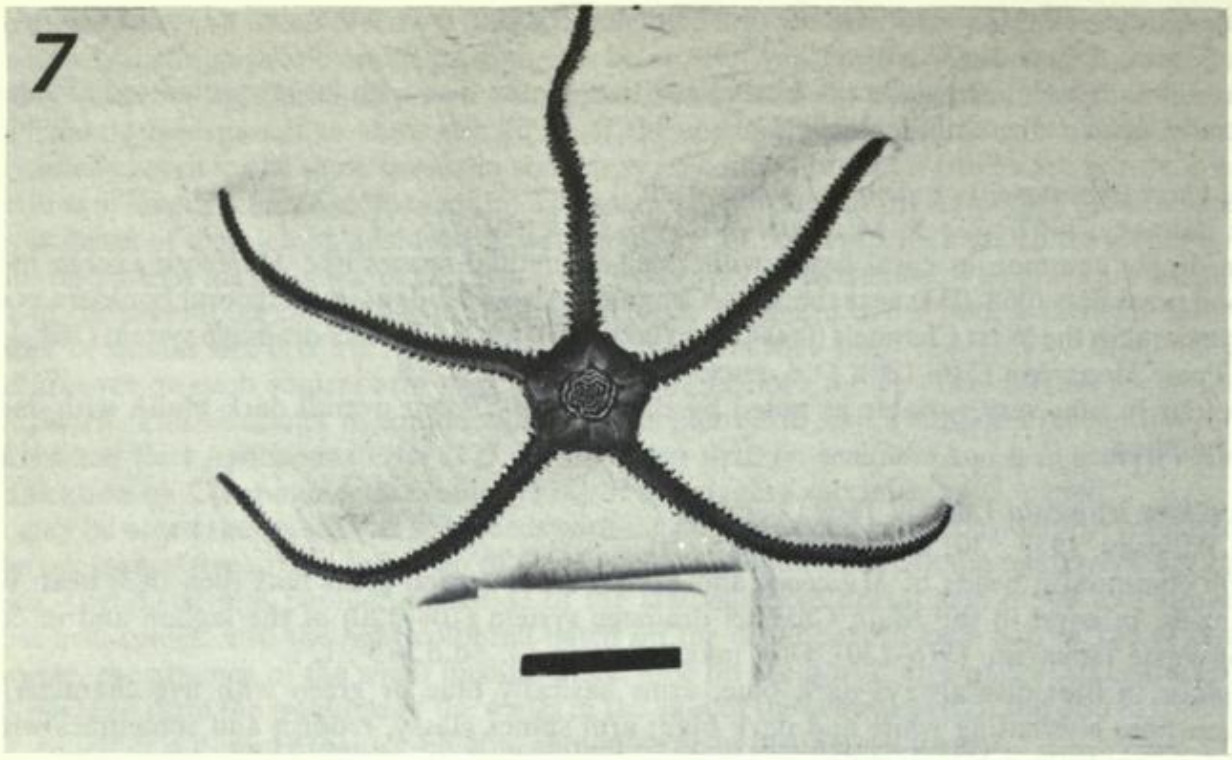


Fig. 7 *Ophiothela tigris* Lyman. (Scale = 10 mm.)

Colour in life: disc uniform black, arms pale cream with red bands always fading after preservation, arm spines pale cream with black spots sometimes forming irregular annulations, ventrally overall white.

Ophiocoma brevipes Peters, 1851
See: Devaney, 1974 : 151.
Prefers sandy substrates under boulders on seaward platforms of the west (058–091) and north (241–127) (360–112) coasts. Also found at the bases of *Thalassodendron* and *Halimeda* in these areas as well as Passe Houareau (316–120) and West Channels (060–070 to 060–090). D.d. max. = 19 mm; a.l. : d.d. = 3·6 : 1.

Colour in life: disc off-white with irregular green markings, arms off-white with pale green banding, ventrally off-white overall but sometimes stained by amber-coloured gut regurgitations.

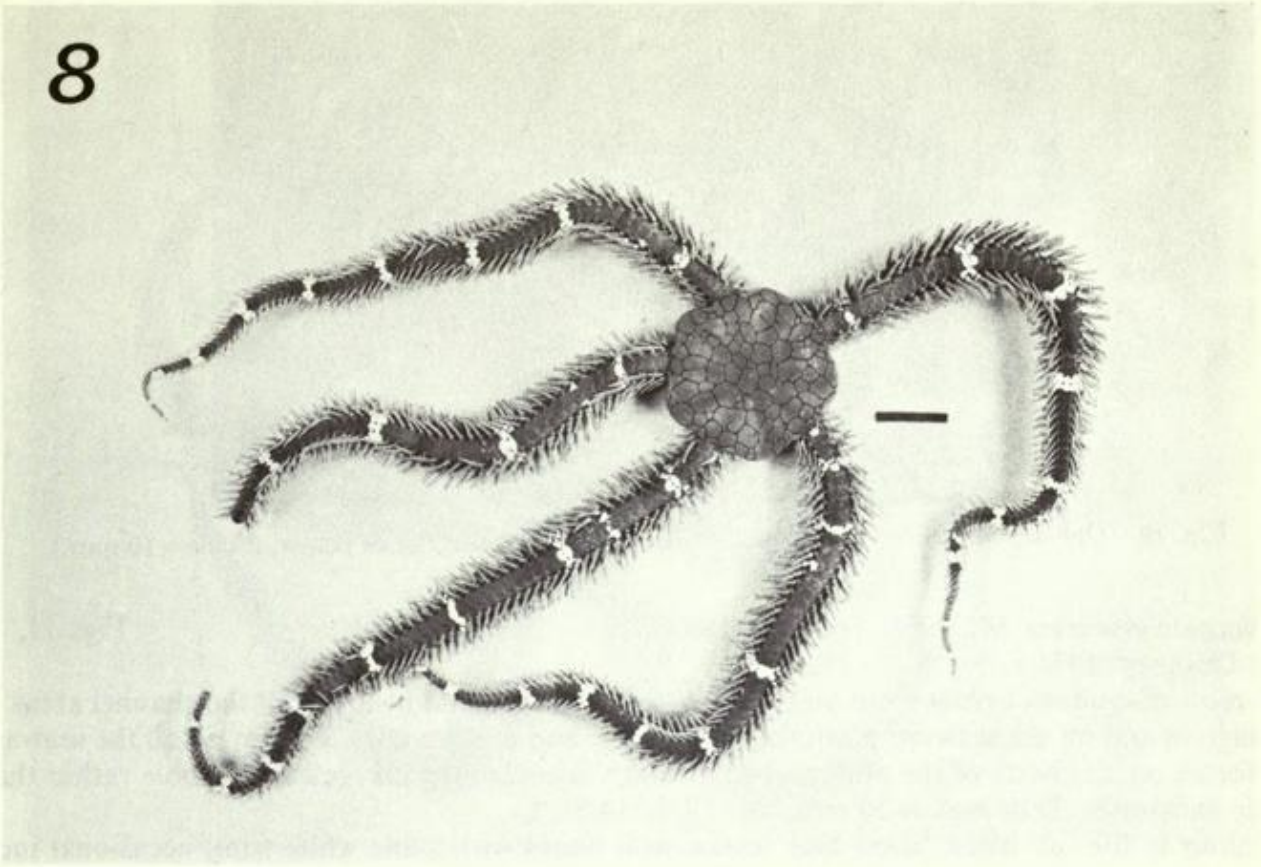
Commonly found carrying the polychaete associate *Holopidella nigropunctata* (Horst, 1915), occasionally with *Gyptis* ? sp., and once with a specimen of *Lepidasthenia* sp. as well but this could have been only incidental (Dr P. E. Gibbs, pers. comm.).

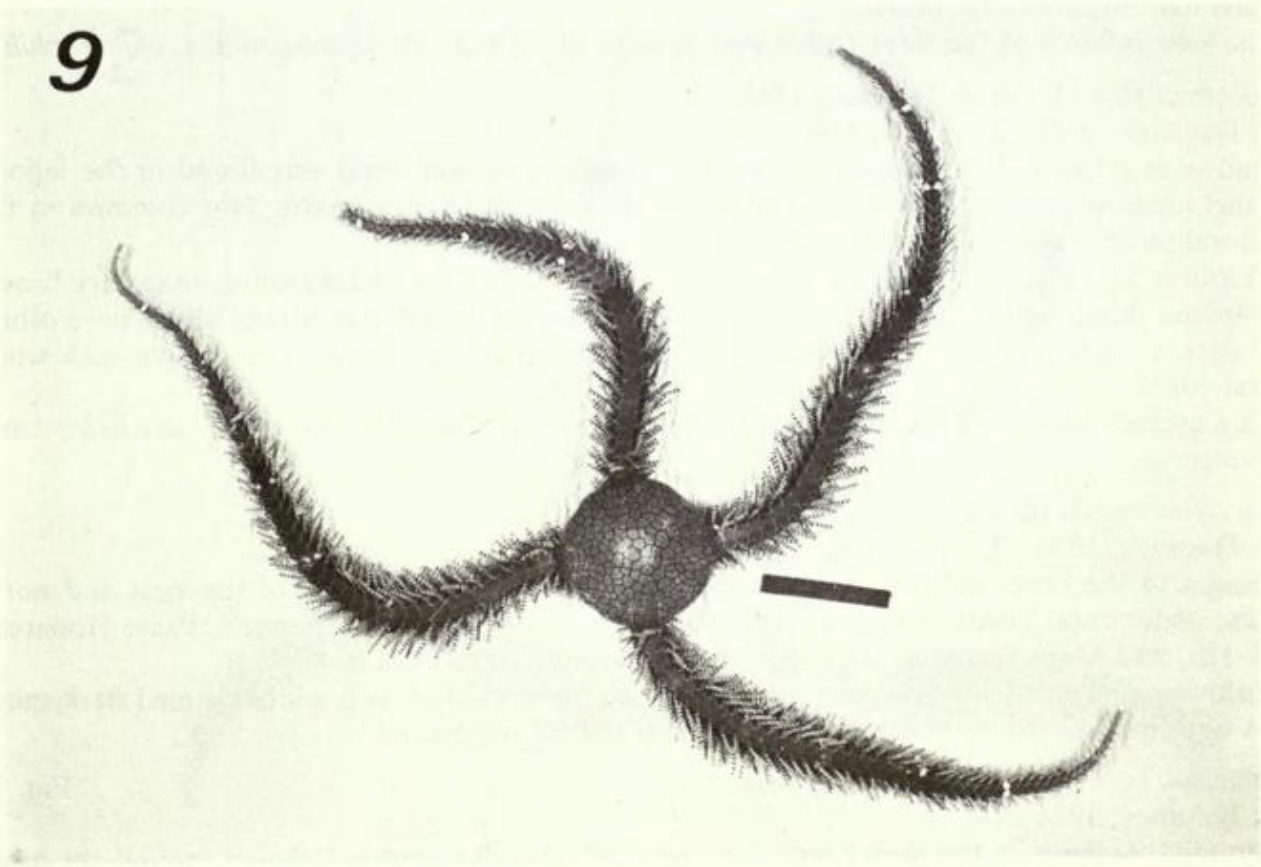
Ophiocoma doederleini de Loriol, 1899 Figs 8–10
See: Devaney, 1970 : 14; 1974 : 154.
Previously recorded from Aldabra as *Ophiocoma dentata* Müller & Troschel, 1842.

Fairly common under boulders over gravel and rubble and in the bases of *Thalassodendron* in the lower eulittoral of seaward platforms of the west (058–091) and north (241–127) coasts. More common in the shallow sublittoral under coral microatolls, especially *Porites*, over sandy gravel in lagoon grass beds (068–083) near West Channels and along Passe Houareau (316–120). D.d. max. = 27 mm; a.l. : d.d. = 4·2 : 1.

Colour in life: basically mid-grey, disc grey with fine black reticulating lines or, less commonly, with white-ringed black spots, or speckled with light spots, arms commonly with spotted white bands all the way round, arm spines always annulated white and grey, ventrally the same grey as dorsally, oral shields white peripherally with large irregular grey blotches.

