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Indian Ocean echinoderms collected during the *Sindbad Voyage* (1980–81): 4. Crinoidea

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CONTENTS

SYNOPSIS. Thirty species of shallow-water Crinoidea, representing eighteen genera in six families, are recorded from collections made during the *Sindbad Voyage* (Oman to China) from the Lakshadweep (Laccadive) Islands, Sri Lanka and Pula Wé Sumatra). Following the zoogeographic subdivisions of Clark and Rowe (1971), extensions of range are recorded for at least six of the species: *Clarkcomanthus albinotus* (Indonesia/East Indies); *Comanthus briareus* (Sri Lanka area); *Comanthus gisleni* (Sri Lanka area & Indonesia/East Indies); *Comanthus suavia* (Sri Lanka area & Indonesia/East Indies); *Comanthus wahlbergii* (Maldive area, Sri Lanka area & Indonesia/East Indies), and *Oxycomanthus bennetti* (Indonesia/East Indies); and possibly also *Comaster parvicirrus* (Sri Lanka area – doubt about earlier record) and *Comaster multifidus* (Maldive area – specimens poorly preserved). In addition to the taxonomic treatment, ecological information for each crinoid species (habitat types, depth range) is provided and broadly analysed.

INTRODUCTION

Systematically, crinoid taxonomy has undergone relatively few changes since the monumental works of A.H. Clark (1915–1967), the major exception to this being the recent revisions to the family Comasteridae by Hoggett and Rowe (1986) and Rowe, Hoggett, Birtles and Vail (1986).

This paper is the fourth in a series reporting the collection of echinoderms made during a cruise by one of us (ARGP) across the Indian Ocean from Oman to China. The expedition was undertaken in a replica of an ancient Arab sailing vessel, 'Sohar'. Systematic accounts of the other echinoderm classes have already been published (Price & Reid, 1985; Marsh & Price, 1991; Price & Rowe, 1996).

Thirty species of shallow-water crinoids from six families are listed, including nine new distribution records. Generally, comments are made where the record extends or modifies a range of distribution, or to clarify the identification. Where no comment is offered, the species was already known from the region and is widespread in the Indo-West Pacific.

MATERIALS AND METHODS

Specimens were collected by one of us (ARGP) and other expedition members at localities from Chetlat Island, Lakshadweep (Laccadives), Sri Lanka and Pula Wé, Sumatra (Indonesia). Details of sampling localities are shown in Figure 1. Sampling was undertaken principally on coral reefs using scuba. At each locality, details of habitat type and depth range were recorded, along with the number of individuals of each species. The number of specimens collected is placed in parenthesis after each sample number in the Material lists for each species. Material was fixed and preserved using standard methods (Lincoln & Sheals, 1979). Conditions on board and for specimen storage on 'Sohar' were not as sophisticated as on modern research vessels. Hence not all specimens returned were in good condition.

Specimens were identified by JIMC. Where the identification was uncertain, due to the changes to crinoid taxonomy by Rowe, Hoggett, Birtles and Vail (1986) and Hoggett and Rowe (1986), confirmation was sought from one of the authors of those papers. In some cases, subsequent re-examination of specimens has engendered doubt, and this doubt is expressed in the text of this paper.

. Where three or more specimens of a species were collected, representative specimens of that species were sent to the Singapore Museum (SM), as the regional museum; otherwise material was divided between the Natural History Museum (NHM), London, and the Western Australian Museum (WAM), Perth.

Species are listed in families, and within each family, alphabetically by genus and species.

RESULTS

Throughout this account synonymy has been confined, where possible, to a single reference from which the original reference can be traced.

