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A review of some key species of mainly Indo-Pacific Ostracoda from the collections of G. S. Brady

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ABSTRACT – Fifteen key species of Recent Ostracoda (all but one from Indo-Pacific waters), selected from the collections of G. S. Brady and deposited in the Hancock Museum, Newcastle-upon-Tyne and The Natural History Museum, London, are reviewed. Holotypes and lectotypes have been formally designated and illustrated (by SEM) in the case of seven of these species: *Neonesidea crosskeiana* (Brady, 1866), *Macrocyprina decora* (Brady, 1866), *Macrocyprina maculata* (Brady, 1866), *Pontocypris attenuata* (Brady, 1868), *Neocyprideis spinulosa* (Brady, 1868), *Keijia demissa* (Brady 1868), *Cytherella semitalis* (Brady 1868). Other taxa reviewed and re-illustrated are five species erected by Brady in 1880: *Neonesidea woodwardiana*, *Paranesidea globulus*, *Loxoconcha pumicosa*, *Kotaracythere inconspicua*, *Cletocythereis rastromarginata* and *Cytherelloidea venusta*, and one species described by Brady in 1890: *Neomonoceratina entomon*. Lectotypes of these have been designated previously, elsewhere. The final species, *Neocyprideis timorensis* which, although found by Brady in 1880, was first formally described by Fyan in 1916. *J. Micropalaeontol.* **20**(1): 31–44, July 2001.

INTRODUCTION

During the course of studies of Recent shallow-water ostracods from the Solomon Islands, and other localities in the Indo-Pacific, several species were encountered that were, or were comparable with, species originally described by G. S. Brady. There is, however, a degree of confusion surrounding certain of these taxa. Scrutiny of the type material indicates that, in some cases, Brady had included several species under one name. For example, the species recorded as *Bairdia crosskeiana* by Brady in 1880 from the *Challenger* Expedition is not the same as that originally described by him in 1866 from the Levant. Likewise, in the *Challenger* material he included together both *Cytheridea spinulosa* Brady, 1868 and *C. timorensis* Fyan, 1916. In addition, there have been several species erected by later workers that can be shown to be junior synonyms, for example, *Bishopina mozarti* and *Aenigmocythere hirudo* both proposed by Bonaduce *et al.* (1976) as the type species of new genera. Similarly, *Morkhovenia* Teeter, 1975, was based on a single species – *Cythere inconspicua* Brady, 1880 – but is now known to be a junior synonym of *Kotoracythere* Ishizaki, 1966. Other taxonomic problems have required resolution, in particular the status of *Cletocythereis bradyi* Holden, 1967. Brady's original material is, therefore, re-illustrated using SEM and holotypes and lectotypes designated where appropriate.

The original names and revised combinations are as follows:

Bairdia crosskeiana Brady, 1866	*Neonesidea crosskeiana*
Bairdia woodwardiana Brady, 1880	*Neonesidea woodwardiana*
Bairdia globulus Brady, 1880	*Paranesidea globulus*
Cytherideis (Cytherideis) decora Brady, 1866	*Macrocyprina decora*
Cytherideis (Cytherideis) maculata Brady, 1866	*Macrocyprina maculata*
Pontocypris attenuata Brady, 1868	*Pontocypris attenuata*
Cytheridea spinulosa Brady, 1868	*Neocyprideis spinulosa*
Cytheridea timorensis Fyan, 1916	*Neocyprideis timorensis*
Loxoconcha pumicosa Brady, 1880	*Loxoconcha pumicosa*
Cythere demissa Brady, 1866	*Keijia demissa*
Cythere inconspicua Brady, 1880	*Kotoracythere inconspicua*
Cytherura entomon Brady, 1890	*Neomonoceratina entomon*
Cythere rastromarginata Brady, 1880	*Cletocythereis rastromarginata*
Cytherella semitalis Brady, 1868	*Cytherella semitalis*
Cytherella venusta Brady, 1880	*Cytherelloidea venusta*

In the following text, the initials HM indicates that the specimens are housed in the Hancock Museum, Newcastle-upon-Tyne. The numbers quoted in McKenzie (1986) were provisional (as already pointed out by Davis & Horne, 1988) and have now been superseded by those cited herein. The initials BMNH indicates material deposited in The Department of Zoology, The Natural History Museum, London – formerly the British Museum (Natural History).