Over 80% of all specimens were infested with the new pycnogonid species *Anoplodactylus ophiurophilus* Stock (1979). Some *O. doederleini* were found carrying the polynoid *H. nigropunctata*.





Figs 8, 9 *Ophiocoma doederleini* de Loriol, five- and four-armed specimens. (Scale = 10 mm.)

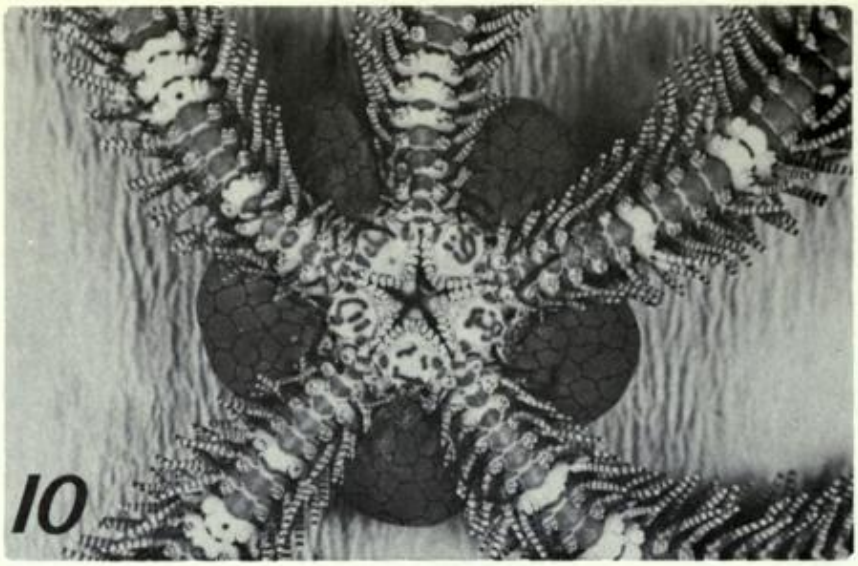


Fig. 10 *Ophiocoma doederleini*, detail of disc and arm bases, from below. (Scale = 10 mm.)

Ophiocoma erinaceus Müller & Troschel, 1842 Figs 11, 12
See: Devaney, 1974 : 155.
The most ubiquitous ophiocomid on Aldabra. Common in coral heads in all the channel areas of the lagoon and off the seaward platforms of the west and north coasts. Present on all the seaward platforms on all coasts of the atoll and particularly associated with rock and rubble rather than sandy substrates. D.d. max. = 30 mm; a.l. : d.d. = 4·5 : 1.

Colour in life: all black, some had ventral arm plates with some white trim, occasional individuals had bright orange podia.

The least infested of the three *Ophiocoma* species which bear the pycnogonid *A. ophiurophilus*.

Ophiocoma pica Müller & Troschel, 1842
See: Devaney, 1970 : 25; 1974 : 159.
Found in coral like *O. erinaceus*, but less commonly, wherever coral was found in the lagoon channel areas or off the seaward platforms on the west and north coasts. Not common in the eulittoral under rubble. D.d. max. = 18 mm; a.l. : d.d. = 4·0 : 1.

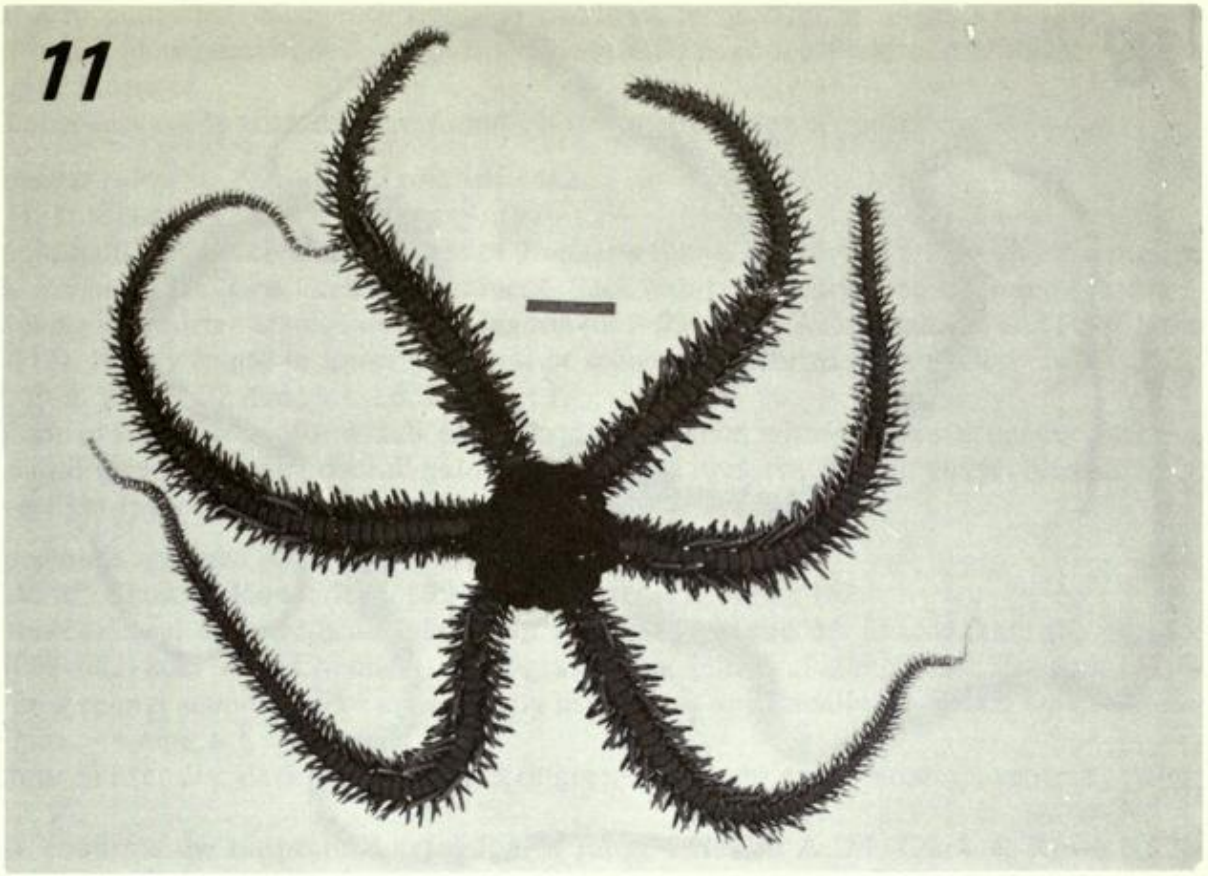
Colour in life: disc with thin gold radiating lines on a dark brown background, long dark brown arm spines, dumb-bell-shaped gold and cream bands on the dorsal arm plates which were otherwise dark brown, ventral arm plates with a similar pattern, oral shields dark brown with white lateral edges.

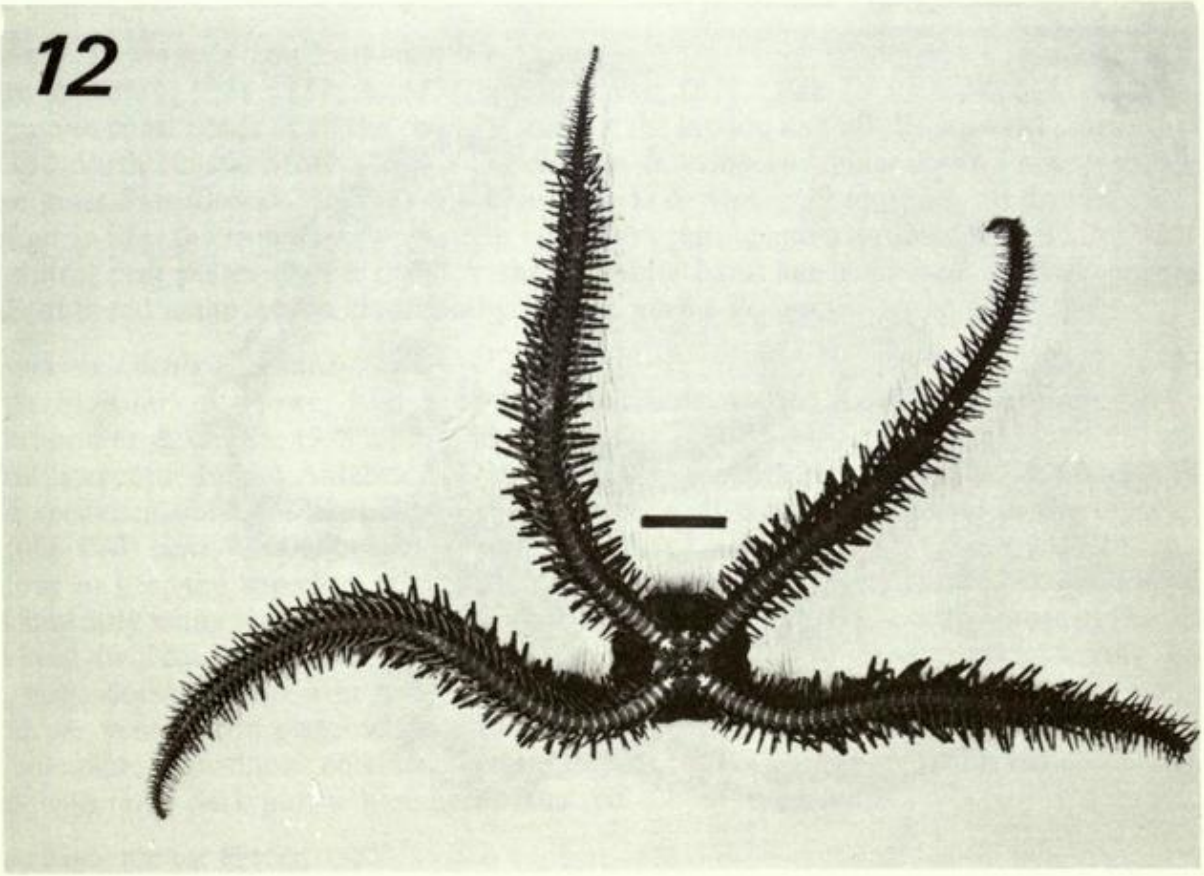
This species has an infestation level by *A. ophiurophilus* between that of *O. doederleini* and *O. erinaceus*.

Ophiocoma pusilla (Brock, 1888)
See: Devaney, 1970 : 25; 1974 : 160.
Common in the lower eulittoral under rubble on the coastal platforms of the west and north coasts, under coral heads of lagoon grass beds (068–083) near West Channels, Passe Houareau (316–120) and Main Channel (108–120). D.d. max. = 7 mm; a.l. : d.d. = 2·7 : 1.

