

NZOI

RECORDS

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**ADDITIONS TO THE ASTEROID FAUNA OF NEW ZEALAND:
FAMILIES BENTHOPECTINIDAE, ODONTASTERIDAE,
ASTERIIDAE AND BRISINGIDAE;
WITH NOTES ON
PORCELLANASTER CAERULEUS WYVILLE THOMSON
(FAMILY PORCELLANASTERIDAE)**

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ABSTRACT

Eight species of asteroids are added to the New Zealand fauna including new species in the genera *Cheiraster* and *Odontaster* with other local representatives, as well as new species in the genera *Hoplaster*, *Perissasterias*, *Brisingella* and *Craterobrisinga* which are new to the fauna. In addition a new genus is erected in the Asteriidae. Notes are also given on juvenile *Porcellanaster caeruleus* Wyville Thomson and on *Cosmasterias dyscrita* H.L. Clark.

INTRODUCTION

New Zealand Oceanographic Institute collections mainly from the bathyal zone around the coasts contain several species of asteroids new to the fauna. In examining some material from the Campbell Plateau Professor H.B. Fell commented that several species appeared new to the fauna, (Dawson 1965; Pawson 1968) and subsequent collections from this area and elsewhere around New Zealand, provided many additional specimens of these forms plus a significant number of further species new to the fauna. Of these new forms, eight are described below, and the genera *Hoplaster*, *Perissasterias*, *Brisingella* and *Craterobrisinga* are added to the fauna, as well as a new genus in the Asteriidae. New species are added in the genera *Cheiraster* and *Odontaster*, which have other local representatives. Notes are also given on juvenile *Porcellanaster caeruleus* Wyville Thomson and on *Cosmasterias dyscrita* H.L. Clark.

SYSTEMATIC ACCOUNT

Family PORCELLANASTERIDAE

Porcellanaster caeruleus Wyville Thomson
(Fig. 1)

Sladen 1889: 134-8, pls 20(1-7), 20a(1-10).
Madsen 1961: 126-42, figs 22-4.

Material Examined

NZOI Stns

- D591, 42° 28.2'S, 176° 51.2'E, 1829 m, 5 specimens;
E399, 46° 10'S, 171° 33'E, 1222 m, 1 specimen;
E411, 46° 38.5'S, 170° 59'E, 1275 m, 1 specimen;
E709, 40° 28'S, 177° 43'E, 1642-1683 m, 1 specimen;
F744, 41° 10'S, 176° 58'E, 1573-1609 m, 1 adult, 2 juvenile specimens;
G704, 46° 17'S, 172° 37'E, 1600 m, 1 specimen;

G705, 46° 04'S, 172° 28.5'E, 1500 m, 2 specimens;

G706, 45° 49'S, 172° 30'E, 1550 m, 1 specimen.

Remarks

Madsen (1961) has previously recorded this species from the Tasman Sea and Kermadec Trench. It is widespread in depths of 1158 to 6035 metres. The two juvenile specimens (Stn F744) are smaller than any listed by Madsen (1961). In the larger specimen ($R/r = 1.5/0.7$ mm) there is one marginal plate in each series extending midway along the ray. Superomarginal spines, cribriform organs and an epiproctal cone are absent. Abactinal embryonic plates are present, and the large crescentic terminal plate has three spines. There are four pairs of tube-feet. Marginal plates are lacking in the smaller specimen ($R/r = 1.0/0.5$ mm) and actinal embryonic plates are present. In both specimens the combined oral plates have one median spine and there are two spines on the adambulacral plates.

Family BENTHOPECTINIDAE

Cheiraster otagoensis n.sp. (Fig. 2)

Description

Rays five, flattened, gradually tapering, outline stellate.

Abactinal plates rounded non-tabulate, both larger and smaller plates occurring on disc and rays, the larger with one central spine encircled by eight to 15 basal spinelets, the smaller with one to nine spinelets. Papularium small, not inflated, situated at arm base, more or less V-shaped with four to nine papulae. Arms central, obscured by adjacent spinelets. Madreporite rounded (diameter 1 mm) with deep coarse sculpture, situated slightly over one-half r from disc centre.

Marginal plates slightly alternate throughout ray, subrectangular or subovoid, wider than long proximally, slightly longer

than wide distally. Both margin series with numerous small spinelets, in addition the supermarginals have one central tapering erect spine, the inferomarginals with one or sometimes two similar spines, the uppermost longest.

Oral plates conspicuous, subtriangular with a broadly convex furrow margin, pointed distally. Seven to nine slender, barely tapering furrow spines longest proximally and eight to 11 similar suboral spines paralleling the straight interradiial margin and in a distal group.

Adambulacral plates wider than long, slightly spaced with a conspicuous furrow projection. One erect tapering subambulacral spine, five to seven smaller, slender, barely tapering furrow spines and three to five smaller though similar spines along the lateral margins of the plate.

Actinal intermediate plates few, extending to the distal margins of inferomarginal one and adambulacral two, each with one to seven spinelets. Two to five pectinate pedicellariae in each interradius actinally,

each comb consisting of four to seven thickened, enlarged flattened spinelets.

Tube-feet biserial with small sucking discs.

Colour

'Disc grey with brown patches, arms light pink to red, underside cream, tube-feet yellowish'. (Field notes, Stn E410). In alcohol, dull cream to dull brown lighter on actinal surface.

Material Examined

NZOI Stns

- E399, 46°10'S, 171°33'E, 1222 m, 2 specimens;
 E405, 47°20'S, 169°55'E, 1004 m, 2 specimens;
 E410, 46°40'S, 170°44.6'E, 1086 m, 2 specimens;
 E414, 45°16'S, 171°49'E, 999 m, 1 specimen;
 F108, 48°19'S, 171°59'E, 1108 m, 4 specimens;

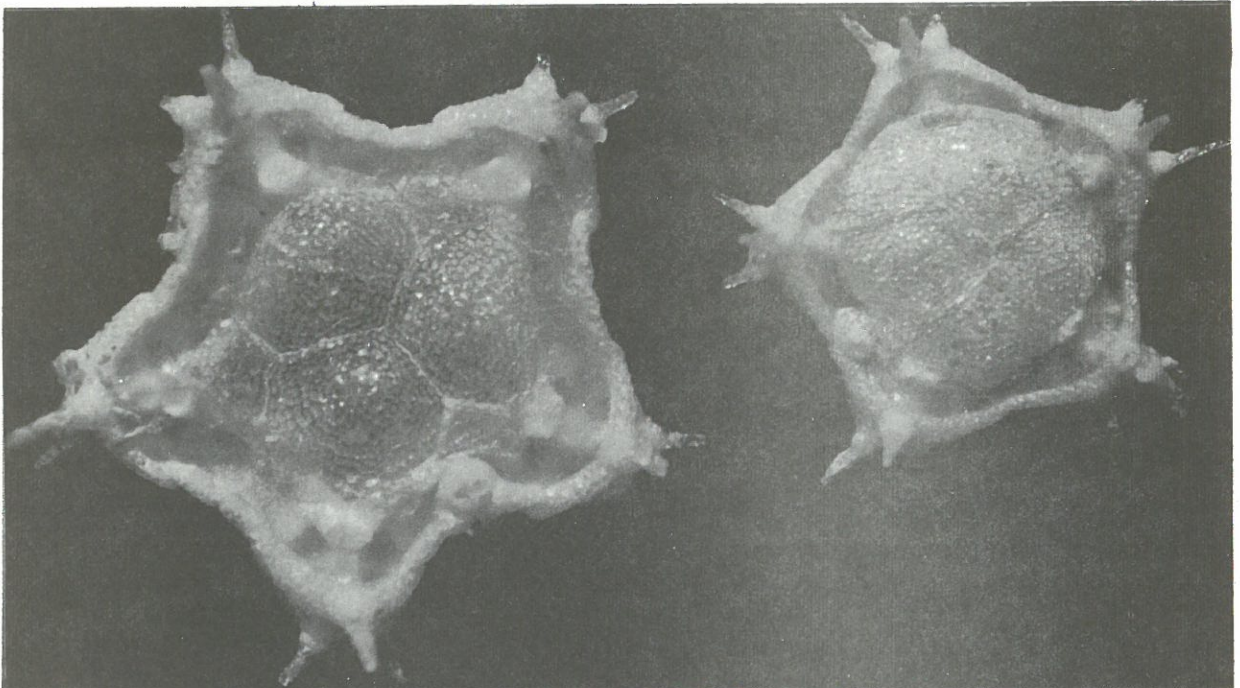


Fig. 1. *Porcellanaster caeruleus* Wyville Thomson, Juvenile specimens, abactinal surface.