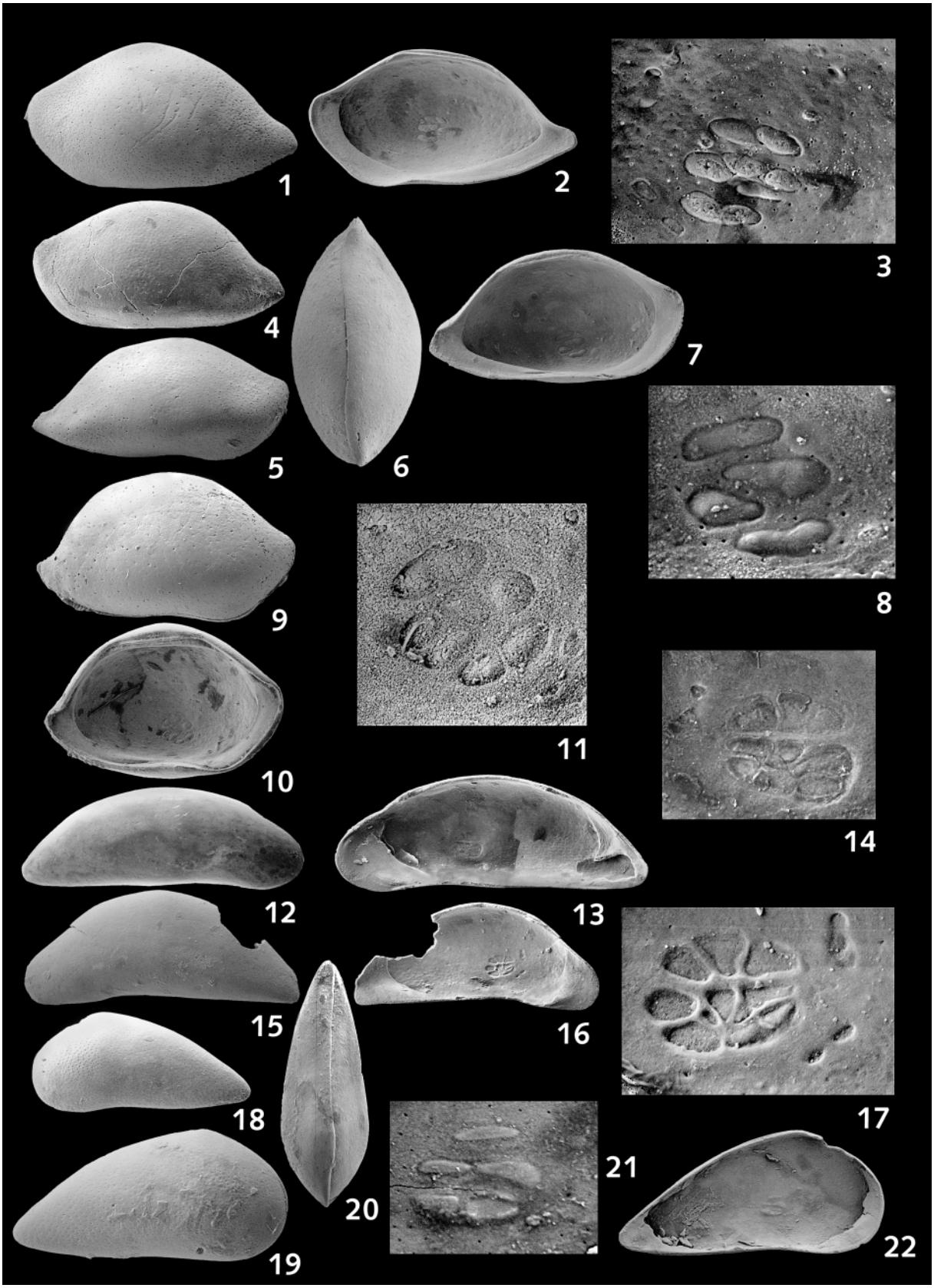
SYSTEMATIC DESCRIPTIONS

Phylum **Crustacea** Pennant, 1777
Class **Ostracoda** Latreille, 1806
Order **Podocopida** Müller, 1894
Suborder **Podocopina** Sars, 1866
Superfamily **Bairdiacea** Sars, 1886
Family **Bairdiidae** Sars, 1888
Subfamily **Bairdiinae**, Sars 1888
Genus *Neonesidea* Maddocks, 1969

Neonesidea crosskeiana (Brady, 1866)
(Pl.1, figs 1–3)

1866 *Bairdia crosskeiana* sp. nov. Brady: 366, pl. 57, fig. 10a–d.
1967 *Bairdia crosskeiana* Brady; Holden: 12.
1988 *Bairdia crosskeiana* Brady; Watson MS: pl. 14, figs 21, 22 (lectotype).
non 1880 *Bairdia crosskeiana* Brady; Brady: 58, pl. 9, fig. 3a–c.
non 1890 *Bairdia crosskeiana* Brady; Brady: 493.

Diagnosis. LV larger, overlapping RV, anteroventral margin broad, obliquely rounded with several short, pointed denticles; posterior acutely pointed at third of height; highly arched dorsal margin, maximum height at anterior third, becoming convex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and sloping steeply to posterior with distinct concavity near extremity, anterodorsally very gently concave; ventral margin convex with 8–9 short, pointed denticles posteroventrally. RV typically bairdioid in outline, dorsal margin straight, slightly oblique; anteroventral margin very gently concavo-convex; anterodorsal margin gently concave; posterodorsal margin strongly concave near extremity. Surface finely and densely punctate. Opaque patches, particularly a large, central ovate patch.

Lectotype. LV and RV, HM no. 1.10.43

Material. Brady's original slide HM no. 1.10.43 contains a left and right adult valve considered to be the disarticulated carapace illustrated by him (pl. 57, fig. 10a–d). HM slide no. 1.09.45 contains syntypic material from the same locality.

Type locality. The Levant, sponge sand. Recent.

Dimensions. Length: lectotype, LV, HM no. 1.10.43, 1.18 mm; lectotype, RV, HM no. 1.10.43, 1.15 mm.

Distribution. A detailed examination of all the specimens included by Brady under the name *B. crosskeiana* is now needed in order to determine its true distribution. For the moment, it is considered doubtful whether this species occurs in the Pacific Ocean, as recorded by Brady (1880, 1890).

Remarks. A lectotype is designated here and illustrated to more properly define this species. There are at least 8 slides labelled *Bairdia crosskeiana* (with various spellings) in the Brady Collection housed in The Natural History Museum, London (BNHM). These contain a number of species, notably *Neonesidea woodwardiana* (Brady, 1880) and *Neonesidea schulzi sensu lato* (Hartmann, 1974). Maddocks (1969, p. 24) noted that *Neonesidea schulzi ifalikensis* Maddocks, 1969 was possibly the form identified as *B. crosskeiana* by Brady (1880, 1890) from the Pacific; it does not appear to be conspecific with that described by him (Brady, 1866) from the Levant. *N. crosskeiana s.s* is similar to *Neonesidea ritugerda s. l.* (Holden, 1967) and has the same shape and characteristically humped caudal process. However, Holden's (1967, p. 12) illustration of *Bairdia crosskeiana* shows a species that is higher and less elongate.

Neonesidea woodwardiana (Brady, 1880)
(Pl.1, figs 4–8)

1880 *Bairdia woodwardiana* sp. nov. Brady: 57, pl. 11, fig. 1a–e.
1890 *Bairdia woodwardiana* Brady; Brady: 494.
1902a *Bairdia woodwardiana* Brady; Chapman: 230.
1902b *Bairdia woodwardiana* Brady; Chapman: 421.
1905 *Bairdia woodwardiana* Brady; Scott: 372.
1910a *Bairdia woodwardiana* Brady; Chapman: 420.
1915 *Bairdia woodwardiana* Brady; Chapman: 39.
1976 *Bairdia woodwardiana* Brady; Puri & Hulings: 267, pl. 4, figs 16–18 (lectotype).
1988 *Bairdia woodwardiana* Brady; Watson MS: pl. 20, figs 18–20 (lectotype).
?1995 *Paranesidea* sp. aff. *woodwardiana* Brady; Yassini & Jones: 306, figs 37, 39.