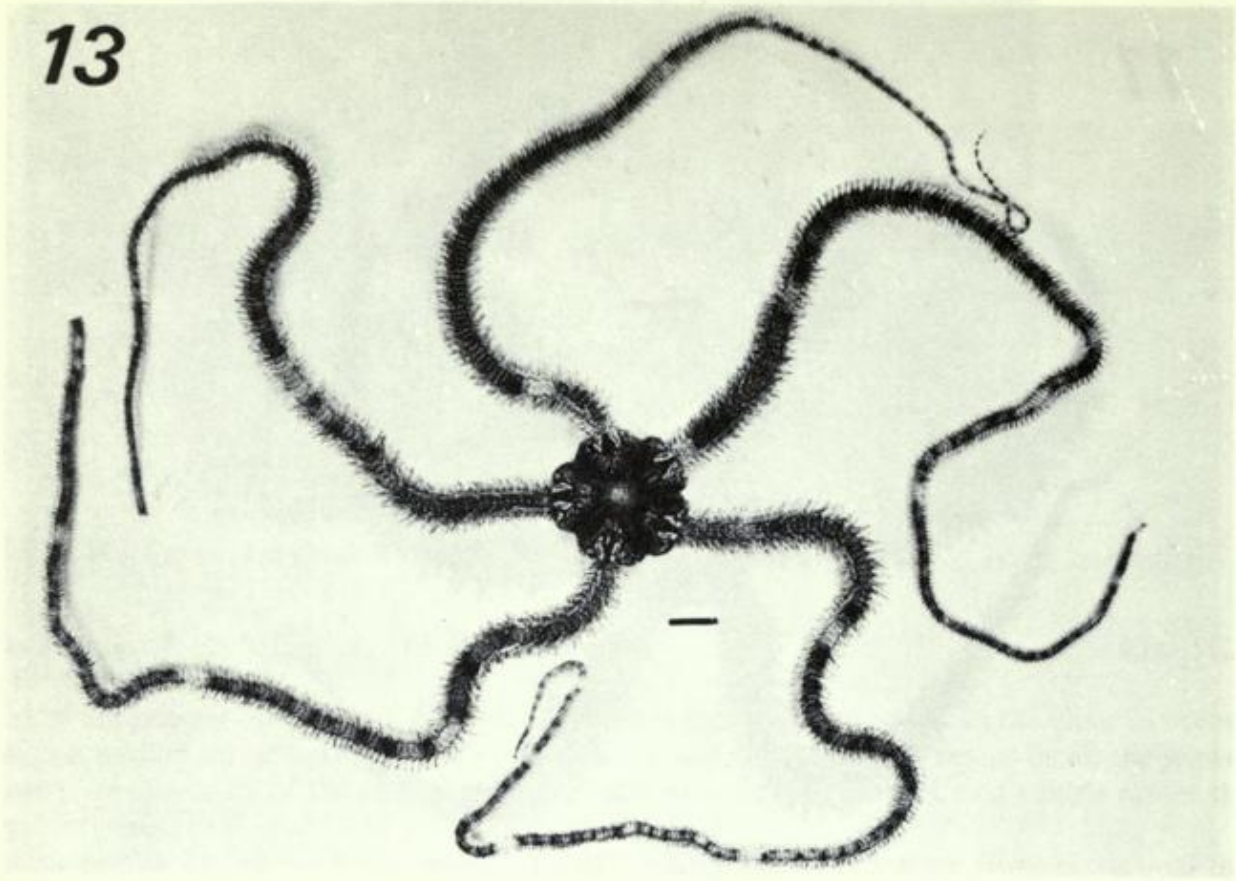
Colour in life: disc uniform dark brown, occasionally spotted with white-rimmed dark spots, arms dark brown with lighter banding, ventrally overall red-brown.

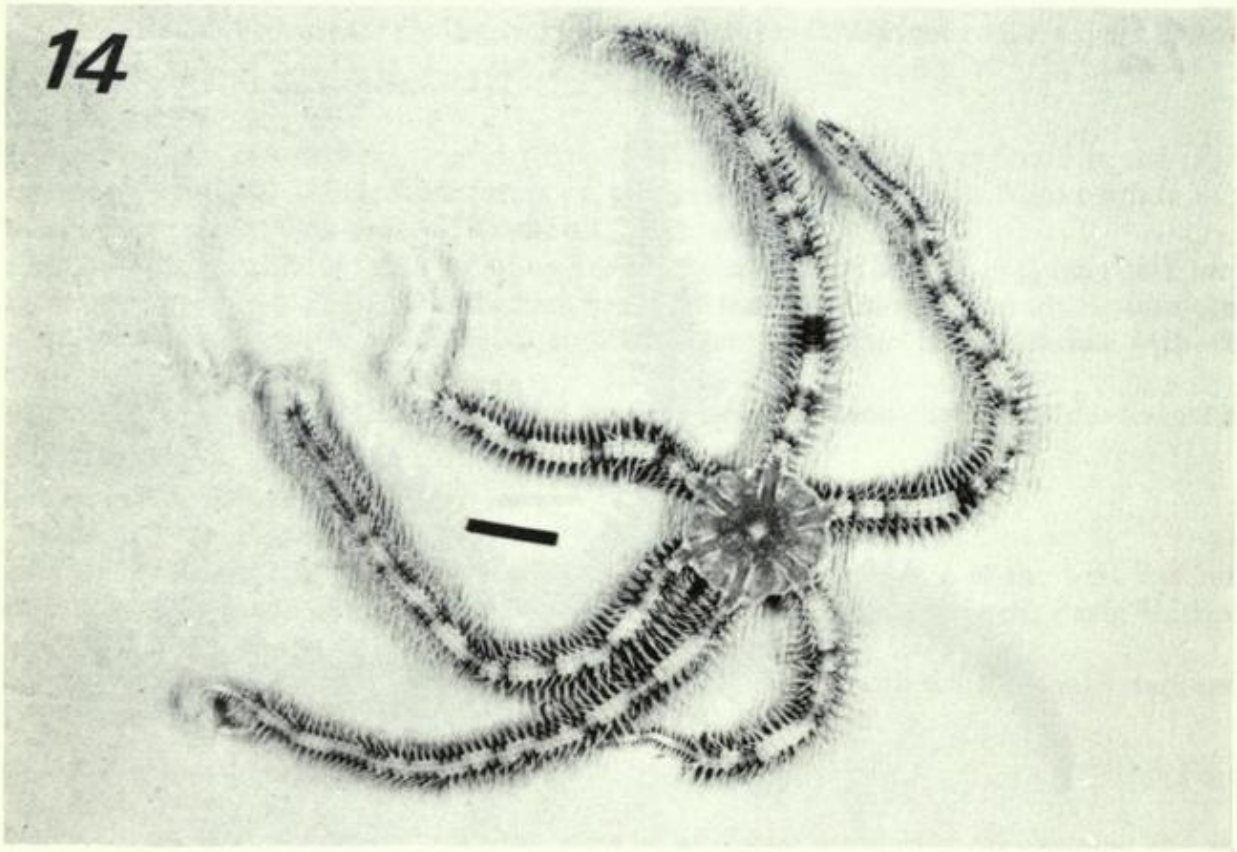
Ophiocoma scolopendrina (Lamarck, 1816) Fig. 13
See: Devaney, 1974 : 161.
Externally common in the upper eulittoral zone of all rocky seaward shores around the atoll. Uncommon in grass beds of seaward and lagoon platforms or in lower eulittoral or shallow sublittoral. Common around the bases of lagoon islets. With increasing size the arms become relatively longer, e.g. d.d. = 13·4 mm; a.l. : d.d. = 4·6 : 1; d.d. = 27 mm; a.l. : d.d. = 6·0 : 1; d.d. = 29 mm, a.l. : d.d. = 10·2 : 1.





Figs 11, 12 *Ophiocoma erinaceus* Müller & Troschel, six-armed specimen from above and four-armed specimen from below. (Scale = 10 mm.)





Figs 13, 14 *Ophiocoma scolopendrina* (Lamarck) and six-armed specimen of *O. valenciae* Müller & Troschel. (Scale = 10 mm.)

Colour in life: patterns extremely variable, disc usually dark with irregular off-white markings, dorsal arm plates brownish with irregular distal white spots, arm spines sometimes annulated, sometimes spotted, sometimes orange-tipped, ventrally overall off-white, oral shields occasionally with grey blotches.

Occasionally white triclads were found on the ventral sides of specimens.

Ophiocoma valenciae Müller & Troschel, 1842 Fig. 14

See: H. L. Clark, 1921 : 131; Devaney, 1970 : 29.

The dominant echinoderm at the bases of *Thalassia* that is heavily covered with algal mat, among which *Halimeda* and *Gracilaria* is prominent. Such habitats occurred on sheltered grass beds that never completely dried at low tide in the lagoon (065–090) near West Channels and Passe Houareau (316–118). Rarely found in lower eulittoral of seaward platforms or in shallow sublittoral under coral. D.d. max. = 22 mm; a.l. : d.d. = 5·5 : 1.

Colour in life: disc uniform dull green, arms dull green with occasional darker banding, arm spines dull green, ventrally overall pale green. During preservation the green colouration usually turns a light tan brown.

Ophiocomella sexradia (Duncan, 1887)

See: A. M. Clark & Rowe, 1971 : 99 & 118; Devaney, 1974 : 162.

Not too common as coral-head infauna of *P. nigrescens* and *M. exacea* from the lagoon grass flats (068–083) near West Channels, in sea-grass bases and coral along Passe Houareau (316–118). May be a sponge associate like the similarly fissiparous and usually six-armed *Ophiactis savignyi*. D.d. max. = 4 mm; a.l. : d.d. = 3·8 : 1.

Colour in life: disc dark green, arms dark green with light green banding, ventrally paler green overall.

This confirms the unspecified extension of range noted in A. M. Clark & Rowe (1971 : 86) to the islands of the western Indian Ocean from East Africa and Madagascar.

Ophiomastix caryophyllata Lütken, 1869 Fig. 15

See: H. L. Clark, 1921 : 137; A. M. Clark & Rowe, 1971 : 120.

Common in coral heads in all the channel areas of the lagoon and off the seaward platforms of the west and north coasts. More abundant even than *O. erinaceus* under *Porites* microatolls on the lagoon grass flats (068–083) near West Channels. D.d. max. = 19 mm; a.l. : d.d. = 7·0 : 1.

Colour in life: the spiny disc white with large dark purple spots outlined with white, both basal and ventral arm plates with a distal V-shaped white band superimposed on dark purple, oral shields outlined white with a central labyrinthine purple design.

Ophiomastix koehleri Devaney, 1977 Fig. 16

See: A. M. Clark & Rowe, 1971 : 118 (as *Ophiocoma wendti*: Koehler); Devaney, 1977 : 275; Cherbonnier & Guille, 1978 : 186–188, pl. 11, figs 1, 2.

Previously recorded from Aldabra as *Ophiocoma wendti* : Koehler by Hughes & Gamble (1977).

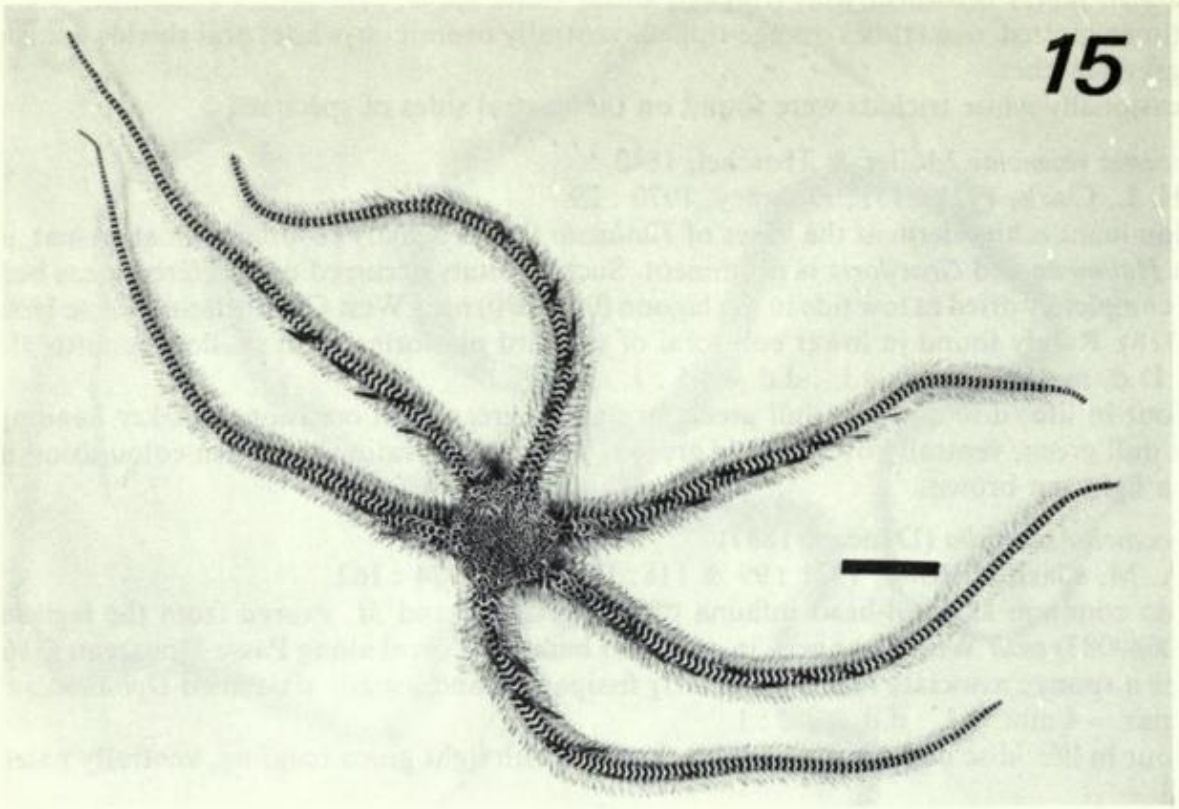
One specimen only, found under a *Porites* microatoll over sandy gravel in the lagoon grass beds (068–083) near West Channels. D.d. = 15 mm; a.l. = 106 mm; a.l. : d.d. = 7·0 : 1.