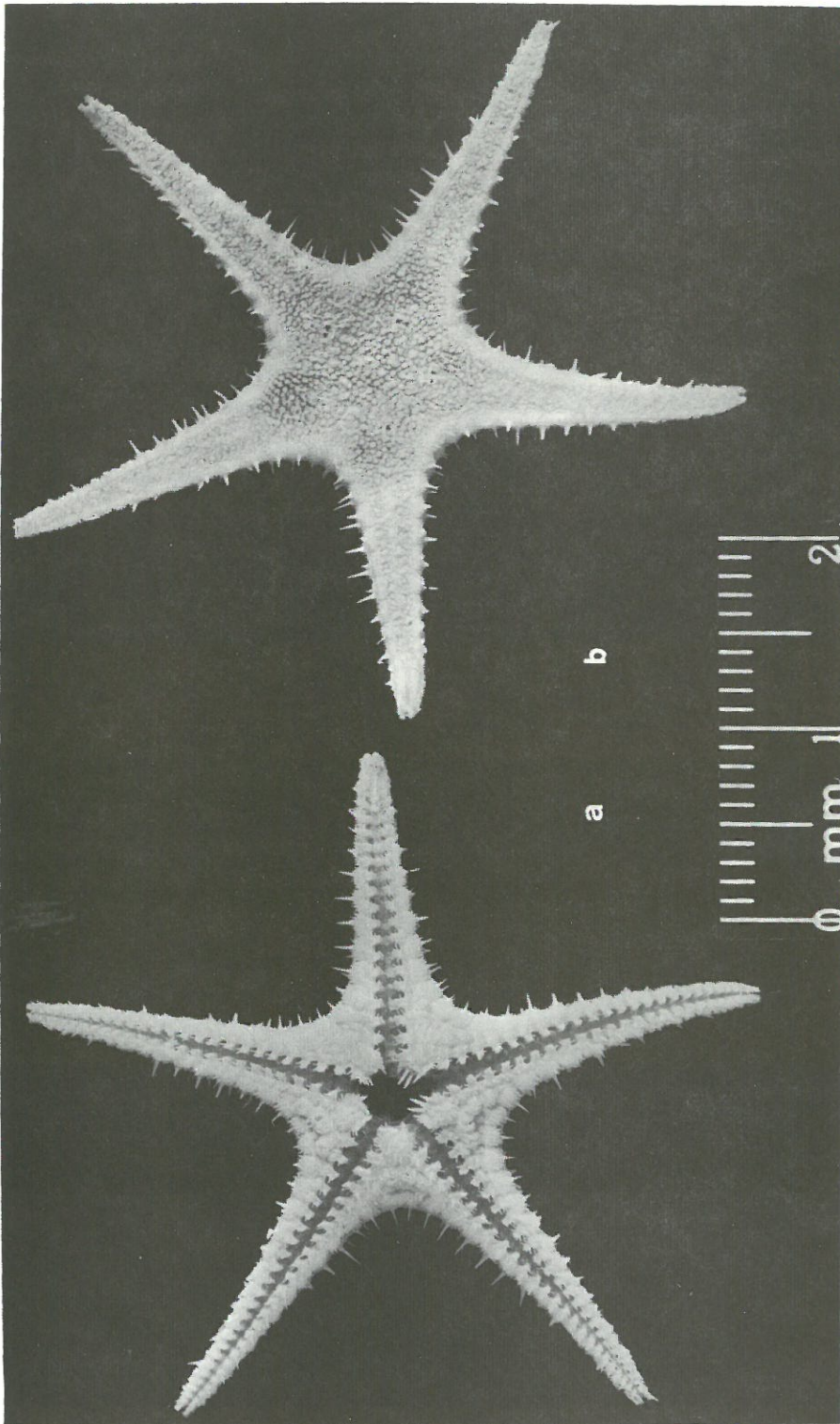


Fig. 2. *Cheiraster otagoensis* n.sp.; a. actinal surface; b. abactinal surface.

- F123, 47°38'S, 178°57'W, 1280 m, 1 specimen;
 F126, 49°48'S, 176°01'E, 1256 m, 2 specimens;
 F758, 42°37'S, 175°30'E, 1245 m, 3 specimens;
 F761, 42°33.2'S, 176°23.5'E, 1234-1205 m, 5 specimens.

Holotype

Deposited in the New Zealand Oceanographic Institute No. 151 (Stn E410).
 R/r = 21/5 mm.

Paratypes

Deposited in the New Zealand Oceanographic Institute No. P.208 (Stn E410).
 R/r = 20/5 mm; No. P.209 (Stn E399).
 R/r = 19/5, 23/6 mm.

Remarks

Cheiraster richardsoni Fell has abactinal pedicellariae, occasional superomarginal spines and four suboral spines, and *C. niascus* Fisher has seven to ten adambulacral furrow spines and usually has intermarginal fasciculate pedicellariae. No other species seem as closely related as these two.

Cheiraster monopedicellaris n.sp. (Fig.3)

Description

Outline stellate, rays five. Flattened, tapering, margin more or less vertical defined mainly by the superomarginals which project above the abactinal surface.

Abactinal plates of disc and ray rounded, slightly spaced, the larger with one central spine and nine to 18 basal spinelets in a single or double circle; the smaller with three to five spinelets. Papularium at arm base, more or less V-shaped, not distended containing three to five papulae. Anus central not prominent. Madreporite close to margin, small, rounded (diameter

1.5 mm) tumid, with deep coarse sculpture almost concealed by the spinelets of adjacent plates.

Marginal plates large, the lateral face of disc and ray high and vertical. All marginals wider than long except distal inferomarginals which are slightly longer than wide, subalternate throughout ray. Superomarginals occupying most of lateral surface of ray and projecting above the abactinal surface. Besides the covering of spinelets the superomarginals have one central erect tapering spine and the inferomarginals have three similar spines proximally, the central one largest, and two spines throughout the ray, the uppermost largest, occasionally with one or two enlarged spinelets.

Oral plates subtriangular, broadest proximally, short, with seven to ten furrow spines, larger proximally, and eight to ten similar suboral spines, along the interradial margin and in a distal group.

Adambulacral plates wider than long with a conspicuous furrow prominence, slightly spaced. One erect subambulacral spine. Seven to nine smaller furrow spines and two to five similar spines on the lateral margins of the plate.

Actinal intermediate plates extending to proximal margin of adambulacral three or four and distal margin of inferomarginal two, small, rounded with one to five spinelets. In each interradius is a single large pectinate pedicellariae with each comb comprising six to seven enlarged flattened curved spinelets.

Tube-feet biserial with small sucking discs.

Colour

'Disc grey, arms pale pink, cream under'. (Field notes, Stn E712). In alcohol, disc light grey abactinally, arms and actinal surface cream.

Material Examined

NZOI Stn

E712, 39°20'S, 178°15.8'E, 772-717 m, 2 specimens.

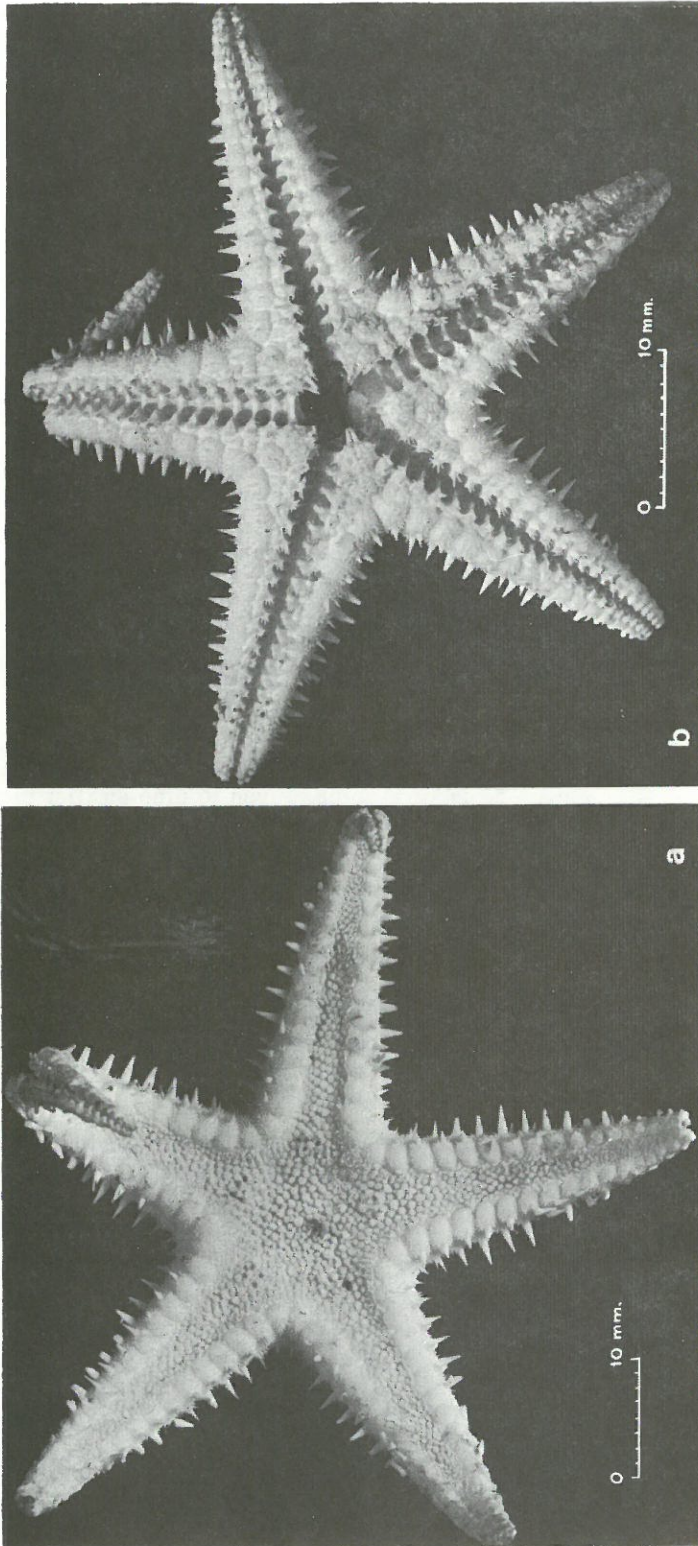


Fig. 3. *Cheiraster monopedicellaris* n.sp.; a. abactinal surface; b. actinal surface.