Diagnosis. LV and RV similar, typically bairdioid in shape; RV longer but LV strongly overlapping RV dorsally. Anteroventral margin broad, obliquely rounded; posterior extremely acutely pointed, below ventral 1/3 of height; broadly arched dorsal margin, less so in RV, maximum height at about mid-length, becoming convex antero- and posterodorsally; ventral margin straight in LV, gentle oral concavity in RV. Surface finely and densely punctate. Central muscle scars a patch of 4 discrete, oblong scars.

Lectotype. LV and RV, BMNH no. 80.38.46, designated by Puri & Hulings (1976).

Material. Brady's original slide is empty. BMNH slide no. 80.38.46 contains a left and right valve (lectotype) and a carapace (paralectotype) and is labelled '*Challenger* station no. 172, D18 off Tongatabu'. BMNH slide no. 80.38.28, labelled *Bairdia crosskeiana*, is also from station 172 and contains 19 specimens of which 4 are *N. woodwardiana*. BMNH slide no. 12.4.51 labelled '*Bairdia crosskeiana*, Challenger D16, Narés Harbour, Admiralty Islands', contains one specimen of *N. woodwardiana*.

Type locality. Off Nukualofa, Tongatabu, southeast of the Fiji Islands, in 18 fathoms, in coral bottom. Recent.

Dimensions. Length: lectotype (disarticulated) – BMNH no. 80.38.46, LV, 0.94 mm; RV, (same number), 0.95 mm. Paralectotype car, BMNH no. 1988.385, 0.91 mm.

Distribution. Recent, off Tongatabu, Fiji (Brady, 1880, 1890), Funafuti (Chapman, 1902b, 1910a), Cocos Keeling Atoll (Chapman, 1902b), east of Tasmania (Chapman, 1915), Sri Lanka (Scott, 1905) and possibly off Australia (Yassini & Jones, 1995). Unless the last-named record is of the species, there has been no published figure since the original description, apart from the re-illustration of the lectotype by Puri & Hulings (1976).

Remarks. *Neonesidea*? sp. aff. *N. woodwardiana* of Williams (1980 MS), Titterton (1984 MS) and Titterton & Whatley (1988) recorded in the Quaternary and Recent of the Solomon Islands are shown to be a separate species by Watson (1988) MS and differ most markedly in possessing a very elaborate muscle scar pattern.

Explanation of Plate 1

Figs 1–3. *Neonesidea crosskeiana* (Brady, 1866): **1**, lectotype (Hancock Museum no. 1.10.43), LV external view; **2, 3**, lectotype (Hancock Museum no. 1.10.43), RV internal view, and details of muscle scars, respectively; **1, 2**, ×40, **3**, ×150. From the Levant, sponge sand. **Figs 4–8**. *Neonesidea woodwardiana* (Brady, 1880): **4, 7, 8**, lectotype (BMNH no. 80.38.46), LV external, internal views, and details of muscle scars, respectively; **5**, lectotype (BMNH no. 80.38.46), RV external view; **6**, paralectotype (BMNH no. 1988.385, ex slide 80.38.46), carapace, dorsal view; **4, 5, 7**, ×45, **6**, ×47, **8**, ×240. From off Nukualofa, Tongatabu, *Challenger* station 172, SW Pacific. **Figs 9–11**, *Paranesidea globula* (Brady, 1880): **9**, lectotype (BMNH no. 80.38.34), RV external view; **10, 11**, lectotype (BMNH no. 80.38.34), LV external view and details of muscle scars, respectively; **9**, ×43; **10**, ×40; **11**, ×190. From Narés Harbour, Admiralty Islands, W. Pacific. **Figs 12–14**, *Macrocyprina decora* (Brady, 1866): lectotype (Hancock Museum no. 1.12.37), RV external, internal views and details of muscle scars, respectively; **12**, ×40, **13**, ×44, **14**, ×200. From off Australia. **Figs 15–17**, *Macrocyprina maculata* (Brady, 1866): lectotype (Hancock Museum no. 2.06.42), LV external, internal views, and details of muscle scars, respectively; **15**, ×48, **16**, ×43, **17**, ×220. From slide labelled 'Australia, West Indies'. **Figs 18–22**. *Pontocypris attenuata* Brady, 1868: **18, 21, 22**, paralectotype (Hancock Museum no. 1.58.33, ex slide, 1.04.09), LV external view, details of muscle scars, and LV internal view, respectively; **19, 20**, lectotype (Hancock Museum no. 1.58.32, ex slide 1.04.09), carapace, external view of RV, and dorsal view, respectively; **18**, ×58, **19**, ×72, **20**, ×65, **21**, ×330, **22**, ×70. From Mauritius.

Genus *Paranesidea* Maddocks, 1969

Paranesidea globulus (Brady, 1880)

(Pl.1, figs 9–11)

1880 *Bairdia globulus* sp. nov. Brady: 54, pl.9, fig. 1a–d.
1976 *Bairdia globulus* Brady; Puri & Hulings: pl. 4, figs 6–11 (lectotype).
1988 *Bairdia globulus* Brady; Watson MS: pl. 16, figs 7, 8 (lectotype).

Diagnosis. Carapace tumid, sub-circular in shape in lateral view; broadly ovate in dorsal view. LV larger, strongly overlapping RV along periphery. Anterior very broadly rounded, extremity at mid-height, narrow flange anteroventrally; posterior bluntly caudate in LV, slightly more cavolate in RV, extremity at 1/3 of height. LV tumid ventrolaterally, overhanging ventral margin so ventral margin appears convex in lateral view. Valve surface with fine, sparse puncta. Large central opaque patch observed in LV, shaped like an amphora.

Lectotype. LV and RV, BMNH no. 80.38.34, designated by Puri & Hulings (1976).

Material. Brady's original slide is empty. BMNH slide no. 80.38.34 contains a left and right valve (lectotype) and is labelled '*Challenger* D16, Narés Harbour, Admiralty Islands, March 2 1875'. A second slide from the same locality contains 2 juveniles, only 1 of which is *P. globulus*.