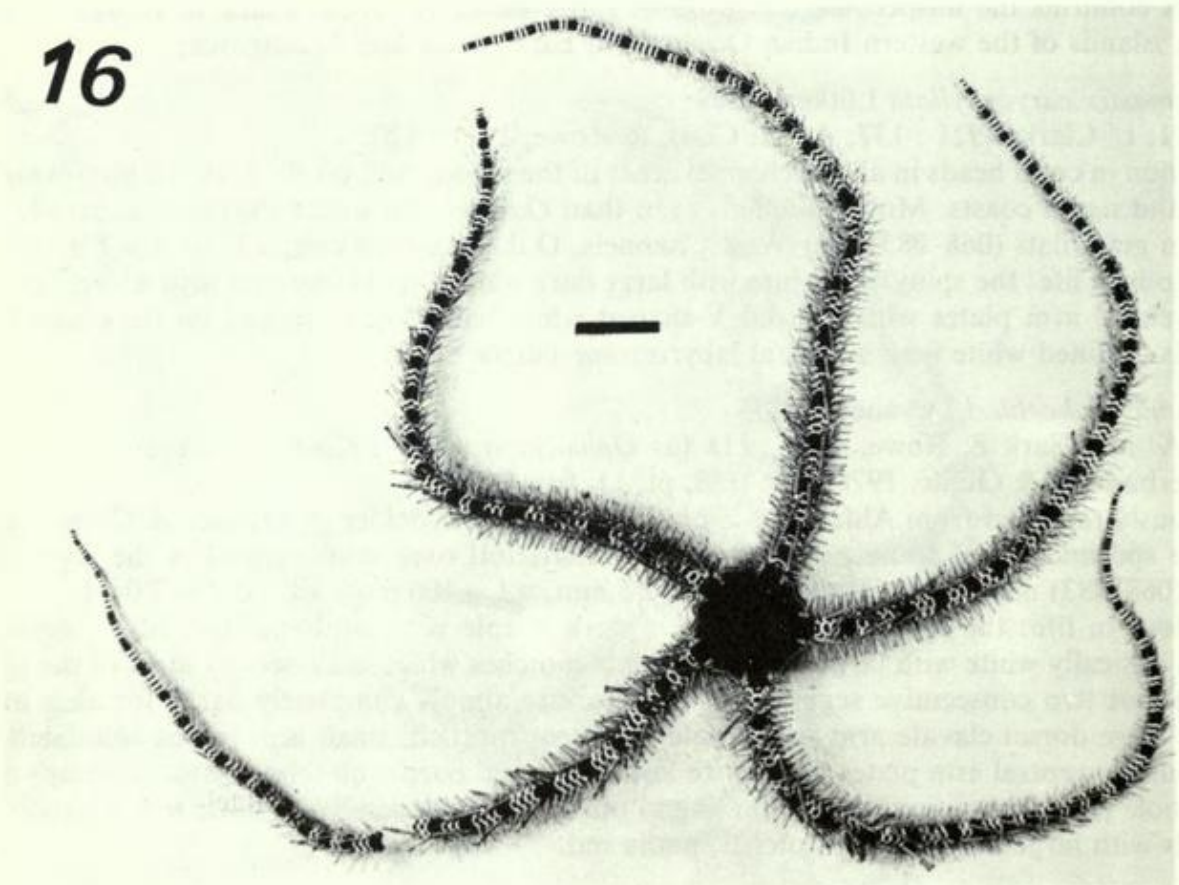
Colour in life: the spineless disc uniform dark purple with white-marked edges, dorsal arm plates basically white with large irregular purple blotches which may occupy most of the plate so that about two consecutive segments out of five are almost completely dark, forming an arm band, large dorsal clavate arm spines pale purple or mottled, small arm spines annulated white and purple, ventral arm plates white with large proximal purple blotches that can occupy almost the whole plate in positions corresponding to the dark areas dorsally, tentacle scales banded, oral shields with large dark purple blotches, podia red.

Ophiomastix venosa Peters, 1851

See: H. L. Clark, 1921 : 138.

Not common; under boulders, coral heads, and *Porites* microatolls in the lagoon grass beds (068–083) near West Channels, along Passe Houareau (316–118), in depression at cliff base of Anse Malabar (241–127), seaward platform of the south coast when it occurred under boulders





Figs 15, 16 *Ophiomastix caryophyllata* Lütken and *O. koehleri* Devaney. (Scale = 10 mm.)

(345–037). D.d. max. = 41 mm; a.l. : d.d. = 5·5 : 1, the ratio not increasing with absolute disc size.

Colour in life: basically bright yellow, the almost completely spineless smooth disc yellow with dark lines outlined in white, arm spines, including the enlarged clavate upper ones, yellow with a dark line, dorsal arm plates with an ill-defined darker yellow median band, ventrally pale yellow overall, podia yellow.

OPHIONEREIDIDAE

Ophionereis dubia (Müller & Troschel, 1842)
See: A. M. Clark & Rowe, 1971 : 122.
Recorded by Hughes & Gamble (1977) and listed as common in a thick stand of *Halimeda* in Passe Houareau (316–117) and from dense *Thalassia* on the west coast seaward platform (056–090). Specimens of confirmed identity have been found in and under coral along the edge of Passe Dubois (060–080). Owing to poor preservation, no measurements or colour notes can be given.

Range extended from East Africa, Madagascar and the Mascarene Islands.

Ophionereis porrecta Lyman, 1860
See Devaney, 1974 : 174.
Fairly common in the crevices of boulders in the lower eulittoral of the west and north coast seaward platforms, in heads of *P. nigrescens* and *M. exacea* from lagoon grass flats (068–083) near West Channels, in heads of *Millepora platyphylla* Ehrenberg from the bottom of Main Channel. D.d. max. = 15 mm; a.l. : d.d. = 9·0 : 1.

Colour in life: disc greyish with irregular dark markings, the dark pattern much more prominent in young specimens, arms mottled white and grey with dark spots, the short spines white, ventrally white with grey blotches overall.

OPHIODERMATIDAE

Ophiarachna affinis Lütken, 1869 Figs. 17, 18
See: A. M. Clark & Rowe, 1971 : 123; Devaney, 1974 : 175.
One specimen found under a *Porites* microatoll over sandy gravel in lagoon grass flats (068–083) near West Channels.

Colour in life: strongly resembling that of *Ophiocoma doederleini*, basically mid-grey, disc light grey with widely-spaced black spots and a pale ramifying linear pattern, arms mid-grey with white bands, arm spines annulated white and grey, including the elongated ventralmost spines, ventrally mid-grey, oral shields white with irregular grey markings. The overall impression is that this specimen is less robust in construction than *O. doederleini*. D.d. = 25 mm; a.l. = 97 mm; a.l. : d.d. = 3·9 : 1.

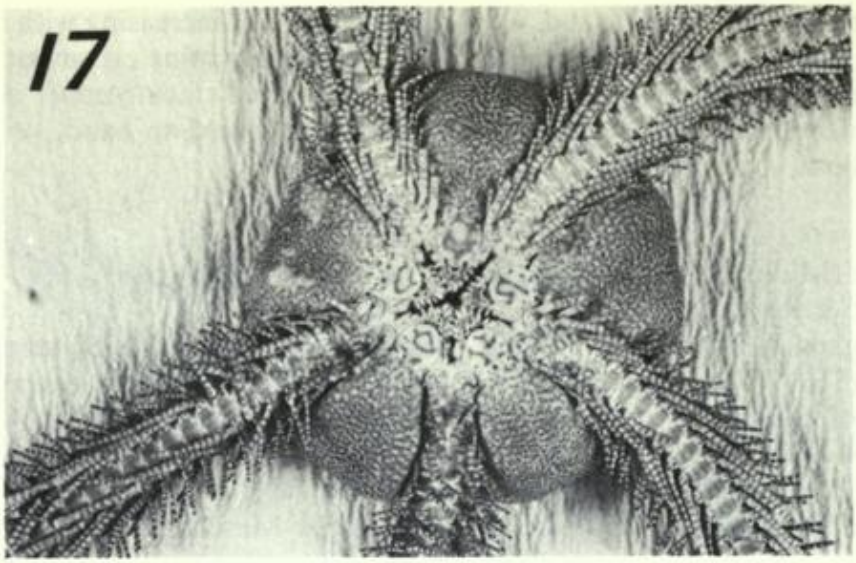
Range extended from Indonesia.

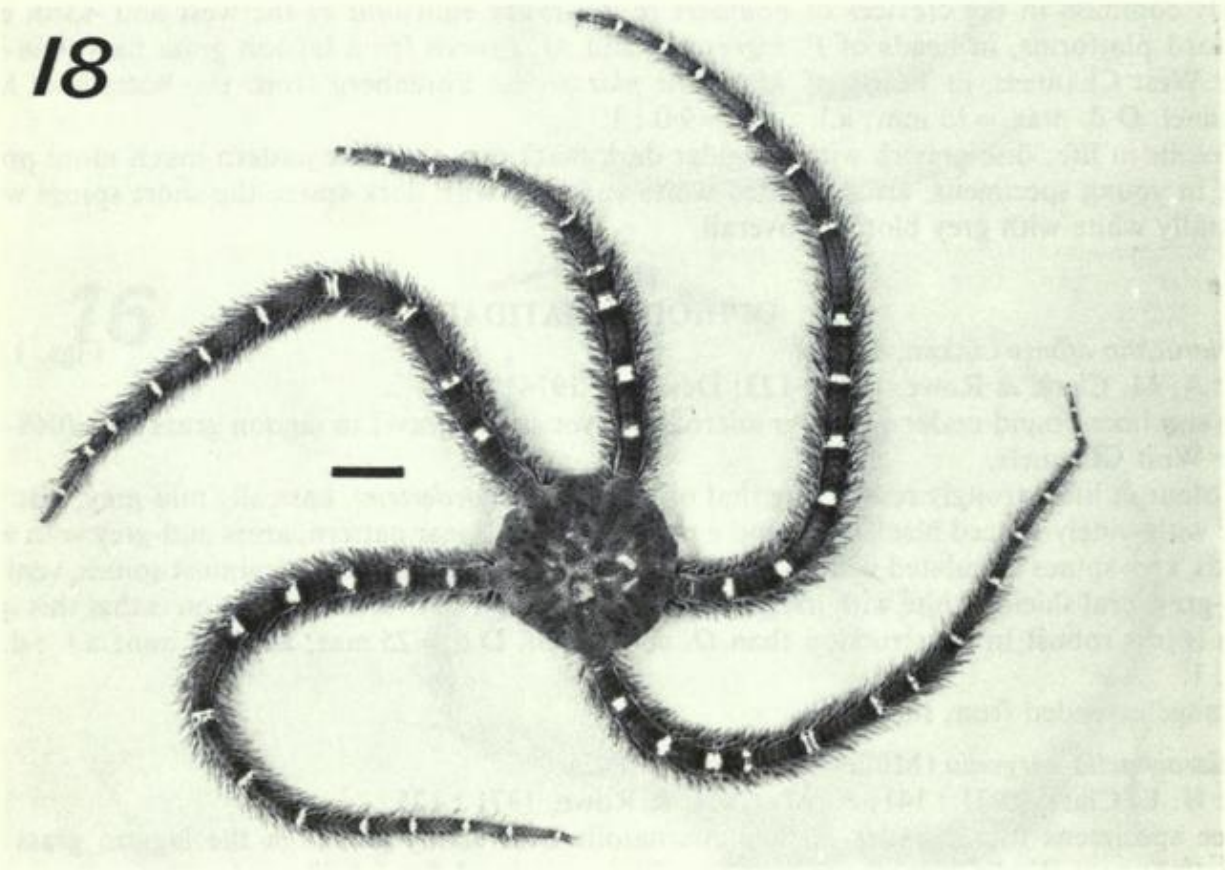
Ophiarachnella gorgonia (Müller & Troschel, 1842)
See: H. L. Clark, 1921 : 141; A. M. Clark & Rowe, 1971 : 125.
Three specimens found under *Porites* microatolls over sandy gravel in the lagoon grass flats (068–083) near West Channels. D.d. max. = 21 mm; a.l. : d.d. = 5·1 : 1.