Holotype

Deposited in the New Zealand Oceanographic Institute No. 152. R/r = 39/7 mm.

Paratype

Deposited in the New Zealand Oceanographic Institute No. P.210. R/r = 35/6 mm.

Remarks

This species is distinguished from the preceding one by the single large actinal pedicellariae in each interradius, the more numerous adambulacral and inferomarginal spines and the fewer papulae. The relative dimensions of both specimens are similar but in *C. monopedicellaris* the ambital height is more than 75% r and in *C. otagoensis* it is less than 50% r. *Cheiraster richardsoni* Fell has abactinal pedicellariae and lacks the regular superomarginal spine and *C. niascus* Fisher has fewer papulae and has intermarginal fasciculate pedicellariae.

Family ODONTASTERIDAE

Odontaster aucklandensis n.sp. (Fig. 4)**Description**

Outline subpentagonal, interbrachial arcs regularly rounded, body flattened. Rays five, marginal plates conspicuous, ambitus high and vertical.

Abactinal plates stellate basally on papular areas rounded and larger elsewhere, all tabulate, highest on papular areas, only half as high elsewhere.

Tabulae of plates on papular areas with 12 to 20 peripheral spinelets in a single or double row enclosing seven to 12 spinelets, elsewhere tabulae with 18 to 22 spinelets and three to six small glassy granules much lower than the spinelets. Spinelets non-tapering, subtruncate and finely serrate but lacking terminal glassy points. Papulae four to six around each plate occurring in a circle around centre of

disc and in a separate subpetaloid radial area extending from about one-quarter r from disc centre to near arm tip, widest at about one-half R, twice as wide as non-papulate interradial area.

Anus subcentral partly obscured by spinelets. Madreporite just less than one-half r from disc centre, rounded, (diameter 1.5mm) with deep coarse radiate sculpture.

Marginal plates large, block-like, encroaching on abactinal and actinal areas, opposite throughout ray, separated by deep narrow grooves, the inferomarginals projecting slightly, except at arm tip. Superomarginals slightly more tumid than inferomarginals, raised above abactinal surface the distal two or three pairs in contact on radial midline. All marginals wider than long except the odd interradial superomarginal which tapers towards the margin. Both series with spines similar to those on the abactinal surface but slightly longer on the inferomarginals and also with scattered glassy granules. Terminal plate small, subtriangular, truncate proximally, with similar spinelets and granules.

Oral plates small subtriangular each pair with a large smooth recurved spine projecting over the distal edge of the plates. Each oral plate with six or seven furrow spines, slightly larger distally and three or four suboral spines, largest proximally, paralleling the distal two-thirds of the major recurved spine.

Adambulacral plates subrectangular, wider than long throughout ray, the first with three or four blunt furrow spines and six or seven similar subambulacral spines in two transverse series, decreasing in size from the furrow. Succeeding plates with two or three furrow spines and four to six subambulacral spines similarly disposed. Distal plates with one furrow and four subambulacral spines in a single transverse series.

Actinal intermediate plates squarish in four to six chevrons, extending for about two-thirds R along ray, with up to 22 spinelets similar to those on the abactinal

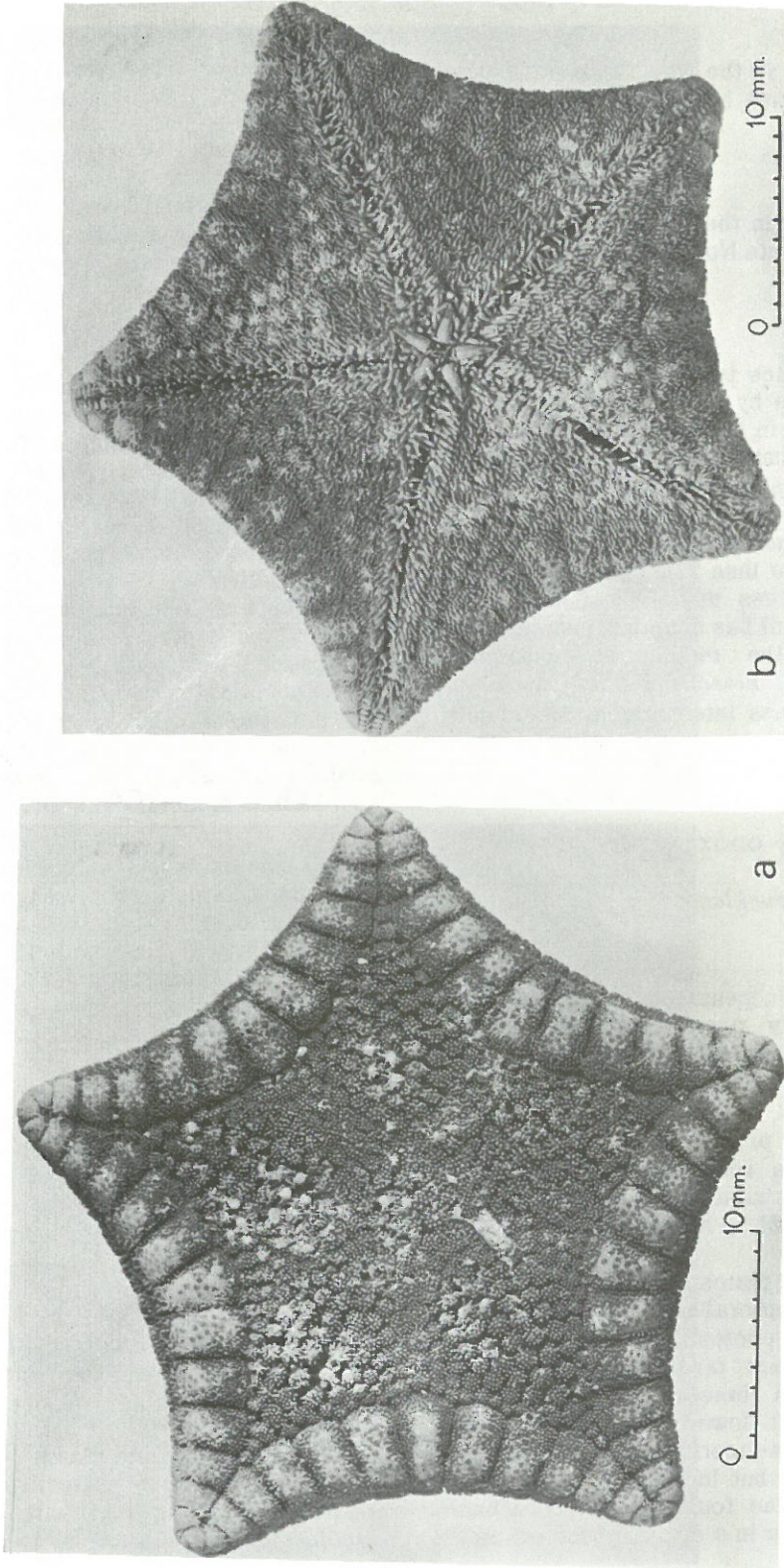


Fig. 4. *Odontaster aucklandensis* n.sp.; a. abactinal surface; b. actinal surface.

and marginal plates, slightly shorter than the subambulacral spines, as well as up to six smooth glassy granules.

Tube-feet biserial, distinctly suckered.

Colour (ex alcohol)

Dull brown or cream.

Material Examined

NZOI Stns

- D104, 50°49.2'S, 166°15.6'E, 95 m, 1 specimen;
 D176, 51°06'S, 167°48.5'E, 216 m, 1 specimen;
 D193, 50°40.5'S, 166°21.5'E, 71 m, 1 specimen;
 D194, 50°44'S, 166°21'E, 95 m, 1 specimen;
 D200, 50°22'S, 167°28'E, 113 m, 4 specimens;
 D208, 49°18'S, 171°46.5'E, 113 m, 1 specimen.

Holotype

Deposited in the New Zealand Oceanographic Institute No. 153 (Stn D176).
 R/r = 18/13 mm.

Paratypes

Deposited in the New Zealand Oceanographic Institute No. P.211 (Stn D200).
 R/r = 11-7/8-5 mm.

Remarks

Odontaster benhami (Mortensen) has similar glassy granules but the spinelets have small terminal points. *Odontaster crassus* (Fisher), *O. penicillatus* (Philippi) and *O. pusillus* (Koehler) lack the glassy granules.

Hoplaster Perrier

Small pentagonal-stellate forms with five short, tapering arms. Abactinal plates convex each with a cluster of short spine-

lets. Secondary abactinal plates absent. Marginal plates conspicuous, non-alternate similarly spinulose. An unpaired interradial marginal in both series. Oral armature spiniform, lacking the median recurved unpaired tooth. Adambulacral armature spiniform in three longitudinal series (one furrow and two subambulacral). Actinal intermediate plates extending along ray, spinulose. Fasciculate actinal pedicellariae present or absent. Superambulacral plates apparently absent. Interradial septum membranous. The genus has been previously reported only from the North Atlantic. It agrees in most respects with the *Odontasteridae* except for the lack of the median recurved tooth at the apex of the jaws.