Type locality. Dredging at 16–25 fathoms, Narés Harbour, Admiralty Islands, north of New Guinea. Recent.

Dimensions. Length: lectotype (disarticulated) – BMNH no. 80.38.34, LV, 1.05 mm; RV (same number), 1.04 mm.

Distribution. Only known from the type locality.

Remarks. *Paranesidea*? *globulus* and *P*? *paucipunctata* of Titterton & Whatley (1988); *P*? *confusa* Titterton & Whatley, 1988; ?*Neonesidea tigra* Watson, 1988 MS; and *Bairdia gigacantha* Kornicker, 1961 are all very similar and form a morphological group, possibly a new genus, with affinities to both *Paranesidea* and *Neonesidea* (K. A. Watson, 1988, pers. comm.). Differences in shape, particularly dorsally and posteriorly distinguish the species within the group, as well as differences in details of the muscle scars and opaque patches. For example, in the left valve, *P*? *confusa* possesses 2 conspicuous patches either side of a large sub-central stripe; in *P*? *paucipunctata* the large sub-central patch is skittle-shaped, ?*N. tigra* possesses a broad central 'stripe', whereas in the present species this patch is shaped more like an amphora.

Superfamily **Cypridacea** Baird, 1845

Family **Macrocyprididae** Müller, 1912

Genus *Macrocyprina* Triebel, 1960

Macrocyprina decora (Brady, 1866)

(Pl. 1, figs 12–14)

1866 *Cytherideis* (*Cytherideis*) *decora* sp. nov. Brady: 366, pl. 57, fig. 13a–c.
1868 *Paracypris hieroglyphica* sp. nov. Brady: 62, pl. 7, figs 7, 8.
1880 *Macrocypris decora* (Brady); Brady: 44, pl.1, fig. 3a–d, pl. 6, fig. 8a–b.
1952 *Macrocypris decora* (Brady); Hornibrook: 13, 16, 17.
1977 *Macrocyprina decora* (Brady); Maddocks: 148.
1978 *Macrocypris decora* (Brady); De Deckker & Jones: 132.
1983 *Macrocypris decora* (Brady): Gou, Zheng & Huang.: 16, pl. 2, figs 18–21.
1985 *Macrocypris decora* (Brady); Wang & Zhao: 75, pl. 6, fig. 6.
1987 *Macrocypris* sp. aff. *M. decora* (Brady); Whatley & Zhao: 336, pl. 11, figs 27, 28.
1990 *Macrocyprina decora* (Brady); Maddocks: 114 [*nomen dubium*].
1997 *Macrocypris decora* (Brady); Dewi: 57, fig. 28.

Diagnosis. Elongate, sub-elliptical in shape in lateral and dorsal views. Dorsal margin broadly and evenly arched, maximum height central; very slight concavity anterodorsally. Ventral margin slightly arcuate; posterior extremity subventral, narrow, rounded. Inner lamella very wide anteriorally, broadly concave. Valve smooth. Opaque.

Holotype. RV, HM no. 1.12.37.

Material. There is only one specimen, a RV as illustrated by Brady (1866) taken from slide HM no. 1.12.37, labelled *Cytherideis decora*. A second slide, HM no. 2.06.42, labelled '*Cytherideis maculata*, *Cytherideis decora* Australia, West Indies', only contains a left valve of *C. maculata*.

Type locality. Australia, 17 fathoms. Recent.

Dimensions. Length: holotype RV, HM no. 1.12.37, 1.22 mm.

Distribution. Wide distribution in the Recent around Australia, New Zealand, Indonesia, East China Sea, Pacific Ocean and Indian Ocean and South Atlantic Ocean. Miocene and Pliocene of India, Australia and China.

Remarks. The species is placed in *Macrocyprina*, rather than *Macrocypris*, following Maddocks (1990).

Brady (1866) described a right valve of *M. decora* as elongate triangular in shape and 1.05 mm in length. In the same paper he also described a larger left valve, of *M. maculata*, as oblong, arcuate, compressed and 1.16 mm in length. There are only two specimens in the Brady Collection that can be referable to these two species: a right valve which is more elongate and compressed and is longer (1.22 mm) and a left valve which is more triangular in shape and smaller (0.99 mm). Despite these discrepancies, confirmation that the left valve is indeed *M. maculata* is provided by the fact that it possesses opaque patches as described by Brady, whereas *M. decora* is opaque (all over). Our evidence notwithstanding, Maddocks (1990, p. 114) argues that the status of the species is best left as a *nomen dubium*. However, we believe that she may not have seen slide HM no. 1.12.37 and that, if she had, her interpretation of the status of this species may have been different.

Macrocyprina maculata (Brady, 1866)

(Pl. 1, figs 15–17)

1866 *Cytherideis* (*Cytherideis*) *maculata* sp. nov. Brady: 367, pl.57, fig. 12a–b.
?1880 *Macrocypris maculata* (Brady): Brady: 44, pl. 1, fig. 2a–d.
1977 *Macrocyprina maculata* (Brady); Maddocks: 148.
1980 *Macrocypris* sp. 1 Williams MS: 47, pl. 2, figs 9, 10.
1984 *Macrocypris* sp. aff. *M. decora* Titterton MS: 135, pl. 4, figs 8, 10; pl. 27, fig. 2.
1988 *Macrocyprina maculata* (Brady); Watson MS: 85, pl. 19, figs 1–5.
1990 *Macrocyprina maculata* (Brady); Maddocks: 119 [*nomen dubium*].

Diagnosis. Elongate, arcuate, subtriangular in lateral view. Anterior margin very narrow, directed downwards; dorsal margin strongly and evenly arched, maximum height central;

ventral margin broadly concave. Inner lamella wide, broad anterior and posterior vestibulae. Valve smooth, translucent with three opaque patches, one sub-central, two large patches at anterior and posterior.

Holotype. LV, HM no. 2.06.42

Material. HM slide no. 2.06.42 is labelled '*Cytherideis maculata*, *Cytherideis decora*. Australia, West Indies', but only contains a left valve of *C. maculata* as illustrated by Brady (1866).

Type locality. Not designated. Recent.

Dimensions. Length: holotype LV, no. HM 2.06.42, 0.99 mm.