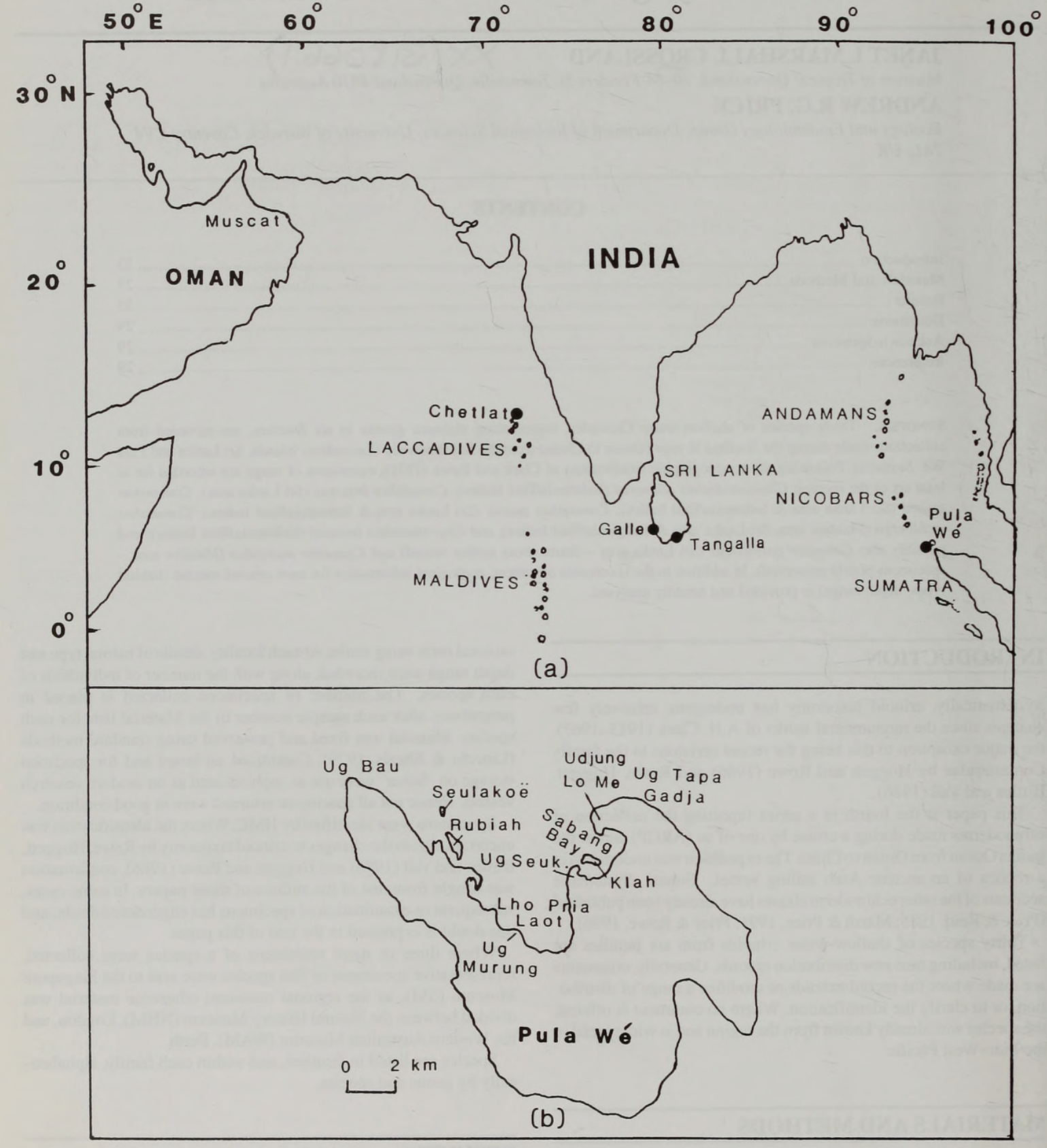

Fig. 1 (a) Map of northern Indian Ocean showing sampling areas (●) during *Sindbad Voyage*, with insert (b) for Pula Wé Sumatra.

Class Crinoidea

Family **COMASTERIDAE**

1. ***Alloeocomatella pectinifera*** (A.H. Clark, 1911)

SEE. Clark and Rowe, 1971:6–7; Hoggett and Rowe, 1986:122; Messing, 1995: 644.

MATERIAL. NHM – 810501C/2 (2), 810505C/1 (1); WAM – 810425F/2 (1); SM – 810421A/1 (1).

COLLECTION SITES. Sabang Bay, Seukundo, and Ug Seukundo, Pula Wé, Sumatra.

HABITATS AND DEPTH RANGE. Subtidal rock/coral, coral reef, on gorgonian; 2–30m.

COMMENTS. The species was described by A.H. Clark (1911) and placed (with reservation) in the genus *Comissia*, later to be included in a new genus *Alloeocomatella* by Messing (1995). The species has been found in the Maldives, Indonesia, the Great Barrier Reef (GBR) of Australia, Papua New Guinea, New Caledonia and the Marshall Islands.