Hoplaster kupe n.sp. (Fig. 5)

Description

Outline pentagonal-stellate, rays five, short, tapering, body more or less flat.

Abactinal plates ovoid and adjacent on disc centre and interradially, slightly spaced on radial areas, connected by five or six short lobes. Plates subtabulate or convex with a flaring cluster of short smooth spinelets each about 1 mm in length with a small blunt slightly expanded tip. On each plate there are one to five central spinelets surrounded by eight to 11 slightly shorter peripheral spinelets.

Abactinal plates extending to terminal plate, secondary plates absent. Up to six papulae around each plate, absent from a narrow subtriangular area extending along the margin and interradially towards the disc centre.

Anus indistinguishable. Madreporite small, low, slightly tumid, subcircular (diameter 1.5 mm) with coarse radiate sculpture, situated about one-half r from the interradial margin.

Marginal plates conspicuous, non-alternate. Odd interradial marginal present in both series. Paired marginals of both

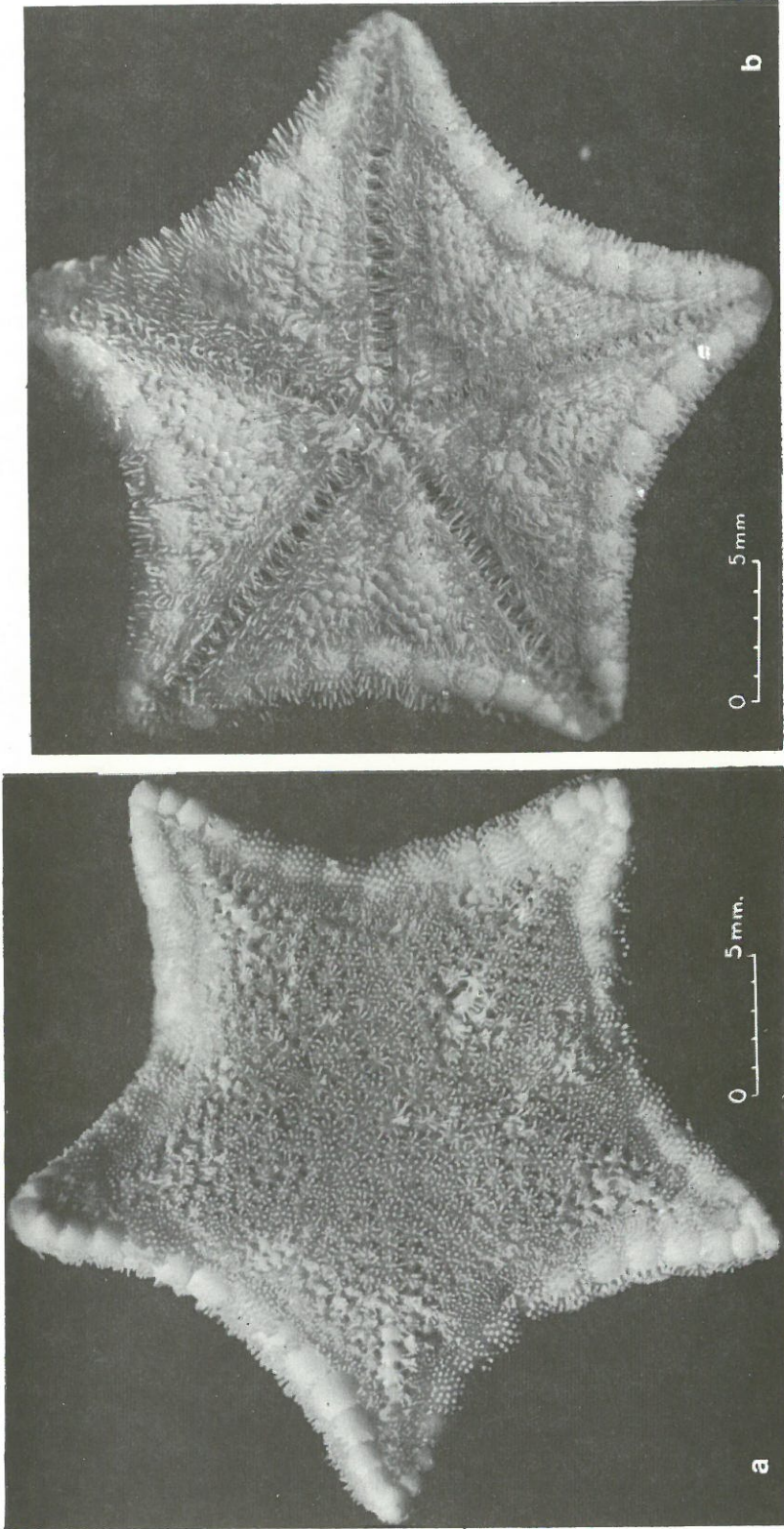


Fig. 5. *Hoplaster kupe* n.sp.; a. abactinal surface; b. actinal surface.

series quadrate, becoming wider than long distally. Odd interradial marginals wedge-shaped, the superomarginal widest toward the disc centre, the inferomarginal widest at margin. Both series covered with short blunt spinelets, longest on the lateral margins, similar to those on the abactinal plates. Terminal plate small, subtriangular with a truncate proximal apex, covered with similar spinelets.

Oral plates large, trigonal with a conspicuous median suture. Seven sharply pointed tapering furrow spines, diminishing in size distally, and 13 to 15 similar suboral spines in two longitudinal series.

Adambulacral plates subquadrate, furrow margin weakly convex, as wide as long, throughout ray. Three or four tapering furrow spines and six to eight shorter though otherwise similar subambulacral spines in two longitudinal series, the outer sometimes irregular. On distal plates, one subambulacral spine is enlarged.

Actinal intermediate plates ovoid, in five chevrons extending for about three-quarters R, with one large subtriangular plate immediately distal to the combined oral plates. Each plate with 15 to 20 slightly rugose tapering spinelets. Fasciculate pedicellariae are occasionally present, each comprised of three to six curved and erect though otherwise unmodified spinelets.

Interradial septum membranous. Superambulacral plates absent.

Tube-feet biserial, distinctly suckered.

Colour (ex alcohol)

Creamy white.

Material Examined

NZOI Stns

- J42, 36°50'S, 170°26'E, 1996-2008 m, 2 specimens;
 J44, 36°40'S, 170°13'E, 2068-2062 m, 2 specimens;
 J51, 36°52'S, 170°42'E, 1975-2000 m, 1 specimen.

Holotype

Deposited in the New Zealand Oceanographic Institute No. 154 (Stn J42). R/r = 16/10 mm, with 15 marginals to the interbrachial arc.

Paratypes

Deposited in the New Zealand Oceanographic Institute.

No. P212 (Stn J42). R/r = 13.5/9 mm.

No. P213 (Stn J44). R/r = 18/10 mm;
 14.5/9.4 mm.

No. P214 (Stn J51). R/r = 16/9.5 mm.

Remarks

Hoplaster spinosus Perrier is based on smaller specimens which may be juveniles since the madreporite, papulae and pedicellariae are apparently lacking, R is 6.5 mm and there are only seven marginals in the interbrachial arc. The present species is a generally more spinulose, larger form (R 16-18 mm with 15 marginal plates) with lobate radial abactinal plates, though the spinules on the plates, especially the abactinal plates, appear shorter than in *H. spinosus*. The main difference between the two species is the greater number of spinules suborally and on the actinal intermediate plates.

Family ASTERIIDAE

Comasterias dyscrita H.L. Clark

Clark, H.L. 1916 : 71-2, pl. 29 (1 2);
 Fell, 1958 : 20, pl. 2 (D, E, H).

Material Examined

NZOI Stns

- A910, 43°04'S, 178°39'W, 549 m, 4 specimens;
 C645, 39°18'S, 172°00'E, 442 m, 1 specimen;
 E840, 33°52'S, 172°16'E, 757-729 m, 1 specimen;
 E885, 38°58'S, 173°16'E, 449-462 m, 7 specimens.