Distribution. Brady (1880) recorded this species from depths of 15–150 fathoms from Simon's Bay, South Africa; Kerguelen Island and Prince Edward Is., southern Indian Ocean; off East Mancoer Island, Bass Strait and off Amboyna in the South China Sea. It is doubtful whether the same species was recorded at all these stations (Watson, 1988 MS, pers.comm.). Brady originally recorded the species from Western Australia, the West Indies (Turks Island). It also occurs in Quaternary (Williams, 1980 MS) and Recent (Titterton, 1984 MS) sediments from the Solomon Islands and around Pulau Seribu, in the Java Sea (Watson, 1988 MS).

Remarks. In spite of the size discrepancy and Maddocks' (1990) misgivings, the distinctive opaque-patch pattern of our figured specimen suggests that it is indeed Brady's holotype. For further comments on this species, see Remarks under *M. decora*, above.

Family **Pontocyprididae** Müller, 1894
Genus *Pontocypris* Sars, 1866

Pontocypris attenuata Brady, 1868
(Pl. 1, figs 18–22)

1868 *Pontocypris attenuata* sp. nov. Brady: 179, pl. 4, figs 11–14.
1880 *Pontocypris attenuata* Brady; Brady: 38, pl. 15, fig. 2a–d.
1902b *Pontocypris attenuata* Brady; Chapman: 419.
1910a *Pontocypris attenuata* Brady; Chapman: 427.
1910b *Pontocypris attenuata* Brady; Chapman: 298.
?1915 *Pontocypris attenuata* Brady; Chapman: 34, pl. 2, fig. 1.
1928 *Pontocypris attenuata* Brady; Chapman & Crespin: 169.
1963 *Pontocypris attenuata* Brady; Ishizaki: 22, pl. 2, fig. 2.
1968 *Pontocypris attenuata* Brady; Ishizaki: 16, pl. 3, fig. 6.
1992 *Pontocypris* cf. *Pontocypris attenuata* (Brady); Mostafawi: p. 136, pl. 8, fig. 177.
1997 *Pontocypris* cf. *P. attenuata* (Brady); Dewi: 58, figs 40–42.
non 1890 *Pontocypris attenuata* Brady; Brady: 491, pl. 1, figs 3–4.
non 1919 *Pontocypris attenuata* Brady; Chapman: 17.
non 1941 *Pontocypris attenuata* Brady; Chapman: 194, pl. 9, fig. 8.

Diagnosis. Elongate, subtriangular in shape in lateral view, narrow kite-shape in dorsal view, widest at anterior third. Anterior margin broadly rounded, posterior acuminate, sharply pointed, extremity ventral. Dorsal margin angularly arched, maximum height and angle at anterior third; ventral margin gently biconvex. Surface of valve minutely punctate; translucent with opaque patches; a large subcentral patch and a smaller posteromedian patch.

Lectotype. ?♀ car., HM no. 1.58.32 (ex slide no. 1.04.09).

Material. The original HM slide no. 1.04.09 contained ten specimens.

Type locality. Mauritius, Indian Ocean. Recent, in mud.

Dimensions. Length: lectotype ?♀car., HM no. 1.58.32, 0.66 mm; paralectotype LV, HM no. 1.58.38, 0.65 mm.

Distribution. *Pontocypris attenuata* occurs widely in shallow-water assemblages of the Indo-Pacific, from Mauritius in the west to Japan in the north and off southeastern Australia, Funafuti and the Solomon Islands. BMNH slide no. 80.38.6, Hong Kong Harbour, 7 fathoms (Brady, 1880) contains some juveniles and BMNH slide no. 12.4.64, Humbolt Bay, Papua, 37 fathoms, contains adults of this species. In the fossil, it is recorded in the Batesford Limestone (Chapman, 1910b), the Tertiary of the Sorento Bore, Victoria, Australia (Chapman & Crespin, 1928) and Miocene of the Yatsuo Formation, Japan (Ishizaki, 1963).

Remarks. Maddocks, in her review of the Pontocyprididae (1991, table 1, p. 311) seems to include this species in *Propontocypris* Sylvester-Bradley, 1947. She then lists (1991, p. 328) among the species included within *Propontocypris* by original binomen – '*Propontocypris* (*Propontocypris*) *attenuata* (Brady, 1868) of Okubo (1979)'. However, since she does not seem to mention *Pontocypris attenuata* Brady, 1868 elsewhere, it is possible that she may have overlooked this species in her review.