Colour in life: disc off-white with irregular light brown markings, radial shields mottled white and grey with small black spots, arms off-white with mid-brown bands one to three segments wide, ventrally overall off-white with arms darker distally.

Ophiarachnella macracantha aldabrensis **subsp. nov.** Figs 19–21
See: H. L. Clark, 1909 : 126; A. M. Clark & Rowe, 1971 : 126 (for *O. macracantha*).
Holotype: B.M. reg. no. 1978.9.1.1, from under a *Porites* microatoll over sandy gravel in the lagoon grass flats (068–083) near West Channels. D.d. = 19 mm, a.l. = 83 mm; a.l. : d.d. = 4·4 : 1.

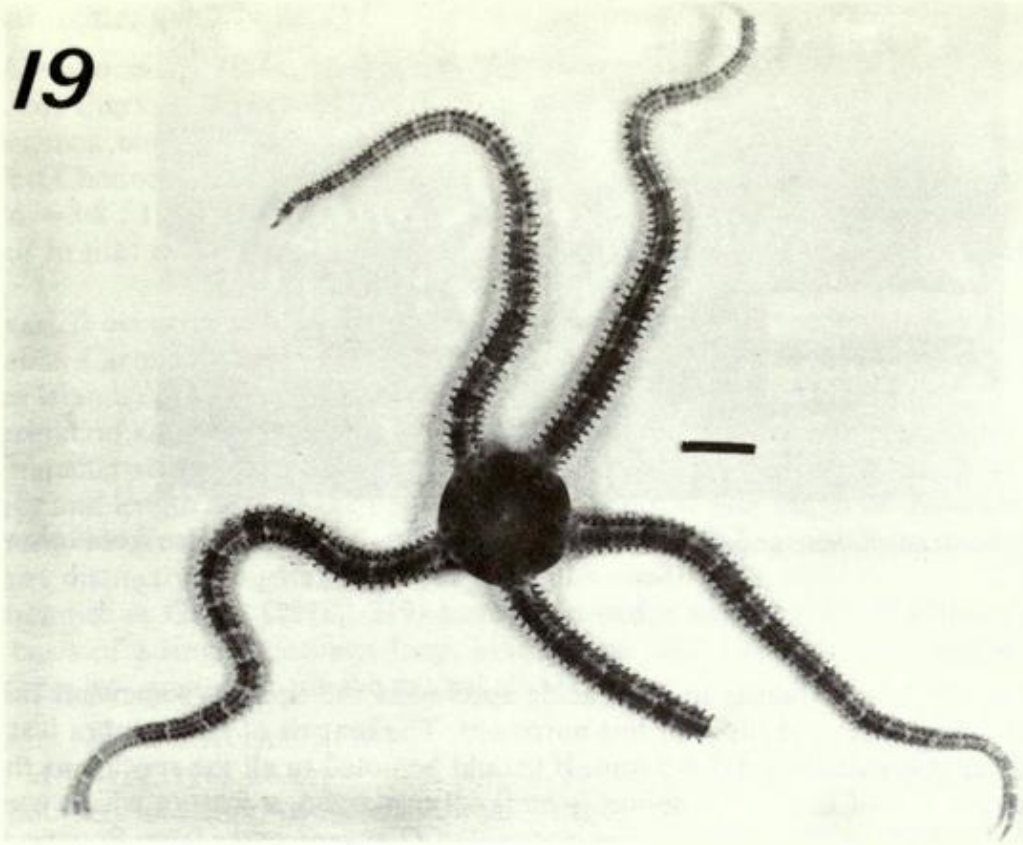
Colour in life: disc blood-red with radial shields the same colour, arms basically blood-red with a lighter linear pattern distally, also with pale transverse bands superimposed on this distal linear pattern, ventrally the arms paler, oral shields not white, unlike the other specimens mentioned below, but with a very broad red band that may cover up to half the oral shield.

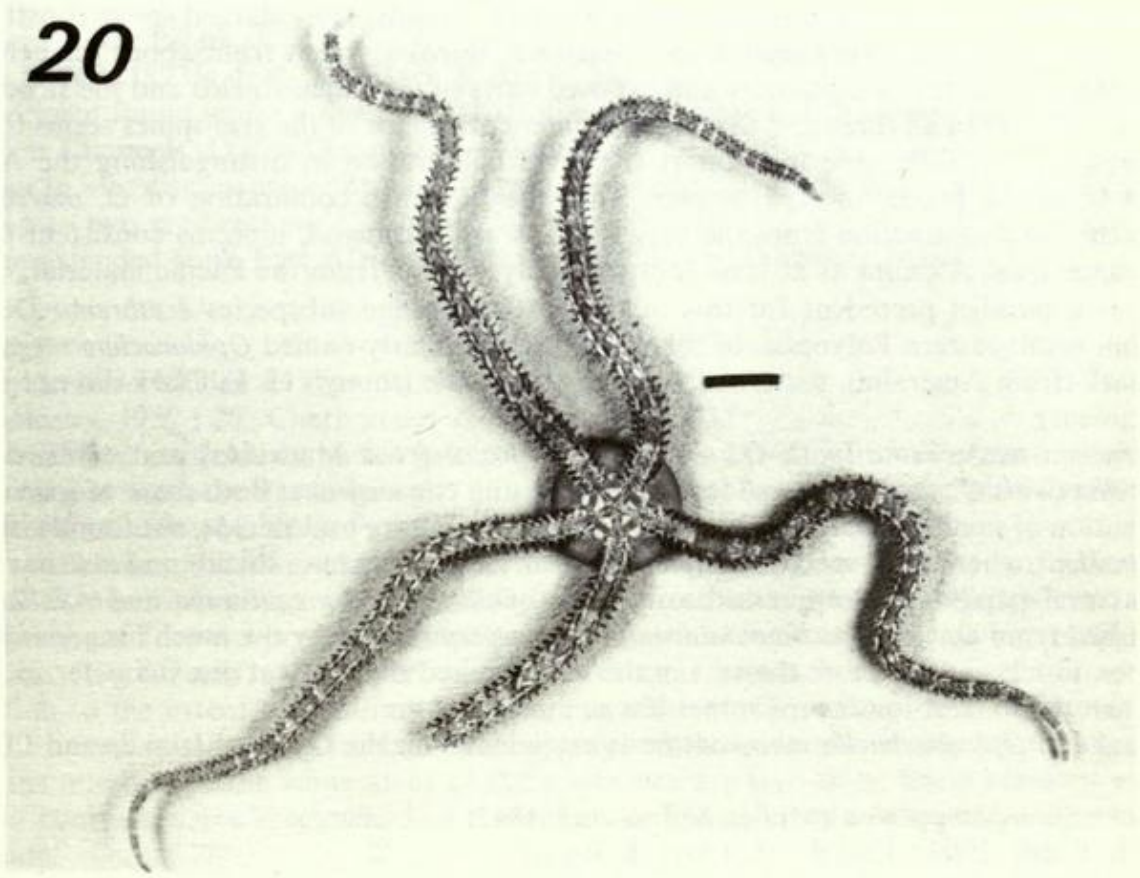




Figs 17, 18 *Ophiarachna affinis* Lütken, detail of disc and arm bases from below, whole animal from above. (Scale = 10 mm.)

This specimen, still vividly red after being dry for 6 months, was compared with two Pacific examples of *O. macracantha*, a dried one from Palau, western Caroline Islands, collected by Dr M. Yamaguchi, and a spirit specimen from Fiji, collected by the *Challenger* (named by Lyman *Pectinura rigida* – a synonym of the closely-related *O. septemspinosa* (Müller & Troschel)). Arm length/disc diameter in the two last is *c.* 100 mm/26 mm (=3·8/1) and 110 mm/21–22 mm (=5·1/1) respectively. Both have brown bands on the arms and the Palau specimen still has the disc pink and grey, as when first dried. The maximum arm spine number in the three specimens is 7, 8 and 9 respectively but the smaller number in the Aldabra specimen can be attributed to its smaller size. Its enlarged lowest arm spines are particularly flattened and spatulate in form, as





Figs 19, 20 *Ophiarachnella macracantha aldabrensis* subsp. nov. (Scale = 10 mm.)

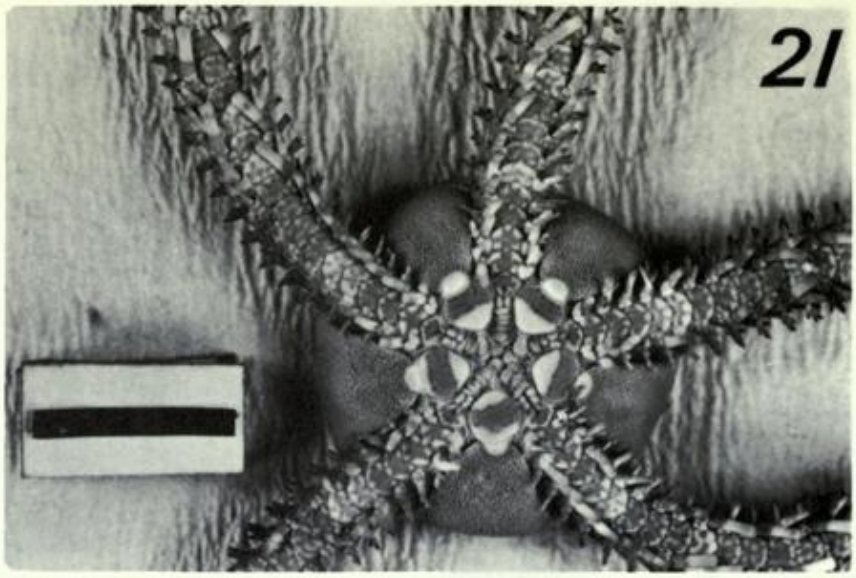


Fig. 21 *Ophiarachnella macracantha aldabrensis*, detail of disc and arm bases from below. (Scale = 10 mm.)

broad at the tip as the base, whereas in the Pacific specimens the tips are somewhat thickened (though not quite cylindrical) and more or less narrowed. The longest of these spines just exceed twice the segment length, equalling 3·0–3·5 mm. It should be noted in all the specimens that only one in every two or three of the lowest spines is markedly enlarged, a feature which was either overlooked by H. L. Clark or absent in the type material of *O. macracantha* from Ponape, eastern Carolines, where up to nine arm spines were found at R 24 mm. The enlarged spines mostly alternate on the two sides of every second (or sometimes third) segment from about segment eight onwards. The size of the disc granules and exposed parts of the radial shields and the structure of the jaws are similar in all three and the minor difference in shape of the arm spines seems to be the only morphological difference to support the vivid colouration in distinguishing the Aldabra specimen from the Pacific ones. However, since the brownish colouration of *O. macracantha* provides the main distinction from the very dark *O. septemspinosa*, it seems consistent to treat this specimen from Aldabra as at least subspecifically distinct from the Pacific material.

There is a parallel precedent for this in the reddish-orange subspecies *erythrema* Devaney, 1974, from south-eastern Polynesia, of the confusingly similarly-named *Ophiarachna megacantha* H. L. Clark (from Australia), patterned with grey or brown (though H. L. Clark did not see any live specimens).