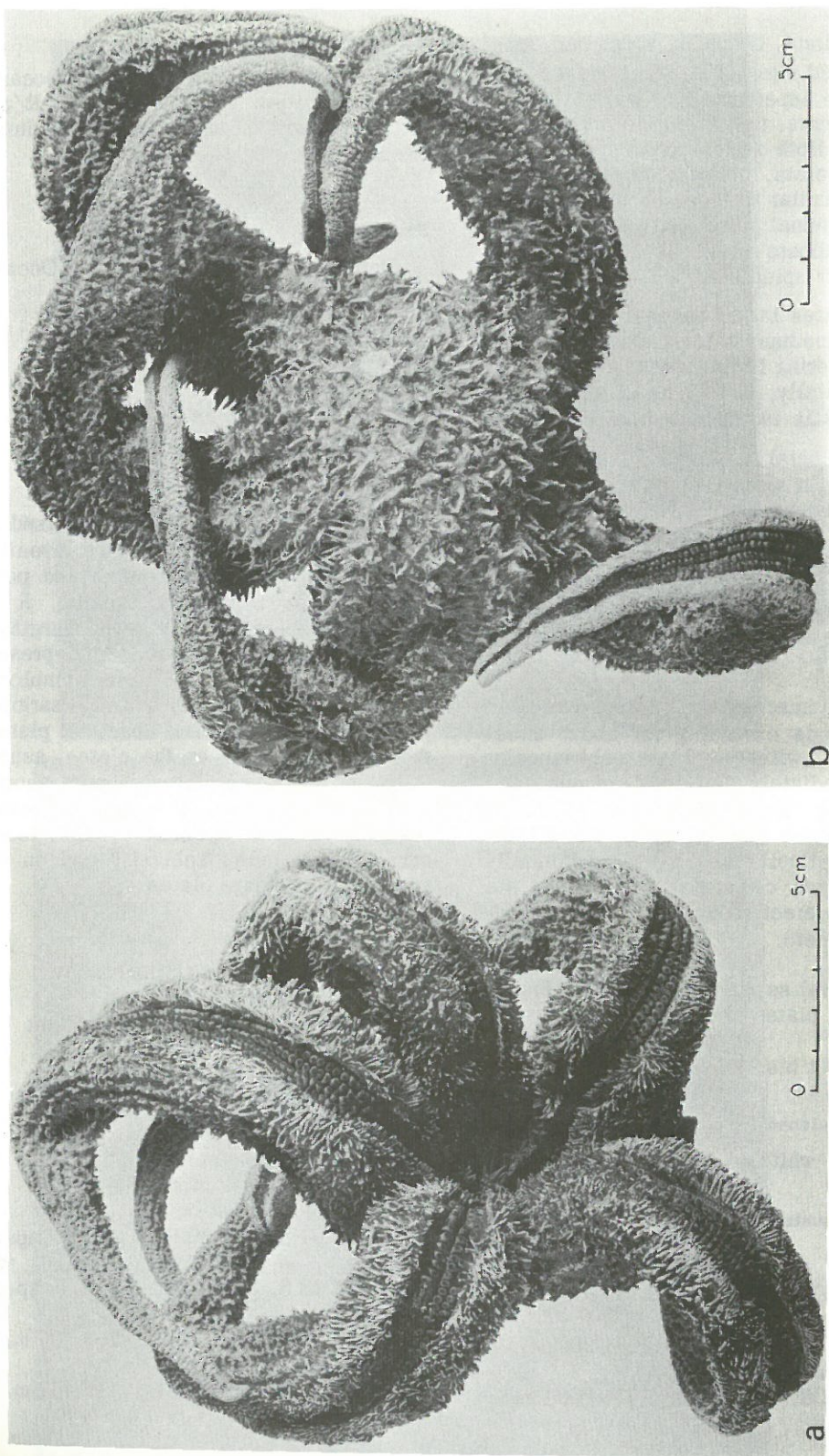


Fig. 6. *Perissasterias monocantha* n.sp.; a. actinal surface; b. abactinal surface.

Remarks

The specimens vary from R/r = 103/14 mm (Stn E840) to R/r = 6/2 mm (Stn A910). In the smaller specimens the adambulacral plates are regularly diplacanthid, there is a single series of non-spiniferous actinal intermediate plates extending for about one-quarter R, and felipedal pedicellariae are absent. In all larger specimens the adambulacrals are triplacanthid, or mixed triplacanthid and diplacanthid on one or more rays. The largest specimen is regularly triplacanthid with three series of spiniferous actinal intermediate plates. Large felipedal pedicellariae abactinally and actinally and smaller lanceolate straight pedicellariae are present along the furrow margin.

Periassasterias H.L. Clark

Large five to seven rayed forms with disc relatively small and rays long and tapering. Abactinal plates cruciform, connected transversely by oblong secondary ossicles. Carinal series evident. Weakly defined dorso-lateral longiseries may be evident. Carinals with one to six spines, dorsolaterals usually with one, marginals with two or three and actinals with two to five spines. Actinals in three to six longiseries of four-lobed plates. Adambulacral plates short with four or five (two to seven) spines in a transverse series. Two or three pairs of adambulacral plates in the post-oral carina. Crossed pedicellariae small, non-distinctive, forming wreaths around abactinal and marginal spines. Straight pedicellariae small lanceolate, present on adambulacral spines and elsewhere. The genus has not been reported previously outside of South African waters where it is represented by three species.

Periassasterias monocantha n.sp. (Fig. 6)**Description**

Disc small, rays five long and tapering.

Abactinal plates triradiate or cruciform, irregular on disc; on ray the carinals are

distinct and in contact, the dorsolaterals irregular, the marginals regular but not conspicuous. Small oblong ossicles connect the plates in irregular transverse series. Carinals, dorsolaterals and superomarginals each with one prominent tapering spine, up to 4 mm in length, shorter on superomarginals with a basal circlet of crossed pedicellariae. Inferomarginals with two similar spines, similarly wreathed. Papulae numerous up to 15 in larger skeletal meshes of disc and arm base, fewer on ray.

Actinal intermediate plates in two series, the inner extending to near arm tip, the outer extending for one-third R along ray, separated by one to three papulae, each plate with two, occasionally one, spines slightly longer, heavier and blunter than the inferomarginal spines, with the tip slightly flattened, each with a wreath of crossed pedicellariae. Adambulacral plates very short with four non-tapering, partly flattened, blunt-tipped spines in a single transverse row, carrying straight pedicellariae which do not form clusters. Two or three proximal adambulacral plates forming a post-oral carina.

Oral plates small with three furrow spines facing over the actinosome, the outer two small, and one suboral spine.

Madreporite polygonal, 7 mm in greatest diameter, with fine radiate sculpture, interradially.

Crossed pedicellariae small, (length 0.25 mm) non-distinctive, in wreaths around abactinal marginal and actinal intermediate spines. Straight pedicellariae, slender and lanceolate (length 0.5 mm) scattered over abactinal surface, on adambulacral spines and along furrow margin.

Tube-feet quadriserial except at arm tip, distinctly suckered.

Colour (ex alcohol)

Light yellow or dull pinkish-brown.

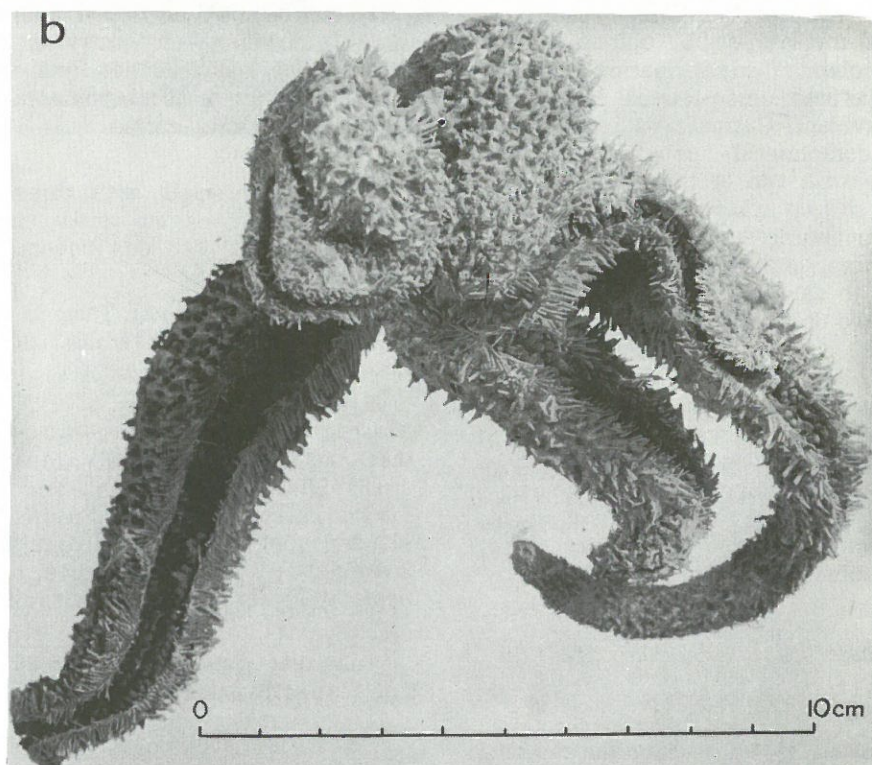
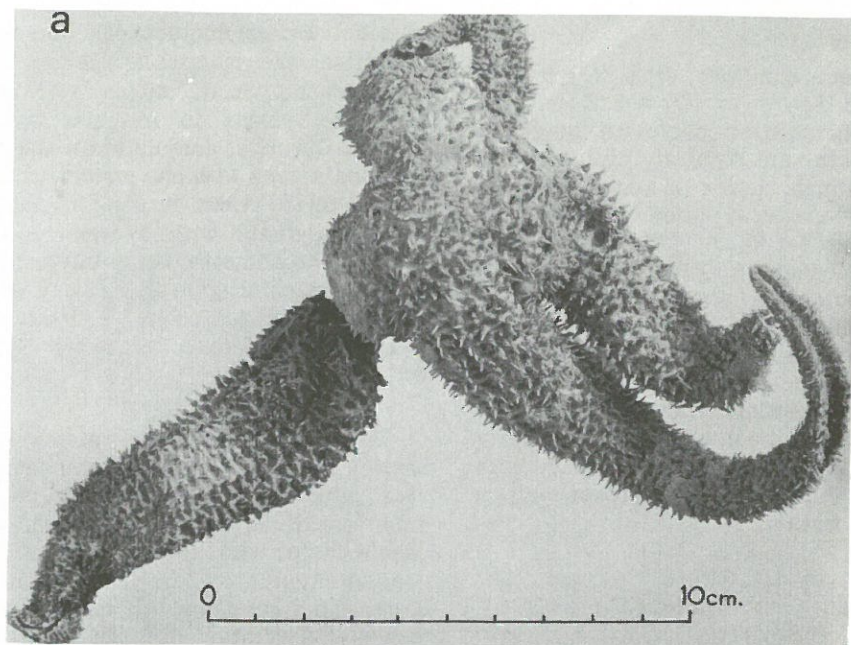


Fig. 7. *Taranuiaster novaezealandiae* n.gen. et sp.; a. abactinal surface; b. actinal surface.