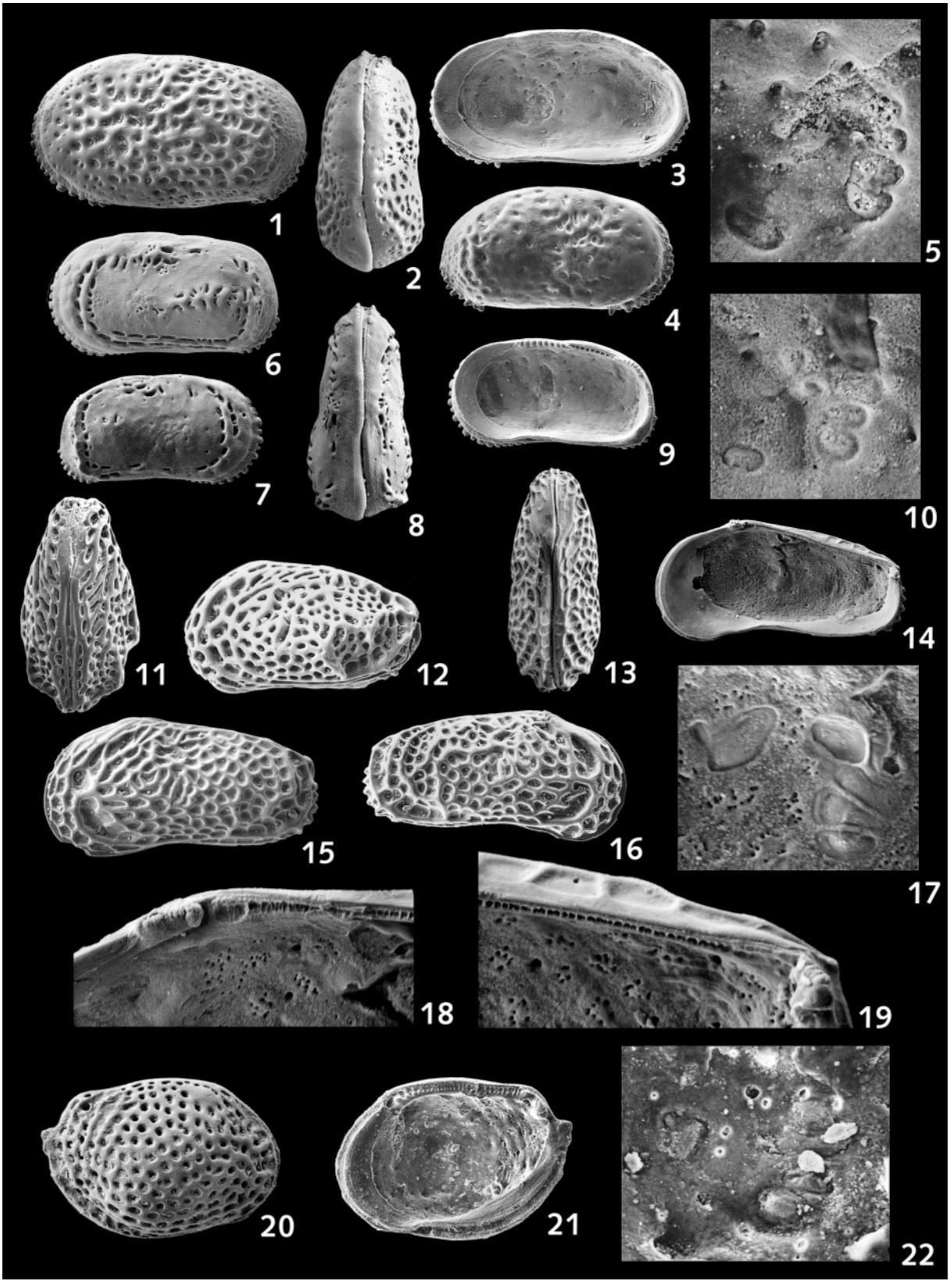
Superfamily **Cytheracea** Baird, 1850
Family **Cytheridea** Baird, 1850

Genus *Neocyprideis* Apostolescu, 1956

1957 *Goelichia* Keij: 69.
1960 *Miocyprideis* Kollmann: 176.
1976 *Bishopina* Bonaduce, Masoli & Pugliese: 397.

Remarks. *Neocyprideis* is very closely related to *Cyprideis* Jones, 1857, but differs mainly in the structure of the hinge which, in *Cyprideis*, is pseudoentomodont. Kollmann (1960) erected *Miocyprideis* which differed from *Neocyprideis* in possessing anterior and posterior marginal denticles, more numerous marginal pore canals and a very strong ventral overlap of the left valve over the right valve. The present authors agree with Van Morkhoven (1963, p. 295) that these differences are insufficient to allow *Miocyprideis* generic status. The diagnosis of *Neocyprideis*, therefore, should be expanded to accommodate those species assigned to *Miocyprideis* and the stratigraphical range of the genus extended to the Recent. Babinot & Colin (1976) would disagree and would contend that the shape of the carapace and hinge are important features in separating *Miocyprideis* from *Neocyprideis*. We would argue, however, that the degree of variation in these two characters alone in the species they would place in their two separate genera is enough to demonstrate that this is just one group of species. Babinot & Colin (1976), in their interesting paper on the evolution of the Cytherideinae, also follow in essence the scheme of evolution of Kollmann (1960) from *Fabanella* via their genus *Sarlatina* to *Cyprideis*, with another branch evolving from *Fabanella* to *Neocyprideis* and *Miocyprideis*. However, we regard this phylogeny as too simplistic and regard *Neocyprideis* as a sibling (or even possible ancestral) genus of *Cyprideis*.

Bonaduce *et al.* (1976) established the genus *Bishopina* which is small and is distinguished by a modified marginal area, an amphidont hinge of which the left valve comprises an elongate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anterior loculate socket, a denticulate median element with 9 toothlets, compared to about 20 in *Miocyprideis* (see Malz & Ikeya, 1986), and a short posterior loculate socket; a muscle scar pattern of a vertical row of 4 adductor scars with 2 anterior antennal scars, a fulcral point and 2 smaller anteroventral scars. These features are not considered to be sufficient to distinguish *Bishopina* from *Neocyprideis*. The former has, therefore, been placed in the synonymy of *Neocyprideis*.

Neocyprideis spinulosa (Brady, 1868)
(Pl. 2, figs 1–5)

1868 *Cytheridea spinulosa* sp. nov. Brady: 182, pl. 13, figs 1–6.
1880 *Cytheridea spinulosa* Brady; Brady: 112, pl. 33, fig. 6a–d.
1890 *Cytheridea spinulosa* Brady; Brady: 505.
1916 *Cytheridea spinulosa* Brady; Fyan: 1210, figs 7, 8.
1954 *Clithrocytheridea spinulosa* (Brady); Keij: 352, pl. 1, fig. 2.
1960 *Miocyprideis spinulosa* (Brady); Kollmann: 178, pl. 18, figs 12, 13; pl. 19, fig. 16.
1963 *Miocyprideis spinulosa* (Brady); Van Morkhoven: 296.
1968 *Clithrocytheridea spinulosa* (Brady); Guha: 212.
1981 *Bishopina spinulosa* (Brady); Wouters: 5.
1986 *Miocyprideis spinulosa*; Malz & Ikeya: 178, pl. 2, figs 1–9; pl. 3, fig. 10.
1986 *Clithrocytheridea* cf. *spinulosa* (Brady); Cabioch, Anglada & Babinot: 26, pl. 8, figs 12–14.
1988 *Neocyprideis spinulosa* (Brady); Watson MS: 108, pl. 22, figs 1–9.
1989 *Neocyprideis spinulosa* (Brady); Whatley & Keeler: pl.1, figs 6, 9–11,13.
1989b *Miocyprideis spinulosa* (Brady); Zhao & Whatley: 235, pl. 1, figs 12–14.
1989 *Bishopina spinulosa* (Brady); Howe & McKenzie: 16, figs 62, 63.
1993 *Miocyprideis spinulosa* (Brady); Jellinek: 123, fig. 207.
1995 *Miocyprideis spinulosa* (Brady). Babinot & Kouyoumontzakis: 30, pl. 2, figs 17–19.
1998 *Miocyprideis spinulosa* (Brady); Hussein: 7, pl. 2, fig. 3.