2. ***Capillaster multiradiatus*** (Linnaeus, 1758)

SEE. Clark and Rowe, 1971:6–7.

MATERIAL. NHM – 810422E/3 (1), 810423C/4 (2), 810425F/2 (4), 810426B/1 (1), 810427D/3 (2), 810428D/2 (1), 810430A/1 (1), 810430A/7 (1), 810430A/23 (1), 810430A/30 (1), 810430A/31 (1), 810504A/2 (1); WAM – 810422C/3 (1), 810422D/9 (1), 810424D/5 (1), 810425B/1 (2), 810525E/1 (2), 810425E/2 (2), 810427D/1 (1), 810428D/1 (1), 810430A/11 (1), 810430A/22a (1), 810430A/25 (1 of 2), 810430A/24b (1), 810430A/29 (1); SM – 810422C/4 (1), 810422D/7 (1), 810424B/4 (1), 810425F/1 (4), 810425F/4 (2), 810425F/5 (1), 810426A/1 (1), 810430A/10 (1), 810430A/21b (1), 810430A/21d (2), 810430A/25 (1 of 2).

COLLECTION SITES. Klah, Seulakoe, Sabang Bay, Ug Murung, Ug Tapa Gadja, Ug Seukundo and Rubiah, Pula Wé, Sumatra.

HABITATS AND DEPTH RANGE. Subtidal rock, coral reef, coral rubble, fire coral, soft coral and gorgonian; 2–30m.

COMMENT. This species is well-known across the Indo-Pacific region. However, its habitat varies; in some regions it inhabits exposed situations, in others it is cryptic. Specimens have been recorded from 0.5–1 m in Madagascar, to 77 m in the Bay of Bengal (Clark, 1972). In this collection, habitat and depth also varied.

3. ***Capillaster sentosus*** (Carpenter, 1888)

SEE. Clark and Rowe, 1971: 6–7.

MATERIAL. WAM – 810501C/4 (1).

COLLECTION SITE. Ug Seukundo, Pula Wé, Sumatra.

HABITAT AND DEPTH. Subtidal rock; 20m.

4. ***Clarkcomanthus albinotus*** Rowe, Hoggett, Birtles and Vail, 1986.

SEE. Rowe, Hoggett, Birtles and Vail, 1986: 238.

MATERIAL. WAM – 810428E/1(1).

COLLECTION SITES. Ug Tapa Gadja, Pula Wé, Sumatra.

HABITAT AND DEPTH. Soft coral, 2–10m.

COMMENT. This is a marked extension of range for this species, previously only recorded from the Great Barrier Reef, Papua New Guinea (Messing, 1994) and Japan.

5. ***Clarkcomanthus littoralis*** (Carpenter, 1888)

SEE. Rowe, Hoggett, Birtles and Vail, 1986: 236.

MATERIAL. NHM – 810423D/1 (broken), 810425C/3 (1), 810428C/4 (2); WAM – 810420A/2 (fragmented), 810430A/12 (1), 810501A/3 (1), 810504C/4 (1); SM –810421C/2 (1), 810428E/2 (1), 810430A/19 (1).

COLLECTION SITES. Klah, Seukundo, Ug Bau, Subang Bay, Ug Tapa Gadja and Ug Seukundo, Pula Wé, Sumatra.

HABITATS AND DEPTH RANGE. Subtidal rock/coral, coral reef; 2–10m.

6. ***Clarkcomanthus luteofuscum*** (H.L. Clark, 1915)

SEE. Rowe, Hoggett, Birtles and Vail, 1986: 233.

MATERIAL. WAM – 810427D/1 (1).

COLLECTION SITES. Ug Murung, Pula Wé, Sumatra.

HABITAT AND DEPTH. Soft coral, 2–10m.

7. ***Comanthina nobilis*** (Carpenter, 1884)

SEE. Rowe, Hoggett, Birtles and Vail, 1986: 243.

MATERIAL. NHM – 810425A/18d (2), 810425D/1 (1), 810430A/34 (1); WAM – 810425A/18e (2), 810430A/16 (1); SM – 810425A/18 (1), 810430A/2 (1), 810501A/5 (2).