Material Examined

NZOI Stn

D138, 48°32'S, 168°19.5'E, 668 m, 2 specimens.

Holotype

Deposited in the New Zealand Oceanographic Institute No. 155. R/r = 315/38 mm.

Paratype

Deposited in the New Zealand Oceanographic Institute No. P215. R/r = 78/14 mm.

Remarks

Perissasterias obtusispina H.L. Clark and *P. polyacantha* H.L. Clark are more spinulose forms with more series of actinal intermediate plates and *P. hepactis* H.L. Clark has seven rays, crossed pedicellariae are uncommon, and there are more series of actinal intermediate plates.

Taranuiaster n.gen.

Diagnosis

Abactinal plates transverse-elongate, carinal series not superficially distinguishable. Carinal dorso-lateral and superomarginal plates cruciform, inferomarginals lacking the lower lobe. Small oblong or lobate elongate ossicles connect the carinal and dorsolateral series over most of ray, in three or four irregular longiseries at arm base. Distinct longitudinal and irregular transverse series evident throughout ray. Carinal, dorsolaterals and superomarginal with one erect tapering occasionally flattened spine, inferomarginals with two erect flattened truncate spines in a slightly oblique transverse series. Larger secondary connecting ossicles with one erect spine. Intermarginal channel broad. Papulae numerous in skeletal meshes also occurring intermarginally and actinally. Actinal intermediate plates absent. Adambulacral plates regularly diplacanthid.

Crossed pedicellariae small, not distinctive, in wreaths around abactinal and superomarginal spines, and on outer face of both inferomarginal spines. Felipedal pedicellariae present intermarginally and actinally, smaller lanceolate straight pedicellariae present on furrow margin of adambulacral and oral plates. Rays five, tube-feet quadriserial.

Type Species

Taranuiaster novaezealandiae n.sp.

Remarks

Stylasterias and *Distolasterias* have distinctive crossed pedicellariae and *Lethasterias* has distinctive fluted spines. Spineless actinal intermediate plates are present in all three genera. *Stephanasterias* and *Aphelasterias* have three or four inferomarginal spines and *Aphanasterias* has compound pedicellariae. *Perissasterias* comprises more spinulose forms with actinal intermediate plates, with lanceolate straight pedicellariae on the adambulacral plates and lacking felipedal pedicellariae. *Diplasterias* which may be the closest relative has actinal intermediate plates and lacks felipedal pedicellariae.

The generic name (feminine gender) is derived from the collecting ship, M.V. *Taranui*.

Taranuiaster novaezealandiae n.sp. (Fig.7)

Description

Discs small, rays five, elongate, tapering.

Abactinal plates of disc with three to five basal lobes. On the ray the carinal dorsal-lateral and superomarginal series are cruciform and the plates overlap. The superomarginal series with a long lower lobe. Small elongate oblong or lobate secondary ossicles connect the carinal and dorsolateral series forming irregular transverse series. Intermarginal channel broad, inferomarginals overlapping with only the upper lobe produced.

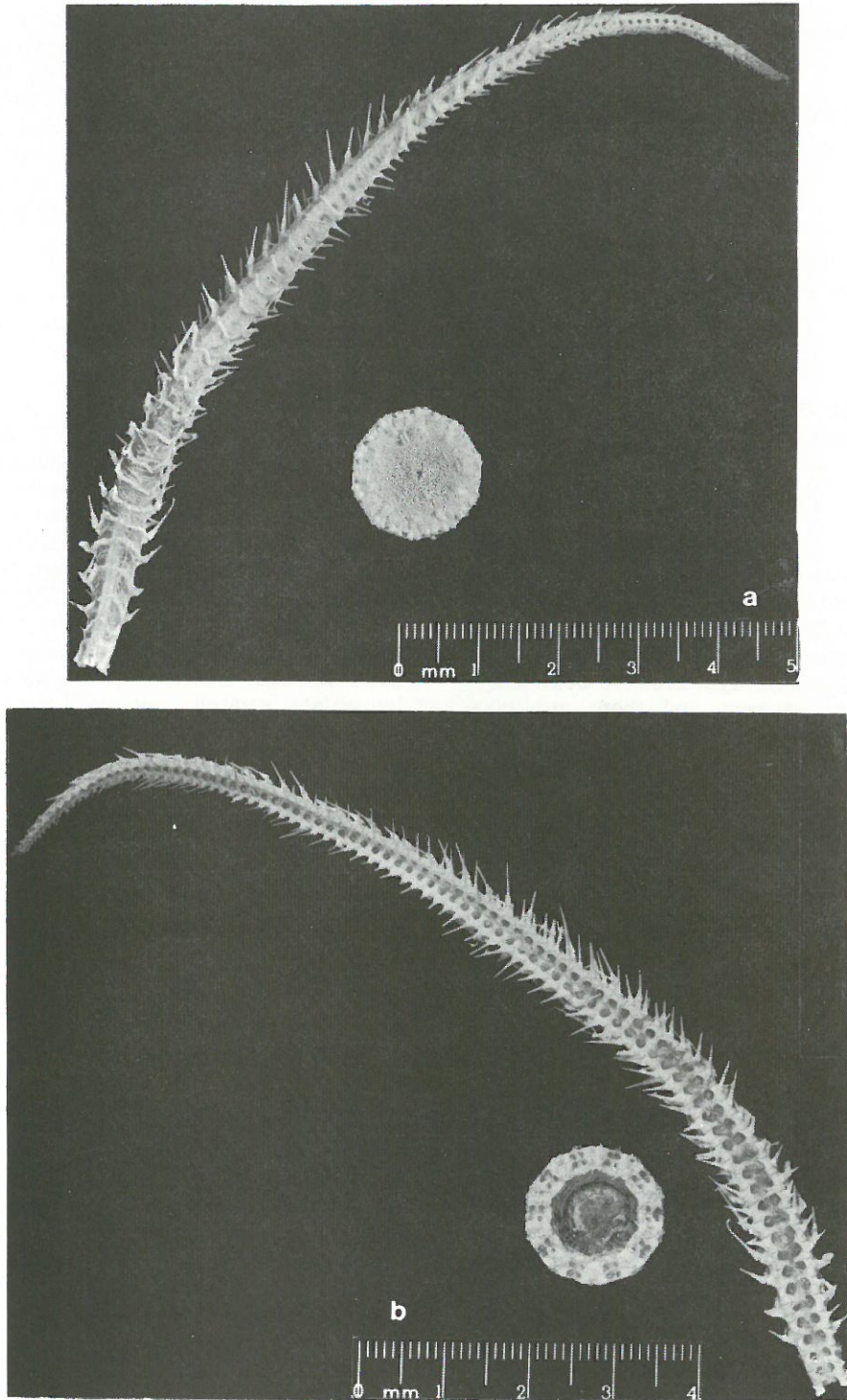


Fig. 8. *Brisingella aotearoa* n.sp.; a. abactinal surface of disc and ray; b. actinal surface of disc and ray.

Carinal series not superficially distinguishable until the skin covering is removed. Carinal dorsolateral, superomarginal and larger secondary ossicles with one pointed, sometimes flattened spine (length 2.5 to 3.5 mm). Inferomarginals with two flattened truncate spines (length 4.0 to 4.5 mm) in an oblique truncate series, the lower the longer. Crossed pedicellariae in circlets around abactinal and superomarginal spines, on outer face of inferomarginal spines only. Papulae numerous, up to 15 in larger skeletal meshes, also occurring intermarginally and between the inferomarginals and adambulacrals. At base of ray there are about seven longiseries of abactinal spines between the superomarginal series. Near tip of ray there are three series, the connecting ossicles being absent.

Actinal intermediate plates absent. Oral plates short and small, each with two short spines in a vertical series facing into the actinosome. Adambulacral plates short, the first two pairs of adjacent rays joined on interradial margin, the third pair just separated. Adambulacral plates regularly diplacanthid throughout ray, the spines 3.5 to 4.0 mm in length, the inner tapering and pointed, the outer truncate and flattened distally.

Madreporite subcircular (diameter 5 mm), low with fine radiate sculpture, near the interradial margin.