Diagnosis. Medium in size, thick shelled. Subrectangular in shape in lateral and dorsal views; greatest height just posterior of mid-length; greatest width posteriorly. Surface of valves coarsely punctate, punctae large, deep, irregular subcentrally; becoming finely punctate around periphery.

Lectotype. ♀ car., HM no. 1.58.39 (ex slide no. 1.47.10).

Material. The original HM slide no. 1.47.10, labelled *Cytheridea spinulosa* from Mauritius, contained 38 specimens but only 7 are *N. spinulosa*, the other 31 are *N. timorensis* (Fyan, 1916), several of which have been illustrated for comparison in Plate 2, figs 6–10. BMNH slide no. 80.38.124, from Amboyna, 15–20 fathoms of Brady (1880) contains *N. spinulosa*.

Type locality. Mauritius, Indian Ocean. Recent, in mud.

Dimensions. Length: lectotype♀ car., HM no. 1.58.39, 0.65 mm; paralectotype ♂ RV, HM no. 1.58.38, 0.61 mm.

Distribution. *Neocyprideis spinulosa* is one of the most widely distributed shallow-water species of the present day, occurring in the subtropical belt from as far west as the eastern coast of South Africa, across Indonesia to the Solomon Islands in the east. The earliest fossil occurrence of this species is from the Upper Pliocene sediments of Timor (Fyan, 1916). Other fossil records include the Pliocene–Pleistocene of Southern India (Guha, 1968) and the Quaternary of the Solomon Islands (Williams, 1980, MS) and Fijian Islands (Malz & Ikeya, 1986).

Remarks. *Neocyprideis spinulosa* differs from *N. timorensis* (Fyan, 1916) in that the punctate/reticulate ornament extends across the entire lateral surface and is coarsest and most irregular centrally; it is also consistently and conspicuously larger in size than the latter. The punctate ornament is variable, even within a single population, for example the specimens in Brady's original slide all vary. Some populations are particularly heavily ornamented, such as those described by Cabioch *et al.* (1986).

Neocyprideis timorensis (Fyan, 1916)
(Pl. 2, figs 6–10)

1916 *Cytheridea timorensis* sp. nov. Fyan: 1211, fig. 9.
1976 *Bishopina mozarti* sp. nov. Bonaduce, Masoli & Pugliese: 397, pl. 12, figs 1–7.
1977 *Cytherelloidea* sp. Hughes MS: pl. 70, fig. 10.
1980 *Neocyprideis timorensis* (Fyan), Williams MS: 57, pl. 3, figs 6–8.
1986 *Bishopina timorensis* (Fyan), Malz & Ikeya, pl. 3, figs 1–3.
1988 *Neocyprideis timorensis* (Fyan), Watson MS: 110, pl. 22, figs 10–18.
1988 *Neocyprideis timorensis* (Fyan), Taylor MS: 42, pl. 2, figs 22, 23.
non 1984 *Neocyprideis timorensis* (Fyan), Titterton MS: 197, pl. 7, figs 1–2; pl. 31, figs 6–16.

Dimensions. Length: ♀ car. HM no. 1.58.41, 0.55 mm; ♂ car. HM no. 1.58.40, 0.51 mm.

Distribution. The Recent of the Red Sea, Singapore, West Malay Peninsula, Java Sea, the Upper Pliocene of Timor and Miocene to Quaternary of the Solomon Islands.

Explanation of Plate 2

Figs 1–5. *Neocyprideis spinulosa* (Brady, 1868): **1, 2**, lectotype (Hancock Museum no. 1.58.39, ex slide 1.47.10), ♀ carapace, external view of RV and dorsal view, respectively; **3–5**, paralectotype (Hancock Museum no. 1.58.38, ex slide 1.47.10), ♂ RV internal, external views and details of muscle scars, respectively; **1, 3**, ×68, **2**, ×54, **4**, ×60, **5**, ×400. From Mauritius. **Figs 6–10**. *Neocyprideis timorensis* (Fyan, 1916): **6, 8** (Hancock Museum no. 1.58.41, ex slide 1.47.10), ♀ carapace, external view of RV and dorsal view, respectively; **7, 9, 10** (Hancock Museum no. 1.58.40, ex slide 1.47.10), ♂ RV external and internal views and details of muscle scars, respectively; **6, 9**, ×65, **7, 8**, ×60, **10**, ×365. From Mauritius. **Figs 11, 12**. *Kotoracythere inconspicua* (Brady, 1880): lectotype (BMNH no.81.5.22), carapace, dorsal view and external view of LV, respectively; **11**, ×87, **12**, ×95. From Torres Strait, *Challenger* station 185, W. Pacific. **Figs 13–19**. *Keijia demissa* (Brady, 1868): **13, 15**, lectotype (Hancock Museum no. 1.58.34, ex slide 2.05.39), ♂ carapace, dorsal and external view of LV, respectively; **14, 16–19**, paralectotype (Hancock Museum no. 1.58.35, ex slide no 2.05.39), ♀ RV internal and external views, details of muscle scars and anterior and posterior parts of hinge, respectively; **13**, ×80, **14**, ×85, **15**, ×100, **16**, ×90, **17**, ×510, **18, 19**, ×390. From Mauritius. **Figs 20–22**. *Loxoconcha pumicosa* Brady, 1880: Lectotype (BMNH no. 81.5.37), RV external and internal views, and details of muscle scars, respectively; **20, 21**, ×78, **22**, ×390. From Narés Harbour, Admiralty Islands, W. Pacific.

Remarks. The figured specimens are taken from the original HM slide no. 1.47.10, labelled '*Cytheridae spinulosa*, Mauritius' in which there are 38 specimens, 31 of which are *N. timorensis*, later described by Fyan (1916). This species is illustrated for comparison with *N. spinulosa* as the two species are often found in association, for example in Fyan (1916), Brady (1868) and in the Solomon Island fauna, known to us, both Quaternary and Recent.