COLLECTION SITES. Ug Murung and Ug Seukundo, Pula Wé, Sumatra.

HABITATS AND DEPTH RANGE. Subtidal rock/coral, coral reef; 6–30m.

8. ***Comanthina schlegelii*** (Carpenter, 1881)

SEE. Clark and Rowe, 1971:6–7; Rowe, Hoggett, Birtles and Vail, 1986: 244.

MATERIAL. NHM – 810422D/4 (1), 810423A/2 (1), 810430A/13 (1), 810504C/3 (1); WAM – 810423C/2a (1), 810430A/6 (1), 810504C/1 (1); SM – 810421C/1 (1), 810421C/4 (1), 810424D/3 (1).

COLLECTION SITES. Seukundo, Klah, Ug Bau and Ug Seukundo, Pula Wé, Sumatra.

HABITAT AND DEPTH RANGE. Subtidal rock and coral reef; 5–20m.

9. ***Comanthus briareus*** (Bell, 1882)

SEE. Rowe, Hoggett, Birtles and Vail, 1986:218

MATERIAL. NHM – 810424B/5 (1); WAM – 810204A/8 (1).

COLLECTION SITES. Kalpitiya, Sri Lanka; Seulakoe, Pula Wé, Sumatra.

HABITAT AND DEPTH RANGE. Coral reef; 3–5m, 20–30m.

COMMENT. The Sri Lankan specimen is a new locality record for

this species, and extends its range west into the Indian Ocean from Indonesia.

10. *Comanthus gisleni* Rowe, Hoggett, Birtles and Vail, 1986.

SEE. Rowe, Hoggett, Birtles and Vail, 1986: 219.

MATERIAL. NHM – 810124A/1 (1), 810204A/3 (1),810430A/14 (1), 810430A/22a (3), 810504B/1 (1); WAM – 810124A/1 (1), 810124A/6 (1), 810204A/2 (1), 810425F/1 (1), 810430A/15 (1); SM – 810422D/5 (1), 810430A/4 (1), 810430A/14 (1), 810504A/1 (1).

COLLECTION SITES. Galle and Kalpitiya, Sri Lanka; Klah, Sabang Bay, Ug Bau, Ug Seukundo and Rubiah, Pula Wé, Sumatra.

HABITATS AND DEPTH RANGE. Subtidal rock, coral rubble, coral reef, soft coral; 2–20m.

COMMENT. All these specimens represent extension of the range of this species into the northern Indian Ocean. It has been recorded from the coast of Western Australia, but otherwise only from the Pacific Ocean coasts and islands, Thailand, Papua New Guinea and Japan (Rowe *et al.*, 1986: 221; Messing, 1994).

11. *Comanthus mirabilis* Rowe, Hoggett, Birtles and Vail, 1986.

SEE. Rowe, Hoggett, Birtles and Vail, 1986: 226.

MATERIAL. NHM – 810501F/2 (1); WAM – 810427C/1 (1); SM – 810430A/5 (1).

COLLECTION SITES. Ug Bau and Ug Seukundo, Pula Wé, Sumatra.

HABITATS AND DEPTH RANGE. Subtidal rock/coral, coral reef; 5–30m.

COMMENT. The WAM specimen has 45 arms. The IIIBr series are mostly 2; where an arm has broken off and regenerated there is usually another devision series and extra arms, otherwise division series beyond IIIBr are randomly distributed. Most pinnules beyond P_2 are broken, so comb distribution further out cannot be ascertained.

12. *Comanthus parvicirrus* (Müller, 1841)

SEE. Rowe, Hoggett, Birtles and Vail, 1986:211; Hoggett and Rowe, 1986: 125.

MATERIAL. NHM – 810123A/1 (1),810123B/2 (1), 810203A/1 (1 of 3), 810206A/1 (1), 810212A/2 (1), 810420A/1 (1), 810425F/1 (1), 810427C/2 (1 of 3), 810428C/2 (1); WAM – 810126B/5 (1),810124A/6 (1);810203A/1 (1 of 3), 810204A/2 (1), 810204A/6 (1), 810425F/3 (1), 810427C/2 (1 of 3), 810428C/5 (1),810430A20a (1); SM – 810125A/2 (1), 810126B/6 (1), 810203A/1 (1 of 3), 810204A/5 (1), 810204A/7 (1), 810425A/18d (1), 810427C/2 (1 of 3), 810430A/20c (1), 810430A/21a (1), 810501E/10 (1).