Crossed pedicellariae small, (length 0.2 to 0.3 mm), not distinctive, in wreaths around bases of abactinal and superomarginal spines, on outer face of inferomarginal spines only. Felipedal straight pedicellariae, up to 2 mm in length with five or six blunt spines occur intermarginally and between the inferomarginal and adambulacral plates. Smaller lanceolate straight pedicellariae, up to 0.5 mm in length occur along the furrow margin of the adambulacral and oral plates.

Tube-feet quadriserial, distinctly suckered.

Colour (ex alcohol)

Creamy-white or dull yellow-brown.

Material Examined

NZOI Stns

F873, 37°19.5'S, 178°11'E, 1050-1053 m, 1 specimen;
J55, 44°05.5'S, 176°12'E, 198 m, 2 specimens.

Holotype

Deposited in the New Zealand Oceanographic Institute No. 156 (Stn J55). R/r = 183/29 mm, one ray detached.

Paratypes

Deposited in the New Zealand Oceanographic Institute P.216 (Stn J55). R/r = 39/6 mm. One ray missing;
P.217 (Stn F873). R/r = 40/6 mm.

Family BRISINGIDAE

Brisingella Fisher

Differing from *Brisinga* in having one gonad on either side of ray. First adambulacral plate separated from that of adjacent rays by the outer ends of the combined oral plates. Interradial pair of marginal plates united by adoral ends only forming a λ -shaped structure with the unpaired interradial plate. Rays slender, deciduous with a non-muscular symphysis uniting first and second adambulacrals and abactinal part of second and third adambulacrals. Adambulacral plates longer than broad, furrow spinelets few or absent, one sharp unmodified subambulacral spine. Oral plates small. No papulae.

Brisingella aotearoa n.sp. (Fig. 8)

Description

Disc small, rounded margin more or less vertical. Rays eight to ten, tapering, at least seven times r in length, deciduous.

Abactinal surface of disc covered by small rounded plates, each with one short fluted spinelet, slightly widened at the tip with one to four terminal points. Minute crossed pedicellariae occur around the spine base but do not form conspicuous wreaths. Anus subcentral, distinct, lacking specialised encircling armature. Marginal disc plates raised, madreporite situated on a marginal, rounded (diameter 1.5 mm), slightly tumid with coarse irregular radiate sculpture, and also with a few spinelets similar to those on the abactinal plates.

Rays elongate, tapering, wider than high, divided into proximal portion, genital inflation and distal portion in the proportions of 5%, 25% and 70% of the arm length, respectively. Eighteen to 21 costae, weaker distally, composed of small elongate plates with occasional small spinelets; one costae to every two adambulacral plates, costae alternating with two or three transverse bands of minute crossed pedicellariae. Intercostal integument without imbedded plates. Marginal spine (length 4 to 5 mm) sharply pointed with fine longitudinal striations and a coating of minute pedicellariae.

Adambulacral plates concave on furrow margin (length 2 to 2.5 mm; width 1 to 1.5 mm). One small proximal furrow spine, coated with pedicellariae directed across the furrow and one larger pointed subambulacral spine (length 2 mm) longitudinally striated and with a coating of pedicellariae, placed just distal of the plate centre. Proximal adambulacral plates occasionally with one small distal furrow spine and the subambulacral spine more or less central.

Oral plates four-sided, pointed distally, and separating the first pair of adambulacral plates of adjacent rays. Each oral plate with two short proximal furrow spines projecting over the actinosome, one larger proximal suboral spine and often with one small lateral furrow spine projecting over the furrow.

Colour (ex alcohol)

Pale yellow-cream or light brown, tube-

feet darker. Gonads light orange visible through the intercostal integument.

Material Examined

NZOI Stns

- C605, 43°40'S, 179°30'E, 441-461 m, 1 disc, arm fragments;
 D206, 50°36'S, 171°23.5'E, 529 m, 3 discs, arm fragments;
 D207, 50°04'S, 171°23'E, 510 m, arm fragments;
 D208, 49°18'S, 171°46.5'E, 113 m, arm fragments;
 D211, 48°53'S, 172°17.5'E, 519 m, 1 disc, arm fragments;
 E120, 42°59'S, 175°29'W, 872 m, arm fragments;
 E433, 43°43'S, 174°30'E, 571 m, arm fragments;
 E724, 37°23.3'S, 178°00.5'E, 645-631 m, arm fragments;
 F115, 49°18.5'S, 179°52'E, 1518 m, arm fragments;
 F126, 49°48'S, 176°01'E, 1256 m, 1 disc, arm fragments;
 F128, 49°09'S, 177°18'E, 978 m, arm fragments;
 F137, 51°42'S, 171°31'E, 519 m, arm fragments;
 F138, 52°03'S, 170°23'E, 353-342 m, arm fragments;
 F755, 43°00'S, 174°30'E, 854-748 m, arm fragments.

Holotype

Deposited in the New Zealand Oceanographic Institute No. 157 (Stn D206), 1 disc, 1 detached ray, R/r = 138/8 mm.

Paratype

Deposited in the New Zealand Oceanographic Institute No. P218 (Stn D206), 2 discs, one with attached arm, plus detached arms.

Remarks

Related species are *Brisingella fragilis* (Fisher) with incomplete secondary costae and a single distal furrow spine, *B. pusilla* (Fisher) with 25 to 30 costae, and a single

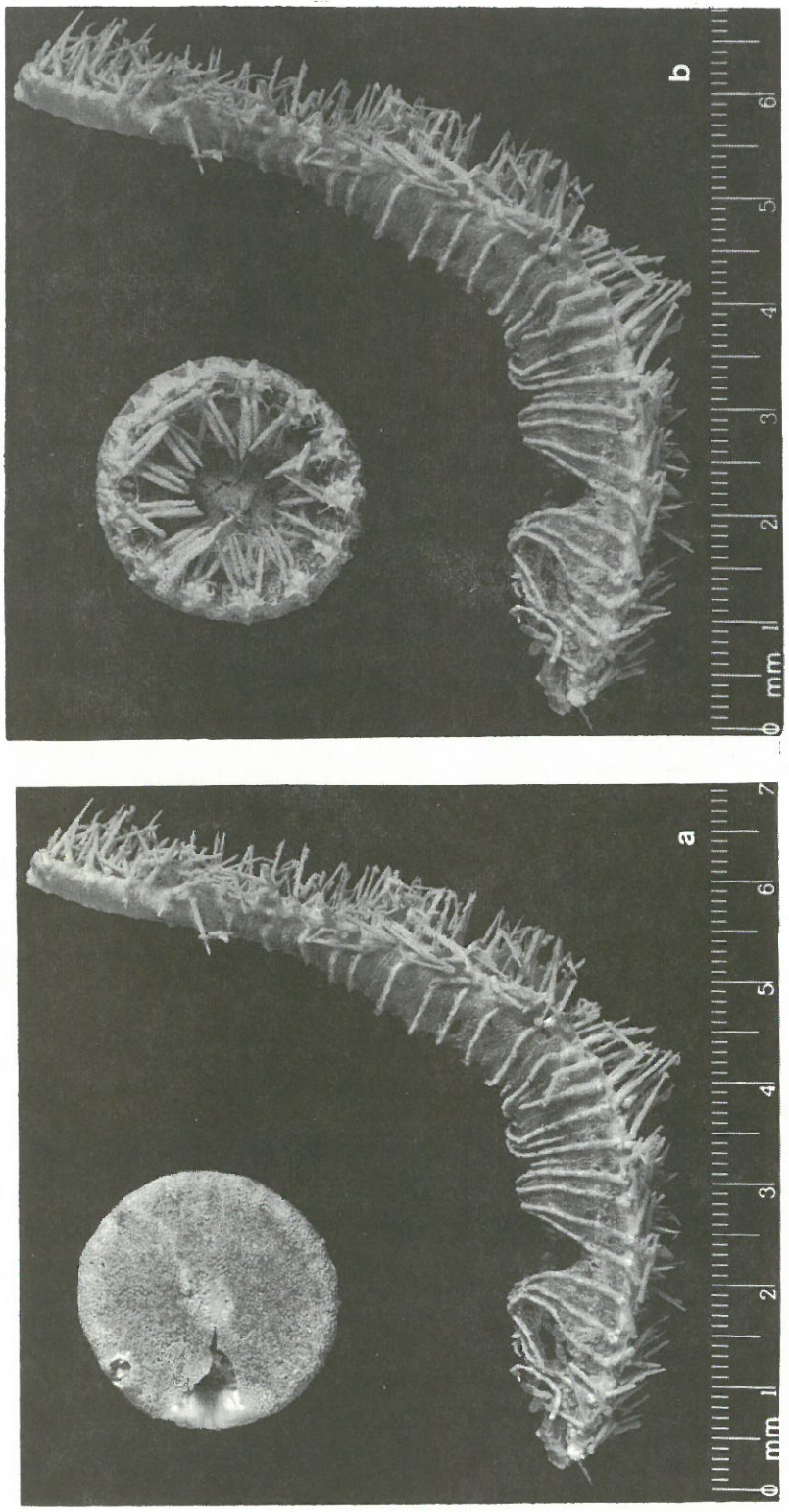


Fig. 9. *Craterobrisinga chathamica* n.sp.;
a. abactinal surface of disc and lateral surface of ray;
b. actinal surface of disc and lateral surface of ray.

distal furrow spine, and *B. pannychia* Fisher with more than 19 costae and regular proximal and distal spines. The nearest geographic relative *B. discincta* (Sladen) has three or four furrow spines and only two or three proximal costae, the remainder being rudimentary. Brisingenid arms from west of Cape Farewell 909-915 metres, (H.E.S. Clark 1970 : 27) probably belong to the species described above.