Ophiarachna megacantha (with *O. robillardi* de Loriol from Mauritius) and *Ophiarachnella macracantha* (with *O. septemspinosa*) form an interesting convergence. Both pairs of species have a combination of small bare patches of radial and supplementary oral shields, not found elsewhere in *Ophiarachna*, where most species of *Ophiarachnella* have larger bare shields and also have more numerous oral papillae and appressed arm spines. *Ophiarachna megacantha* and *robillardi* are distinguished from *Ophiarachnella macracantha* and *septemspinosa* by the much longer and fewer arm spines, numbering no more than six in the first two and that only at disc diameter 25 mm or more, when the longest lower arm spines are as much as 7 mm long.

The range of *Ophiarachnella macracantha* is extended from the Caroline Islands and Fiji.

Ophiarachnella septemspinosa (Müller & Troschel, 1842)
See: H. L. Clark, 1909 : 126; A. M. Clark & Rowe, 1971 : 126.
Occasionally found under coral rubble along Passe Dubois (060–080), in the lower eulittoral off the research station (054–091), along the sides of Main Channel (108–120). Most common under *Porites* microatolls over sandy gravel in lagoon grass flats (068–083) near West Channels where groups of up to eight individuals were found. D.d. max. = 38 mm; a.l. : d.d. = 4·1 : 1, only a

slight increase in relative arm length with disc size. The largest specimen weighed 29·3 g whereas the largest *Ophiomastix venosa* weighed 23·6 g (d.d. = 41 mm).

Colour in life: uniform dull grey or grey-green overall, radial shields dark brown.

Ophiochaeta hirsuta Lütken, 1869 (with synonym *O. boschmai* A. H. Clark, 1964)
See: A. M. Clark & Rowe, 1971 : 127; Gibbs, Clark & Clark, 1976 : 129.
One specimen under a *Porites* microatoll over sandy gravel in the lagoon grass flats (068–083) near West Channels, two more from coral along Passe Houareau (316–118). D.d. max. = 8·2 mm; a.l. : d.d. = 3·8 : 1.

Colour in life: uniform grey-brown with pale brown banding on the arms, ventrally off-white overall.

The varied occurrence of spinelets on the discs of the four specimens from Aldabra and two from Palau, Caroline Islands, indicate that *Ophiochaeta boschmai* A. H. Clark, 1964 (type locality Molucca Islands) is a synonym of *O. hirsuta* Lütken, 1869. One Aldabra and one Palau specimen have peripheral and ventral spinelets only (intermixed among the indented granules), as thought to be characteristic of *O. boschmai*. The other specimens have spinelets in various degrees of frequency and length also on the upper sides of the discs. The length of the coarser armament on the convex marginal plates of the disc is also variable, being usually almost granuliform but sometimes distinctly elongate.

Cherbonnier & Guille (1978 : 219) have described a new species of *Ophiochaeta*, *O. crinita*, on the basis of a single specimen from Madagascar with the disc armament entirely spiniform except for a few granules near the genital slits.

Ophioconis permixta Koehler, 1905
See: A. M. Clark, 1965 : 63.
Under boulders and coral in the shallow sublittoral off the Settlement (056–100).

Range extended from East Africa and Madagascar.

Ophiopeza fallax Peters, 1851
See: de Loriol, 1893*b*: 4; A. M. Clark & Rowe, 1971 : 127.
One specimen found under a *Porites* microatoll over sandy gravel in lagoon grass flats (068–083) near West Channels. D.d. = 13 mm, a.l. = 43 mm; a.l. : d.d. = 3·3 : 1.

Colour in life: disc covered with smooth grey-brown skin, arms the same colour with red-brown bands up to two segments wide, ventrally off-white overall.

Range extended from East Africa, Madagascar and the Mascarene Islands.

OPHIURIDAE

Ophiolepis cincta Müller & Troschel, 1842 Fig. 22
See: Balinsky, 1957 : 28; Cherbonnier & Guille, 1978 : 232.
Under boulders, particularly buried in sandy gravel in the lower eulittoral of seaward platforms of the west and north coasts, under coral heads and microatolls in the lagoon grass flats (068–083), near West Channels and along Passe Houareau (316–112). D.d. max. 15 mm.

This species occurs in two distinct colour forms. The majority are predominantly dark brown on the disc (sometimes all brown – Fig. 22 right) with some white spots or larger patches, which in three specimens forms a pentaradiate pattern with a more or less regular white patch in each interradius (Fig. 22 top); the upper side of the arms is brown interrupted by white bands in proportion to the extent of white on the disc, the white bands numbering 3–7 per arm. (When dried, the brown usually turns to black or dark grey and the underside is paler, especially the disc. Under the microscope the white areas of the upper side are seen to be finely marbled with dark grey.) In contrast, some specimens had the colour in life uniformly ochre or grey-green on the upper side.

These two colour forms are also correlated with differences in the relative arm length. In life the seven drab uniform specimens collected were estimated (by Sloan) to have a.l. : d.d. = 5·5 : 1, compared with 2·7–3·8 : 1 for 15 of the boldly coloured specimens. (Following some shrinkage of the disc in drying, the ratios have fallen slightly to means of 5·2 : 1 and 3·6 : 1.)

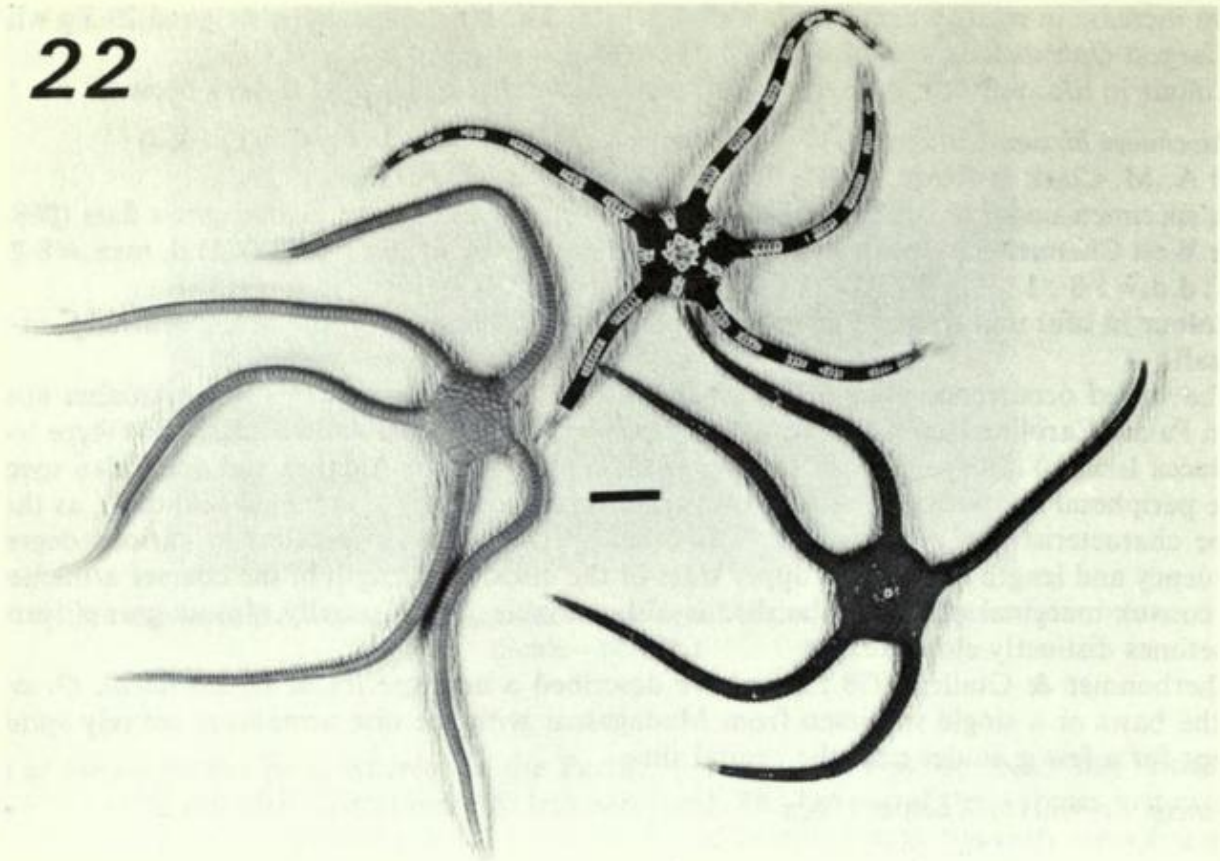


Fig. 22 *Ophiolepis cincta garretti* Lyman (pale specimen on left) and *O. cincta cincta*. (Scale = 10 mm.)

Evidently the patterned form is not restricted to Aldabra since Balinsky (1957) records *O. cincta* at Inhaca, Mozambique, as 'rather brownish with irregular white spots on the disc and white cross-bands on the arms, these white areas being finely marbled with greyish'. Also Cherbonnier & Guille (1978) found specimens from Madagascar (and Dar-es-Salaam, Tanzania) to have the disc 'marron foncé et beige clair . . ., marron foncé dominant' and the arms banded; they give the a.l. as *c.* 3 × d.d. In a sample of 38 specimens in spirit in the BMNH collections from Zanzibar the disc colour is now mainly dull dark brown or grey patterned with light grey marbled spots or patches, usually interradially and centrally and sometimes making a regular pentaradiate pattern as in the top specimen in fig. 22. The range of a.l. : d.d. in these specimens is 2·2–4·6 : 1, mean 3·2 : 1 but the sample also includes a single relatively long-armed and uniformly dull brownish coloured specimen with a.l. : d.d. = 4·6 : 1. Three similar drab-coloured specimens from Aldabra collected by Taylor and two from Mauritius have a.l. : d.d. 4·4–5·9 : 1.

The type locality of *O. cincta* is the Red Sea (no details). Müller & Troschel do not describe the disc colour but note that the arms are banded dark and light; a.l. : d.d. they give as only 2·5 : 1. Eleven specimens in the BMNH collections from the Gulf of Aqaba and the southern Red Sea (5–15 years in alcohol) still show broad bands on the arms; their discs are mainly brownish or grey with light grey spots or larger patches, varying in size, shape and position but often with an enlarged central light patch while sometimes the smaller patches are interradial and in one case form a pentaradiate regular pattern. They have a.l. : d.d. 3·1–4·1 : 1, mean 3·7 : 1.

Although all these specimens show the distinctive regular arrangement of small platelets almost encircling the smooth disc plates and bordering each dorsal arm plate on its distal side, thought to be characteristic of *O. cincta*, it is clear that two taxa (best ranked as subspecies in the opinion of A. M. C.) can be distinguished, at least in the western Indian Ocean, one relatively long-armed and drab-coloured and the other shorter-armed and with a bolder and usually patterned coloura-

tion. The latter is clearly the nominate subspecies, *O. cincta cincta*, of which the Aldabra specimens may be recognizable as a colour form with a strong tendency for developing a regular pentaradiate pattern.

In seeking a name for the drab-coloured relatively long-armed subspecies, a possible candidate is *Ophiolepis garretti* Lyman, 1865, type locality Kingsmills (i.e. Gilbert) Islands in the Pacific. The holotype and only specimen had a.l. : d.d. 55 : 9 = 6·1 : 1. In life the colour of the disc was uniform brick red but the arms were banded with paler areas. Lyman then thought it distinguishable from *O. cincta* not only by the longer arms but also by the shorter oral shields and the rougher texture of the dorsal arm plates. However, in his *Challenger* report (1882) he synonymized it with *O. cincta*. Unfortunately, no good samples from the Pacific are available. In spite of the banded arms of the holotype of *O. garretti*, the long arms and uniformly coloured disc justify reviving the name for the subspecies showing these characters.

The apparent absence of the widespread species *Ophiolepis superba* H. L. Clark from Aldabra, despite intensive collecting, is notable. This conspicuous ophiuroid with d.d. commonly 15–25 mm has been recorded in the western Indian Ocean from East Africa, Madagascar, Mauritius and from Mahé. It usually has a bold pentaradiate disc pattern of purple (in life) on light brown but in this case the light areas are radial, not interradial.

Ophioplocus imbricatus (Müller & Troschel, 1842)
See: H. L. Clark, 1921 : 143; A. M. Clark & Rowe, 1971 : 128.
Fairly common partially buried in sand or sandy gravel under boulders in the lower eulittoral of the west and north coast seaward platforms, occasionally at the bases of *Thalassodendron* on these platforms as well. D.d. max. = 19·5 mm, arm length very variable in every specimen but a.l. : d.d. usually more than 4 : 1.