COLLECTION SITES. Galle, Hikkaduwa, Kandakkuliya, Kalpitiya, Negombo and Unawatuna, Sri Lanka; Klah, Sabang Bay, Ug Murung, Ug Bau, and Ug Seukundo, Pula Wé, Sumatra.

HABITATS AND DEPTH RANGE. Subtidal rock/coral, coral reef; 2–20m.

COMMENT. The specimens from Sri Lanka may constitute a new record *for C. parvicirrus* as it is now defined (Rowe *et al.*, 1986), depending on the correctness of H.L. Clark's (1915) identification of a specimen from the region.

13. *Comanthus suavia* Rowe, Hoggett, Birtles and Vail, 1986.

SEE. Rowe, Hoggett, Birtles and Vail 1986: 222.

MATERIAL. NHM – 810501B/1 (1); WAM – 810123A/2(1), 810124A/6, 810501B/4 (1).

COLLECTION SITES. Galle, Sri Lanka; Rubiah, Pula Wé, Sumatra.

HABITATS AND DEPTH RANGE. Subtidal rock, coral reef; 5–20m.

COMMENTS. This is a major extension of range, as the species was originally thought to be restricted to the northern Great Barrier Reef and New Guinea. Two specimens, whose identity was originally in doubt, have now been confirmed as this species. One, 810124A/6, has 7–9 triangular comb teeth, recurved but with bases not in contact; terminal tooth small, proximal tooth usually saucer-shaped. Combs appear irregularly, e.g. on P_1, P_3, P_6 or P_2, P_3, P_4, P_6. The centrodorsal is stellate with cirrus buds and cirrus scars, and subradial clefts are present. Specimen 810501B/4 has short combs with 4+2 teeth, triangular but not in lateral contact, a saucer-shaped proximal tooth, and a smaller secondary tooth on some pinnules.

14. *Comanthus wahlbergii* (Müller, 1843)

SEE. Rowe, Hoggett, Birtles and Vail, 1986: 228.

MATERIAL. NHM – 810123B/1 (1), 810421A/5(1); WAM – 810204A/2 (1); SM – 8101423B/3 (1), 810204A/4 (1).

COLLECTION SITES. Chetlat I., Laccadive Islands; Galle and Kalpitiya, Sri Lanka; Seukundo, Pula Wé, Sumatra.

HABITATS AND DEPTH RANGE. Subtidal rock, coral reef; 3–30m.

COMMENT. The collection of *C. wahlbergii* from the Laccadives, Sri Lanka and Sumatra, Indonesia fills the gaps in the distribution of this species around the Indian Ocean.

15. *Comaster multifidus* (Müller, 1841)

SEE. Clark and Rowe 1971: 6.

MATERIAL. NHM – 810421A/4 (1); WAM – 810425E/1 (1); SM – 801210B/5 (1, fragmented), 801212A/2 (1, fragmented).

HABITATS AND DEPTH RANGE. Subtidal rock and coral; 10–30m.

COLLECTION SITES. Chetlat I., Laccadive Is; Sabang Bay and Seukundo, Pula Wé, Sumatra.

COMMENT. This species is well known from Indonesia and northern Australia, and from the South Pacific. The record from the Laccadives is a marked extension of range, but identification is not positive because of the condition of the specimens.

16. *Oxycomanthus bennetti* (Müller, 1841)

SEE. Clark and Rowe, 1971:6–7; Rowe, Hoggett, Birtles and Vail, 1986:259.

MATERIAL. NHM – 810421B/3 (1), 810422D/9 (1),810423C/5 (1), 810423C/5 (1),810424D/2 (1),810424D/4 (1), 810425A/18b (1), 810425A/18 (1), 810425E/1 (1), 810425F/2 (1), 810425F/3 (3), 810428B/2 (1); WAM – 810422D/6 (1), 810423C/2b (1), 810423C/3 (2), 810423C/6 (1), 810424A/3 (1), 810424D/6 (1),810424D/7

(1), 810425A/18c (1), 810427D/1 (2), 810428A/5 (1), 810428B/3 (1), 810504C/2 (1); SM – 810421C/5 (1), 810422D/8 (1), 810423A/1 (1), 810423C/1 (1), 810424D/1 (1), 810427D/1 (1), 810427D/2 (1), 810428A/6 (1), 810430A/8 (2),810430A/35 (1), 810430A/36 (1), 810501C/4 (2).