Craterobrisinga Fisher

Resembling *Brisinga* in appearance and in having serial gonads and closely opposed first marginal and adambulacral plates of adjacent rays, but differing in having proximally two conspicuous subambulacral spines, either the larger or both with the tip enlarged, capitate and often truncate. Costae usually numerous, genital region extended. Adambulacral plates short, armature crowded. A non-muscular symphysis between first and second adambulacral plates and between dorsal end of second and third ambulacral ossicles. Lateral and major adambulacral spines long and bristling.

Craterobrisinga chathamica n.sp. (Fig. 9)

Description

Disc small, rounded, rays 13, deciduous, elongate, tapering.

Disc plates small, ovoid, each with one short, skin-covered spinelet. The spinelets are slender and taper to a single point, but appear papilliform due to the slim cover.

Rays swollen in costal region which occupies the basal third or more of ray. At the base there are three to five inconspicuous costae followed by at least 19 well-spaced, prominent irregular costae composed of small oblong plates with occasional small skin covered spinelets. Intercostal integument with small prickles and one transverse band of minute crossed pedicellariae between costae. Distal portion of ray not inflated with occasional

spaced irregular indistinct transverse ridges. Marginal spine pointed, up to 6 mm in length, with coating of minute crossed pedicellariae. Costae spaced at about every second or third adambulacral plate.

Oral plates small, with six large blunt proximal spines, (length 4.5 to 5 mm), longitudinally striated and with a coating of minute crossed pedicellariae, placed one above the other, the uppermost longest, projecting over the actinosome, and two much smaller, blunt spines distally placed and projecting over the furrow, similarly clad but not striated.

Adambulacral plates short (length 2 mm), and about as wide proximally, with two furrow spines one proximal and one distal, each pointed and erect with a coating of pedicellariae. Subambulacral spines central or just distal of centre, two in number, both longitudinally striated and with a coating of pedicellariae. The inner, up to 5.5 mm in length sharply pointed, the outer, 6.5 mm in length is thicker and slightly expanded distally with several terminal points, one or two of which may be enlarged. Distal adambulacral plates lack the proximal furrow spine.

Madreporite marginal, subcircular (diameter 4 mm), slightly raised, with enlarged spinelets around margin. Gonads numerous, serial, one to three gonads between successive costae of the genital region.

Pedicellariae crossed, minute, not distinctive, apparently absent from disc.

Tube-feet biserial, distinctly suckered.

Colour (ex alcohol)

Brownish or cream, the gonads similar or sometimes orange and visible through the intercostal integument.

Material Examined

NZOI Stns

D90, 43°50'S, 179°00'W, 399 m, arm fragments;

J58, 43° 31'S, 179° 09.5'W, 512 m, arm fragments;
J59, 43° 51'S, 179° 25'W, 309 m, one disc, arm fragments.

Holotype

Deposited in the New Zealand Oceanographic Institute No. 158 (Stn J59). Disc diameter 27 mm, arms at least 125 mm long.

Paratypes

Deposited in the New Zealand Oceanographic

Institute No. P.219 (Stn J58); No. P.220 (Stn D90).

Remarks

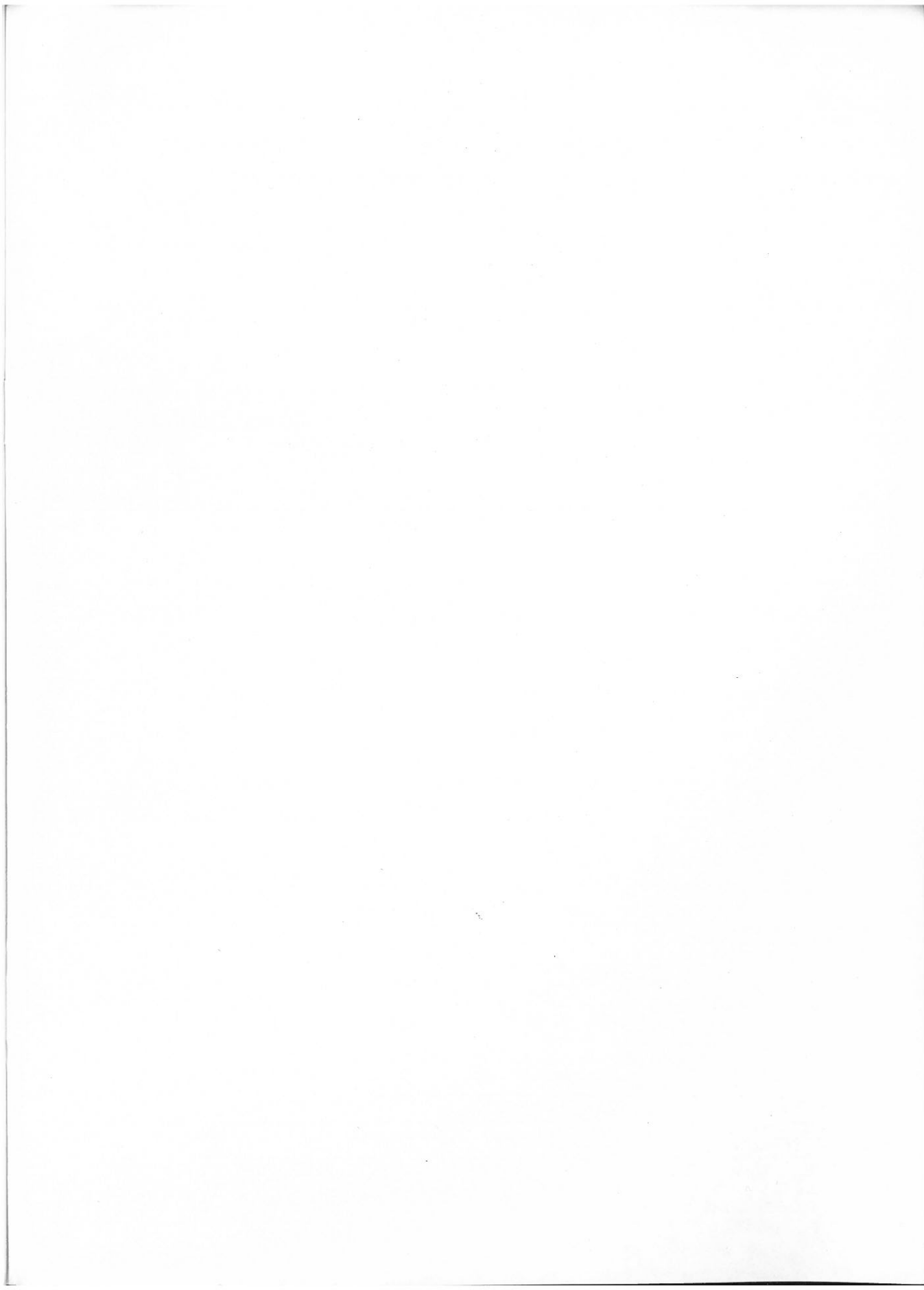
Craterobrisinga alberti (Fisher) has one capitate subambulacral spine and one much smaller, blunt or truncate, associated spinule. *Craterobrisinga eucoryne* (Fisher) and *C. analoga* Fisher have both subambulacral spines blunt or truncate proximally. *Craterobrisinga evermanni* (Fisher) has only weakly modified subambulacral spines. Other members of the genus lack small prickles in the intercostal integument.

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REFERENCES

- CLARK, H.E.S. 1970: Sea-stars (Echinodermata: Asteroidea) from 'Eltanin' Cruise 26, with a Review of the New Zealand Asteroid Fauna. *Zool. Publs Vict. Univ. Wellington* 52 : 34 pp., 3 pls.
- CLARK, H.L. 1916: Report on the sea-lilies, starfishes, brittlestars and sea-urchins obtained by the F.I.S. *Endeavour* on the coasts of Queensland, New South Wales, Tasmania, Victoria, South Australia and Western Australia. *Biol. Results Fish. Exp. 'Endeavour' 1909-14.* 123 pp., 44 pls.
- DAWSON, E.W. 1965: Oceanography and marine zoology of the New Zealand subantarctic. *Proc. N.Z. ecol. Soc.* 12 : 44-57.
- FELL, H.B. 1958: Deep-sea Echinoderms of New Zealand. *Zool. Publs Vict. Univ. Wellington* 24 : 40 pp., 5 pls.
- MADSEN, F.J. 1961: The Porcellanasteridae. A monographic revision of an abyssal group of sea-stars. *Galathea Rep.* 4 : 33-174, 13 pls.
- PAWSON, D.L. 1968: The echinozoan fauna of New Zealand subantarctic islands, Macquarie Island and the Chatham Rise. *Bull. N.Z. Dep. scient. ind. Res.* 187 : 35 pp., 1 pl. (*Mem. N.Z. oceanogr. Inst.* 42.)
- SLADEN, W.P. 1889: Asteroidea. *Rep. scient. Results explor. Voyage Challenger.* *Zool.* 30 : 893 pp., 117 pls.



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