Colour in life: darker grey-green overall than *Ophiolepis cincta garretti*, the disc with ill-defined, coarse, dark grey reticulations, arms banded with dark grey, ventrally more grey still with dark grey oral shields.

Class **ECHINOIDEA**

CIDARIDAE

Eucidaris metularia (Lamarck, 1816)
See: Mortensen, 1928 : 386.
Common under boulders and at the bases of sea-grass on the seaward platforms of the west and north coasts, in and under coral in lagoon grass flats near West Channels and Passe Houareau. A ubiquitous species wherever coral and sea-grass occur with the exception of the exposed seaward east and south coasts.

Phyllacanthus imperialis (Lamarck, 1816)
See: Mortensen, 1928 : 504.
Abundant on sponge-covered rocks, along with a large population of *Ophiactis savignyi*, at the tidal intake to the large land-locked marine pool (059–094) on Ile Picard. For a description of this unusual marine pool habitat see Taylor (1971*a* : 196).

Prionocidaris baculosa (Lamarck, 1816)
See: Mortensen, 1928 : 437.
Found under algae and coral amongst *Thalassodendron* on seaward platforms of and in old *Stomopneustes variolaris* burrows at the cliff base of Cinq Cases (396–055).

Prionocidaris verticillata (Lamarck, 1816)
See: Mortensen, 1928 : 428 (as *Plococidaris*).
At the bases of *Thalassodendron* on the west and north coast seaward platforms, under coral heads in lagoon grass flats near West Channels and Passe Houreau. Never as common as *Eucidaris metularia* and rarely found as coral head infauna. Only small specimens were found, e.g. greatest test diameter 20 mm.

DIADEMATIDAE

Astropyga radiata (Leske, 1778)
See: Mortensen, 1940 : 187.
Epifaunal on a sand patch as a group of 20 in the western lagoon (097–105).

Diadema savignyi Michelin, 1845
See: Mortensen, 1940 : 265; A. M. Clark & Rowe, 1971 : 153.
Under boulders in the lower eulittoral of the west and north coast seaward platforms, more common in, but especially under, coral heads in the lagoon grass flats (068–083) near West Channels and in Passe Houareau (316–118). Specimens found were never large, maximum test diameter 50 mm.

Diadema setosum (Leske, 1778)
See: A. M. Clark & Rowe, 1971 : 153; Dart, 1972 : 50 (feeding & ecology); Herring, 1972 : 169 (feeding & ecology).
Reported by Hughes & Gamble (1977), found among sea-grasses on lagoon flats near West Channels (063–089) and by Price (1971), incorrectly identified, from the same area and habitat.

We feel the record needs confirmation as the differences between *D. setosum* and *D. savignyi* are so subtle (see A. M. Clark, 1967 : 49) and *D. setosum* appears to be rare in the Mascarene Islands and East Africa, though it is the dominant or only species in the Red Sea. If correct, it would provide an extension of range.

Echinothrix calamaris (Pallas, 1774)
See: Mortensen, 1940 : 285; Herring, 1972 : 169 (feeding & distribution).
Under boulders in the lower eulittoral of the west and north coast seaward platforms, most common, like *D. savignyi*, in the more sheltered lagoon habitats like the grass flats near West Channels and Passe Houareau where they occur under coral heads and microatolls.

STOMECHINIDAE

Stomopneustes variolaris (Lamarck, 1816)
See: Mortensen, 1935 : 507; Taylor, 1971*a* : 183 (ecology on Aldabra); Herring, 1972 : 169 (feeding & ecology).
Abundant in holes along the lower eulittoral and especially the sublittoral fringe of the exposed east and south coastal platforms. Interestingly, this species was present under rubble on the rock platform at Dune Jean Louis (275–039) whereas the relatively more exposed rock platform near Point Hodoul (407–080) had no rubble present and the animals were found only in holes in intact bedrock.

In the burrows of this species, two species of crustaceans were found: the gnathophyllid shrimp *Gnathophyllum americanum* Guérin, 1856 (normally free-living predators on asteroids and ophiuroids – Dr A. J. Bruce, pers. comm.) and the porcellanid crab *Petrolisthes virgatus* Paulson, 1876 (not reported previously as associated with echinoids and a new locality record for this species – Dr J. Haig, pers. comm.). The crabs at least were found as male/female pairs.

Although unrecorded from the islands of the western Indian Ocean by A. M. Clark & Rowe (1971), this species was in fact collected by J. D. T. at Mahé and reported in Taylor (1968). It is also common in the Mascarene Islands and on the East African coast.

TOXOPNEUSTIDAE

Tripneustes gratilla (Linnaues, 1758)
See: Mortensen, 1943*a* : 500; Herring, 1972 : 169 (feeding & ecology).
Sometimes found under boulders in the lower eulittoral of the west and north coast seaward platforms, but common under microatolls and coral heads on the lagoon grass flats near West Channels and Passe Houareau. As with some other Aldabra echinoids, only small individuals were taken, maximum test diameter 52 mm.

Toxopneustes pileolus (Lamarck, 1816)
See: Mortensen, 1943*a* : 472.
Reported only by Hughes & Gamble (1977) – from a sheltered site in Passe Houareau (319–118).

PARASALENIIDAE

Parasalenia gratiosa A. Agassiz, 1863
See: Mortensen, 1943*b* : 269.
From rubble in the bottom of Passe Dubois, at about 10 m.
Range extended from East Africa and Madagascar.

ECHINOMETRIDAE

Colobocentrotus atratus (Linnaeus, 1758)
See: Mortensen, 1943*b* : 434.
On the lower eulittoral cliff face between Point Hodoul and Anse Cedres (390–103).

Echinometra mathaei (de Blainville, 1825)
See: Mortensen, 1943*b* : 381; Khamala, 1971 : 167 (ecology); Dart, 1972 : 50 (feeding & ecology); Herring, 1972 : 169 (feeding & ecology); Russo, 1977 : 693 (distribution).
The most ubiquitous echinoid on Aldabra, found under boulders, coral heads and in holes on all the seaward shores, in or under coral heads or microatolls in all the channel areas of the lagoon. Most common and reaches its largest size in holes in the lower eulittoral of exposed east and south coast rocky shores, see Taylor (1971*a* : 183) for habitat details.
As with *S. variolaris*, on the south coast *E. mathaei* shares its burrow with the shrimp *G. americanum* or the crab *P. virgatus*.

Echinostrephus molaris (de Blainville, 1825)
See: Mortensen, 1943*b* : 304; Campbell *et al.*, 1973 : 155 (feeding & ecology).
Common in burrows in coral boulders at places where there is plenty of current like any of the channels leading out of the lagoon, also found off the seaward platforms of the west and north coasts, not common in the eulittoral.
Range extended from East Africa, Madagascar and the Mascarene Islands.

Heterocentrotus trigonarius (Lamarck, 1816)
See: Mortensen, 1943*b* : 420.
Spines and test fragments of this species were found among corals at 15 m deep off the research station (052–091), found live in a crevice at the base of cliffs at Point Hodoul (404–105).

ECHINONEIDAE

Echinoneus abnormalis de Loriol, 1883
See: Mortensen, 1948*a* : 80.
In sand under coral heads in the lagoon grass flats (068–083) near West Channels, under coral alongside Passe Dubois (060–080), under boulders in the shallow sublittoral off the research station (052–091).
Range extended from the Mascarene Islands.

Echinoneus cyclostomus Leske, 1778
See: Mortensen, 1948*a* : 75; Rose, 1978 : 199 (ecology).
A shallow burrower in sand under boulders on the seaward platforms of all coasts around Aldabra, also under boulders and coral heads in the lagoon at all the channel areas. Never common.

CLYPEASTERIDAE

Clypeaster fervens Koehler, 1922
See: Mortensen, 1948*b* : 86.
Reported only by Hughes & Gamble (1977) – infauna at sea-grass bases on the seaward platform at Anse Malabar (241–127) on the north coast.

Clypeaster reticulatus (Linnaeus, 1758)
See: Mortensen, 1948*b* : 71.
In sand among sea-grass roots in the lagoon (065–090) near West Channels, on the seaward platform of the west coast, and on sand in the lagoon near Ile Châlen (080–074).

FIBULARIIDAE

Echinocyamus crispus Mazetti, 1896
See: Mortensen 1948*b* : 185.
In sand and coarse gravel along Passe Dubois (060–080) among *Thalassodendron* beds.
Range extended from East Africa and Madagascar.

Fibularia ovulum Lamarck, 1816
See: Mortensen, 1948*b* : 208.
In sand and coarse gravel on the north side of Passe Dubois (060–080) with plentiful *Thalassodendron*. As with the other channel areas, this is a habitat of strong and persistent currents.
Clark & Rowe (1971 : 144) give no record of this species from the islands of the western Indian Ocean but their proposed neotype (p. 168) is in fact from Mahé. This is the first record from Aldabra.

Fibularia volva A. Agassiz, 1846
See: Mortensen, 1948*b* : 213.
Reported only by Hughes & Gamble (1977) – infauna in soft mud at a very sheltered site in the Passe Houareau area (319–119).
If correct, this record extends the range from the Red Sea.

ECHINOLAMPADIDAE

Echinolampas ovata (Leske, 1778)
See: Mortensen, 1948*a* : 275.
Reported only by Hughes & Gamble (1977) – infauna from a muddy, sheltered site in Passe Houareau (319–118).
If correct, this record extends the range from the Mascarene Islands.

SPATANGIDAE

Maretia planulata (Lamarck, 1816)
See: Mortensen, 1951 : 27.
Found in sand in Passe Magnan (063–074) of the West Channels and in sand under boulders at the edge of the seaward platform on the north coast (308–124).

Pseudomaretia alta (A. Agassiz, 1863)
See: Mortensen, 1951 : 58.
Reported only by Price (1971) – from the grass flats on the seaward side of West Channels.

SCHIZASTERIDAE

Schizaster lacunosus (Linnaeus, 1758)
See: Mortensen, 1951 : 300.
Reported only by Hughes & Gamble (1977) – infauna from under a thick stand of *Halimeda* in Passe Houareau (316–119).
Range extended from Natal.

BRISSIDAE

Brissus latecarinatus (Leske, 1778)
See: Mortensen, 1951 : 514.
Infauna associated with sand under sea-grass in Passe Houareau (316–118), in sand under boulders on seaward platforms of the west and north coasts.

Metalia dicrana H. L. Clark, 1917
See: Mortensen, 1951 : 546.
Reported only by Hughes & Gamble (1977) – infauna under sea-grass in the lower eulittoral of the seaward platform at Anse Cèdres (360–112).

Metalia spatagus (Linnaeus, 1758)
See: Mortensen, 1951 : 540.
In sand patches amongst *Thalassodendron* on seaward platforms of the west and north coasts, under boulders at the edges of these platforms, and in sand in all the channels.

Metalia sternalis (Lamarck, 1816)
See: Mortensen, 1951 : 535.
In a sand pocket under boulders on west coast seaward platform (063–128); a large test (126 × 114 mm) was found on the beach at Anse Polymnie (108–124) in the lagoon.

Class **HOLOTHURIOIDEA**

HOLOTHURIIDAE

Some useful colour illustrations to many of the species below are given in the recent paper by Rowe & Doty (1977).

Actinopyga sp. cf. *A. bannwarthi* Panning, 1944
See: Cherbonnier, 1955 : 136.
One specimen only, found on the lagoon grass flats (068–083) near West Channels.
If this specimen is *A. bannwarthi*, it extends the range from the Red Sea.

Actinopyga echinites (Jaeger, 1833)
See: Cherbonnier, 1955 : 136; Rowe & Doty, 1977 : 228.
Reported only by Hughes & Gamble (1977) – from the lower eulittoral among seagrass on the seaward platform at Anse Cèdres (360–112).