COLLECTION SITES. Seukundo, Klah, Ug Bau, Seulakoe, Sabang Bay, Ug Murung and Ug Seukundo, Pula Wé, Sumatra.

HABITATS AND DEPTH RANGE. Subtidal rock/coral, coral reef, soft coral; 2–30m.

COMMENT. Rowe *et al.* (1986) do not record this species from Indonesia, although it was recorded from Papua New Guinea by Messing (1994); therefore this collection fills in the gap between the Andaman Islands and the Philippines.

Family **HIMEROMETRIDAE**

17. ***Amphimetra tessellata*** (Müller, 1841)

SEE. Clark and Rowe, 1971:6–7.

MATERIAL. WAM – 810425E/2 (1).

COLLECTION SITE. Sabang Bay, Pula Wé, Sumatra.

HABITAT AND DEPTH. On gorgonian; 10–20m.

18. ***Himerometra robustipinna*** (Carpenter, 1881)

SEE. Clark and Rowe, 1971:8–9.

MATERIAL. NHM – 810423E/1 (1).

COLLECTION SITES. Ug Bau, Pula Wé, Sumatra.

HABITAT AND DEPTH. On a wreck, 5m.

Family **MARIAMETRIDAE**

19. ***Lamprometra palmata*** (Müller, 1841)

SEE. Clark and Rowe, 1971: 8–9.

MATERIAL. NHM – 810425E/1 (1), 810504D/2 (1 of 2); WAM – 810124A/7 (1), 810212A/4 (1); SM – 810425F/3 (1), 810504D/2 (1 of 2).

COLLECTION SITES. Galle and Unawatuna, Sri Lanka.

HABITATS AND DEPTH RANGE. Subtidal rock, coral, coral reef; 2–20m.

20. ***Oxymetra finschi*** (Hartlaub, 1890)

SEE. Clark and Rowe, 1971: 8–9.

MATERIAL. WAM – 810430A/33 (1).

COLLECTION SITE. Ug Seukundo, Pula Wé, Sumatra.

HABITAT AND DEPTH RANGE. Subtidal rock; 12–13m.

21. ***Stephanometra indica*** (Smith, 1876)

SEE. Clark and Rowe, 1971:8–9.

MATERIAL. NHM – 81020A/3 (1); WAM – 801212A/1 (fragmented); SM – 810421C/3 (fragmented).

COLLECTION SITES. Chetlat I., Laccadive Islands; Klah and Seukundo, Pula Wé, Sumatra.

HABITAT AND DEPTH RANGE. Coral reef; 4–8m.

COMMENT. Even though two of the three specimens are fragmented, they are easily identifiable as this widely-distributed Indo-Pacific species.

22. ***Stephanometra spinipinna*** (Hartlaub, 1890)

SEE. Clark and Rowe, 1971:8–9.

MATERIAL. NHM – 810423D/1 (1).

COLLECTION SITE. Ug Bau, Pula Wé, Sumatra.

HABITAT AND DEPTH. Coral reef; 2–8m.

Family **COLOBOMETRIDAE**

23. ***Cenometra bella*** (Hartlaub, 1880)

SEE. Clark and Rowe, 1971:10–11; Meyer and Macurda, 1980:88–89.

MATERIAL. NHM – 810423C/7 (1).

COLLECTION SITE. Ug Bau, Pula Wé, Sumatra.

HABITAT AND DEPTH. On gorgonian; 10–20m.

24. ***Colobometra perspinosa*** (Carpenter, 1881)

SEE. Clark and Rowe, 1971:10–11.

MATERIAL. NHM – 810421B/5 (1), 810425F/2 (2); WAM – 810427C/1 (2), 810501D/3 (1); SM – 810424A/2 (1), 810501A/1 (1), 810501B/2 (1).

COLLECTION SITES. Seukundo, Klah, Sabang Bay, Ug Murung and Ug Seukundo, Pula Wé, Sumatra.