Actinopyga mauritiana (Quoy & Gaimard, 1833)
See: Rowe & Doty, 1977 : 228; Bakus, 1968 : 24 (ecology).
An ubiquitous epifaunal species on hard substrates at the edge of the seaward platforms on the west and north coasts and more widespread through the eulittoral on the rock benches of the exposed seaward east and south coasts. Interestingly the *A. mauritiana* on the exposed coasts were much smaller, but more numerous than those on the more sheltered coasts. Occasionally seen on the coral flats in the Main Channel drainage system in the lagoon. The only epifaunal holothuroid on the eulittoral rock benches of the exposed coasts.

Large specimens commonly carried the polychaete *Gastrolipidia davigera* Schmarda, 1861. Some specimens had a parasitic gastropod, *Melanella muelleriae* (Sturany, 1904), projecting from the body wall.

Actinopyga miliaris (Quoy & Gaimard, 1833)
See: Panning, 1944 : 47 (as *A. lecanora miliaris*).
Found on the sand in Passe Dubois (060–080) and on grass flats in the lagoon (083–085).

Bohadschia marmorata Jaeger, 1833
See: Rowe & Doty, 1977 : 229.
Found on lagoon grass flats (068–083) or under the overhang of isolated coral heads near West Channels, usually covered with dead fronds of sea-grass.
Range extended from East Africa and Madagascar.

Labidodemas rugosum (Ludwig, 1875)
See: Théel, 1886 : 226 (as *Holothuria rugosa*).
Common under boulders at the edge of the west coast seaward platform.

Holothuria (*Cystipus*) *rigida* (Selenka, 1867)
See: Rowe & Doty, 1977 : 234.
Not common, found in sand under boulders in the lower eulittoral of the seaward platforms of the west and north coasts, in sand in the lagoon north east Ile Esprit (115–067).
Range extended from East Africa and Madagascar.

Holothuria (*Halodeima*) *atra* Jaeger, 1833
See: Rowe & Doty, 1977 : 230; Bonham & Held, 1963 : 305 (ecology); Bakus, 1968 : 24 (ecology).
Common throughout the whole lagoon but not in the great densities reported in the literature from other sheltered reef and lagoon flats. Occasional on the seaward platforms of the west and north coasts.

Holothuria (*Lessonothuria*) *pardalis* Selenka, 1867
See: Rowe & Doty, 1977 : 233.
Found under boulders over sandy gravel or sand on all the seaward platforms around Aldabra, especially on the more sheltered west and north coast seaward platforms, also in the channel areas of the lagoon under coral heads and microatolls over sandy gravel and sand. It should be noted that the spicules of various specimens which have been attributed to *H. pardalis* show a wide range of form and the species is therefore in need of review (Rowe, pers. comm.).

Holothuria (*Lessonothuria*) *verrucosa* Selenka, 1867
See: Semper, 1968 : 90 (as *Holothuria immobilis*).
One specimen only collected from a sand and coral patch in one of the West Channels.

Holothuria (*Mertensiothuria*) *leucospilota* (Brandt, 1835)
See: Rowe & Doty, 1977 : 233; Bonham & Held, 1963 : 305 (ecology).
Occasionally found under boulders over sand in standing water in the upper eulittoral of the Ile Picard beach-rock (056–100); more common in the lower eulittoral of all the coastal seaward platforms around Aldabra, especially the sheltered west and north coasts; also under coral heads over sand in the channel areas of the lagoon.

Holothuria (*Mertensiothuria*) *pervicax* Selenka, 1867
See: Rowe & Doty, 1977 : 234.
Not too common, usually found under coral over sand in channel areas of the lagoon like Main Channel (104–110), West Channels (068–083) and Passe Houareau (316–118); less commonly seen under coral at the edge of seaward platforms like Dune Jean Louis (275–039).

One specimen had parasitic gastropods, *Melanella muelleriae*, projecting from the body wall.

Holothuria (*Microthele*) *nobilis* (Selenka, 1867)
See: Rowe & Doty, 1977 : 231.
Most individuals were of the black form with the large lateral bumps white; others were uniformly grey. On lagoon grass flats (068–083) and among coral heads near West Channels, near Ile Châlen (080–072). On 23 April 1978 a specimen with one end elevated off the substrate was noted as emitting a milky substance and was probably spawning.

Holothuria (*Platyperona*) *difficilis* Semper, 1868
See: Rowe & Doty, 1977 : 232; Bakus, 1968 : 23 (ecology).
One specimen found under a coral head over sandy gravel on lagoon grass flats (068–083) near West Channels, one specimen found under coral over muddy sand in a mangrove creek at Passe Gionnet (137–120) in the lagoon, one specimen found under boulders over sand on the seaward platform at Anse Var (068–122).

Holothuria (*Selenkothuria*) *moebii* Ludwig, 1883
See: H. L. Clark, 1946 : 426.
One specimen only, found under a boulder in the upper eulittoral of the Ile Picard beach-rock (056–100).

Range extended from the Mascarene Islands.

Holothuria (*Selenkothuria*) *parva* Krauss *in* Lampert, 1885
See: Cherbonnier, 1952 : 503.
Common under boulders over intact bed rock in the upper eulittoral beach-rock of Ile Picard (056–100), also found in sand pockets at the cliff base of Dune d'Messe (265–038) on the exposed south coast. (The identification is by A. M. C.)

Range extended from East Africa and Madagascar.

Holothuria (*Semperothuria*) *cinerascens* (Brandt, 1835)
See: Rowe & Doty, 1977 : 230.
Abundant in crevices and holes in the same lower eulittoral band with the echinoids *Echinometra mathaei* and *Stomopneustes variolaris* on the exposed south and east coasts at Dune Jean Louis (275–039) and near Point Hodoul (407–080); uncommon in the sheltered upper eulittoral beach-rock at Ile Picard (056–100) on the more sheltered west coast.

One specimen had several of the parasitic gastropods, *Melanella muelleriae*, on the body wall.

Holothuria (*Theelothuria*) sp. cf. *H. hamata* Pearson, 1913
See: Pearson, 1913 : 51; Cherbonnier, 1955 : 156.
Two specimens taken from amongst algae and sea-grass on the lagoon side of West Channels.

If these specimens are *H. hamata*, the range would be extended to the western Indian Ocean from the Red Sea.

Holothuria (*Theelothuria*) *maculosa* Pearson, 1913
See: Pearson, 1913 : 53 (Aldabra is the type locality for this species).
Recorded only by Hughes & Gamble (1977) – from sea-grass flats in Passe Houareau (316–118).

Holothuria (*Thymiosycia*) *arenicola* Semper, 1868
See: Rowe & Doty, 1977 : 232.
A common, ubiquitous species in sand or sandy gravel under boulders in the lower eulittoral of the seaward platforms on all coasts around Aldabra; also in sand under coral heads and sea-grass in the channel areas of the lagoon.

Some specimens were infested with the parasitic gastropod *Melanella muelleriae* on the body wall.

Holothuria (*Thymiosycia*) *hilla* Lesson, 1830
See: Rowe & Doty, 1977 : 232.
Found under boulders over sandy gravel or coarse rubble in the lower eulittoral of the seaward platforms all around Aldabra, also under coral heads in all the channel areas of the lagoon.

Holothuria (*Thymiosycia*) *impatiens* (Forskaal, 1775)
See: Rowe & Doty, 1977 : 233.
The most common of the ubiquitous cryptic holothurian species, under boulders over sand and sandy gravel on all seaward platforms around Aldabra and, like all the others, more common on the relatively sheltered coastal platforms of the west and north coasts, common under coral heads in the channel areas of the lagoon and occasionally in the coral heads as well.

Holothuria (*Thymiosycia*) *remollescens* Lampert, 1888
See: H. L. Clark, 1946 : 437.
Three specimens were taken from under rubble among sea-grasses on the seaward platform of the west coast.

Range extended from the Red Sea.

STICHOPODIDAE

Stichopus chloronotus Brandt, 1835
See: Rowe & Doty, 1977 : 227; Yamanouchi, 1956 : 347 (feeding & ecology).
The most common epifaunal holothurian species on hard substrates in the sublittoral fringe and shallow sublittoral of the west and north coastal platforms, also a common species on the coral flats and patch reefs in the Main Channel drainage system of the lagoon. Not seen on the exposed rock benches of the east and south coasts.

Humphreys & Lützen (1972) described a new parasitic gastropod, *Megadenus cantharelloides*, from an Aldabra specimen of *S. chloronotus*, living on the inner face of the body wall of *S. chloronotus*.

Stichopus sp. cf. *S. horrens* Selenka, 1867
See: Rowe & Doty, 1977 : 227.

Found under *Porites* microatolls on the lagoon grass flats (068–083) near West Channels and under boulders at the edge of the seaward platform of the west coast.

The length of the larger specimen as preserved is 85 mm, whereas *S. horrens* may exceed 200 mm. This may account for the absence of the large tack-like tables with pointed spires so characteristic of large specimens of *S. horrens* and present in a specimen from Egmont Reef, Chagos Archipelago, recorded under 'Maldive area' by Clark & Rowe (1971). If correct, this new record would extend the range still further. However, Cherbonnier (1967) has recorded a new species, *Stichopus pseudhorrens*, from Eilat, northern Red Sea, the holotype (length 220 mm) also having some tack-like tables. It has some conspicuous conical warts similar to but probably forming more rows than in the Aldabra specimens and also differs in being a dark chestnut colour.

Stichopus sp. cf. *S. variegatus* Semper, 1868
See: James & Pearse, 1969 : 102; Yamanouchi, 1956 : 347 (feeding & ecology).
One specimen of an unusual red colouration found under a *Porites* microatoll on the lagoon grass flats (068–083) near West Channels.

Thelenota ananas (Jaeger, 1833)
See: Rowe & Doty, 1977 : 227.
Found on sand at the bottom of channels between patch reefs in the Main Channel drainage system of the lagoon and on sand off the seaward platform of the north and west coasts at greater than 5 m depth.

Range extended from the Maldive Islands and the Mascarene Islands (unpublished from the BMNH collections) as well as from the West Pacific.

CUCUMARIIDAE

Orbithyone megapodia H. L. Clark, 1938
See: H. L. Clark, 1946 : 396.
Reported only by Hughes & Gamble (1977) from under rubble off the west coast seaward platform.

The species is poorly distinguished, the holotype from northern Australia having spicules only in the tentacles, not the body wall, and measuring only 15 mm in length, so the record is very dubious.

PHYLLOPHORIDAE

Afrocucumis africana (Semper, 1863)
See: Rowe & Doty, 1977 : 226.
Abundant under boulders in the upper eulittoral of the Ile Picard beach-rock (056–100) and common in crevices on the exposed seaward rock benches of the east and south coasts, less common under boulders over gravel on the seaward platforms of the west and north coasts.

SYNAPTIDAE

Euapta godeffroyi (Semper, 1868)
See: Rowe & Doty, 1977 : 235.
Under boulders and at the bases of sea-grass in the lower eulittoral of the sea-grass platforms of the west and north coasts, under coral heads on the grass flats in the lagoon at Passe Houareau and West Channels.

Range extended from the Mascarene Islands.

Polyplectana kefersteini (Selenka, 1867)
See: Rowe & Doty, 1977 : 235.
Some collected in the same areas as *Euapta godeffroyi* above.

Range extended from the Red Sea.

Synapta maculata (Chamisso & Egsenhardt, 1821)
See: Rowe & Doty, 1977 : 234.

Found on *Thalassia* beds on the seaward platform of the west coast and on the seaward side of the West Channels.

CHIRIDOTIDAE

Chiridota stuhlmanni Lampert, 1896
See: Heding, 1931 : 676.
Collected under the upper eulittoral beach-rock of Ile Picard (056–100) and from rubble in Passe Houareau.

Range extended from East Africa.

Chiridota violacea (J. Müller, 1850)
See: Heding, 1928 : 296; Hughes & Gamble, 1977 : 334 (habitats & distribution on Aldabra).
Can be the dominant member of the infauna in certain sheltered, sandy areas in the lagoon (315–117) near Passe Houareau as well as other similar areas.

Range extended from East Africa and Madagascar.

Polycheira rufescens (Brandt, 1835)
See: Heding, 1928 : 306.
Common under boulders on the upper eulittoral beach-rock of Ile Picard (056–100), also one specimen was found under boulders on the lagoon side (063–080) of Passe Dubois.

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