HABITATS AND DEPTH RANGE. Subtidal rock/coral, coral reef on gorgonian; 2–30m.

25. ***Decametra brevicirra*** (A.H. Clark, 1912)

SEE. Clark and Rowe, 1971:10–11.

MATERIAL. WAM – 810425D/2 (1).

COLLECTION SITE. Sabang Bay, Pula Wé, Sumatra.

HABITAT AND DEPTH. Subtidal rock and sand; 25m.

COMMENT. Clark & Rowe (1971) implied that the main key characteristic of *D. brevicirra*, the similarity in segment numbers in P_1 and P_2, distinguishing this species from its congeners *D. mylitta* (A.H. Clark, 1912) and *D. chadwicki* (A.H. Clark, 1911), would not 'hold good' when more specimens from the type locality, the Bay of Bengal, had been collected. This specimen, from Sumatra, clearly has 10 segments on both proximal pinnules. It differs from the other specimen of this genus collected in the same area, which clearly keys out to *D. parva* (below) on the basis of having a higher cirrus segment number. It may be time for a thorough re-examination of the genus, as there are doubtless more records than there were in 1971.

26. ***Decametra parva*** (A.H. Clark, 1912)

SEE. Clark and Rowe, 1971:10–11.

MATERIAL. NHM – 810428A/11 (1).

COLLECTION SITE. Ug Bau, Pula Wé, Sumatra.

HABITAT AND DEPTH. Subtidal rock and coral, 20–30m.

27. ***Oligometra carpenteri*** (Bell, 1884)

SEE. Clark and Rowe, 1971:10–11.

MATERIAL. WAM – 810124A/7 (1).

COLLECTION SITE. Galle, Sri Lanka.

HABITAT AND DEPTH. Subtidal rock; 10–15m.

COMMENT. This is an extension of range for the species, which is well known along much of the Great Barrier Reef and has been recorded in Indonesia. This specimen has much less well-developed keels on the proximal pinnules than in specimens from the GBR, where the two species of the genus are quite distinct. However, the pinnules are wider than long, and lack flaring of their distal ends of segments. Only *O. serripinna* has been previously recorded from the Sri Lanka area.

28. ***Oligometra serripinna*** (Carpenter, 1881)

SEE. Clark and Rowe, 1971:10–11.

MATERIAL. NHM – 810425D/2 (1); WAM – 810425E/2 (1); SM – 810422C/5 (1).

COLLECTION SITES. Klah and Sabang Bay, Pula Wé, Sumatra.

HABITATS AND DEPTH RANGE. Subtidal rock/sand, coral reef, on gorgonian; 10–30m.

COMMENT. See above.

Family **TROPIOMETRIDAE**

29. ***Tropiometra carinata*** (Lamarck, 1816)

SEE. Clark and Rowe, 1971:10–11.

MATERIAL. NHM – 810126B/5 (4), 810428D/3 (1); WAM – 810123B/3 (1), 810213A/2 (4), 810428D/6; SM – 810123A/1 (1), 810212A/4 (3).

COLLECTION SITES. Galle, Hikkaduwa, Unawatuna and Tangalla, Sri Lanka; Ug Tapa Gadja, Pula Wé, Sumatra.

HABITATS AND DEPTH RANGE. Subtidal rock/coral, coral reef; 3–15m.

COMMENT. *T. carinata* is well known from Indian Ocean reefal areas.

Family **ANTEDONIDAE**

30. ***Antedon parviflora*** (A.H. Clark, 1912)

SEE. Clark and Rowe, 1971: 10–11.

MATERIAL. NHM – 810425D/2 (1).

COLLECTION SITE. Sabang Bay, Pula Wé, Sumatra.

HABITAT AND DEPTH. Subtidal rock and sand, 25m.

Table 1 Regional distribution of crinoids from the *Sindbad Voyage* (names in parenthesis are equivalent zoogeographic subdivision of sampling area, following Clark & Rowe, 1971)

Laccadives **(Maldive area)**	**Sri Lanka (Sri Lanka area)**	**Pula Wé, Sumatra (Indonesia/East Indies)**
Comanthus wahlbergii	*Comanthus briareus*	*Alloeocomatella pectinifera*
Comaster multifidus	*Comanthus gisleni*	*Capillaster multiradiatus*
Stephanometra spinipinna	*Comanthus parvicirrus*	*Capillaster sentosus*
	Comanthus suavia	*Clarkcomanthus albinotus*
	Comanthus wahlbergii	*Clarkcomanthus littoralis*
	Lamprometra palmata	*Clarkcomanthus luteofuscum*
	Oligometra carpenteri	*Comanthina nobilis*
	Tropiometra carinata	*Comanthina schlegelii*
		Comanthus briareus
		Comanthus gisleni
		Comanthus mirabilis
		Comanthus parvicirrus
		Comanthus suavia
		Comanthus wahlbergii
		Comaster multifidus
		Oxycomanthus bennetti
		Amphimetra tessellata
		Himerometra robustipinna
		Oxymetra finschii
		Stephanometra indica
		Stephanometra spinipinna
		Cenometra bella
		Colobometra perspinosa
		Decametra brevicirra
		Decametra parva
		Oligometra serripinna
		Tropiometra carinata
		Antedon parviflora

DISCUSSION

The crinoids of the tropical Indo-west Pacific region (Africa, Indonesia, Philippines, tropical Australia and the South Pacific) are relatively well-documented (Clark & Rowe, 1971). The region between the Red Sea and Indonesia has to date produced a relatively depauperate crinoid record, but the reasons for this are not clear. Unfortunately, the *Sindbad* collection does not resolve the problem. The low number of crinoids in this collection from the Laccadives and from Sri Lanka is probably due to a combination of two factors: lower abundance and diversity of this group in the localities collected, and limited sampling time available in those regions. This situation is unfortunate, as the areas of the northern Indian Ocean, except for the western fringe of Indonesia, are not well-represented in any collections of echinoderms, so that species and even generic distributions within the region are not well-known. In fact, the majority of specimens collected during the *Sindbad Voyage* are from around the small island of Pula Wé, at the western tip of Sumatra, Indonesia. SE Asia is the region of the Indo-West Pacific associated with greatest echinoderm species richness (Clark & Rowe, 1971), and Indonesia in particular is commonly regarded as the centre of distribution for coral reefs, other invertebrate groups and marine tropical diversity in general (Veron, 1995; Gray, 1997).

Crinoid records from this voyage's collection are divided into the different regions sampled in Table 1, which also shows the equivalent zoogeographic subdivisions adopted by Clark & Rowe (1971). The observed distribution is highly skewed, with all but two of the 30 species collected in Sumatra, eight in Sri Lanka and only three in the Laccadives. Regional comparison based on more comprehensive records, including Indian Ocean data of Clark and Rowe (1971) and the results of James (1989) for the Laccadives (13 additional species) and Sri Lanka (14 additional species), shows species distributions to be less uneven. Nevertheless, the resulting pattern reveals a progressive increase in species richness from the Maldive area to Sri Lanka to East Indies/Indonesia, as suggested in the *Sindbad* data (Table 1). However, the Laccadives, in particular, probably remain undersampled. These islands are a prohibited area under the control of India, and access will probably continue to be restricted.

Range extensions, to the western fringe of Indonesia (Pula Wé) and into the Indian Ocean, are recorded for at least six of the 30 crinoid species collected during the *Sindbad Voyage*, as follows: *Clarkcomanthus albinotus* (Indonesia/East Indies); *Comanthus briareus* (Sri Lanka area); *Comanthus gisleni* (Sri Lanka area & Indonesia/East Indies); *Comanthus suavia* (Sri Lanka area & Indonesia/East Indies); *Comanthus wahlbergü* (Maldive area, Sri Lanka area & Indonesia/East Indies); *Oxycomanthus bennetti* (Indonesia/East Indies); and possibly also *Comaster parvicirrus* (Sri Lanka area – depending on validity of an earlier record) and *Comaster multifidus (*Maldive area?– specimens poorly preserved).

Of the crinoids represented, *Capillaster multiradiatus* and *Oxycommanthus bennetti* were the most common, each occurring in 19% of the samples, followed by *Comanthus parvicirrus* which occurred in 9% of the samples. The first two species also occupied a relatively wide range of depths (2–30 m) and habitats compared to most other species collected. A more comprehensive ecological and biogeographic assessment of echinoderms of Pula Wé, Sumatra is currently in progress.

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