Family **Loxoconchidae** Sars, 1925
Subfamily **Loxoconchinae** Sars, 1925
Genus *Loxoconcha* Sars, 1866

Loxoconcha pumicosa Brady, 1880
(Pl. 2, figs 20–22)

1880 *Loxoconcha pumicosa* sp. nov. Brady: 118, pl. 28, fig. 2a–d.
1890 *Loxoconcha pumicosa* Brady; Brady: 507.
1976 *Loxoconcha pumicosa* Brady; Puri & Hulings: 298, pl. 18, figs 10–12 (lectotype).
1984 *Loxoconcha* sp. cf. *L. pumicosa* Brady; Titterton MS: 362, pl. 11, figs 7–8; pl. 46, figs 11–21.
1988 *Loxoconcha pumicosa* Brady; Watson MS: 181, pl. 34, figs 7–16.

Diagnosis. A species of *Loxoconcha* with an ornament of closely and concentrically arranged, subcircular, deep punctae aligned longitudinally ventrally. Sub-rhomboidal in shape in lateral view, elliptical in dorsal view, greatest width median. Posterior margin with blunt, upturned caudal process, well above mid-height; dorsal margin gently arched with gentle concavity behind posterior cardinal angle.

Lectotype. ♀ RV, BMNH no. 81.5.37, designated by Puri & Hulings (1976).

Material. BMNH slide no. 81.5.37 contains only one right valve. Puri & Hulings state that this was a carapace and that there is another carapace as well. This and the left valve (if they had split the valves) were not found.

Type locality. Narés Harbour, Admiralty Islands, just north east of New Guinea, 16 fathoms, collected March, 1875. Recent.

Dimensions. Length: lectotype♀ RV, BMNH no. 81.5.37, 0.48 mm.

Distribution. Recorded by Brady (1880) from the Recent of Booby Island and the Admirality Islands and (1890) from New Caledonia, Fiji and Samoa. It also occurs in the Recent around Pulau Seribu, Java Sea (Watson, 1988 MS) and the Solomon Islands (Titterton 1984 MS).

Family **Pectocytheridea** Hanai, 1957
Genus *Keijia* Teeter, 1975

Keijia demissa (Brady, 1868)
(Pl. 2, figs 13–19)

1868 *Cythere demissa* sp. nov. Brady: 180, pl. 12, figs 1, 2.
1890 *Cythere demissa* Brady; Brady: 497.
1953 *Leptocythere demissa* (Brady); Hornibrook: 13, 17, 21.
1973 *Leptocythere demissa* (Brady); Teeter: 47, fig. 2a–g.
1975 *Keijia demissa* (Brady); Teeter: 436, figs 7r, s, 8e.
1976 *Aenigmocythere hirundo* sp.nov. Bonaduce, Masoli & Pugliese: 380, pl. 4, figs 6–11, text-fig. 4.
1978 *Pectocythere*? *foveata* sp. nov. Hartmann: 144, pl. 14, figs 12, 13; text-figs 619, 620.
1980 *Hemicytheridea anterocostata* sp. nov. Williams MS: 88, pl. 5, figs 2–4, 6 [*nomen nudum*].
1984 *Hemicytheridea anterocostata* sp. nov. Titterton MS: 415, pl. 14, figs 5, 6; pl. 51, figs 1–10 [*nomen nudum*].
?1985 *Keijia novilunaris* sp. nov. Zhao; Zhao, Wang & Zhang: 211, pl. 21, figs 14–18.
1986 *Keijia demissa* (Brady); Cabioch, Anglada & Babinot: 25, pl. 8, figs 4, 5.
1987 *Keijia demissa* (Brady); Whatley & Zhao: 353, pl. 5, figs 27, 28.
1987 *Pectocythere foveata* Hartmann; Yassini & Jones: 826, pl. 14, figs 12, 13.
1988 *Keijia demissa* (Brady); Taylor MS: 90, pl. 6, figs 10, 11.
1988 *Keijia demissa* (Brady); Watson MS: 211, pl. 40, figs 15–26.
1989a *Keijia demissa* (Brady); Zhao & Whatley: 171.
1989 *Keijia demissa* (Brady); Whatley & Keeler: 73, pl. 4, figs 12–14.
1989 *Pectocythere* (?) *foveata* Hartmann; Howe & McKenzie: 32.
1989 *Mckenziartia foveata* (Hartmann); Yassini & Mikulandra: 133, figs 2 g–i, 3 g, 4b.
1991 *Keijia hirundo* (Bonaduce, Masoli & Pugliese); Behrens: 113, pl. 2, figs 12, 13.
1991 *Keijia foveata* (Hartmann); Behrens: 114, pl. 3, figs 1, 2.
1992 *Keijia borneoensis* sp. nov. Mostafawi: 140, pl. 2, figs 41–43.
1992 *Keijia demissa* (Brady); Mostafawi, pl. 2, fig. 44 (lectotype).
1993 *Keijia demissa* (Brady); Witte: 26, pl. 4, figs 10–12.
1995 *Keijia demissa* (Brady); Babinot & Kouyoumontzakis: 20, pl. 1, figs 20, 21.
1995 *Keijia demissa* (Brady); Yassini & Jones: 338, figs 271–274.
1995 *Keijia demissa* (Brady); Shyam Sunder, Varma & Naidu: 473, 476, 478, pl. 1, figs 7, 8.
1998 *Keijia demissa* (Brady); Hussein: 6, pl. 1, fig. 16.
non 1880 *Cythere demissa* Brady. Brady; 66, pl. 12, fig. 7a–h.
non 1954 *Leptocythere demissa* (Brady); Keij: 354, pl. 1, fig. 3a, b.

Diagnosis. A species of *Keijia*, elongate, narrowly subrectangular in shape in lateral and dorsal views. Strongly reticulate with the peripheral muri concentric to the margins being strengthened into ribs, dominated by a strong anterior submarginal rib behind which are two large drop-shaped fossae. Three prominent posterior ribs, one peripheral around the posterior, continuing ventrally and submarginally to merge into the anterior rib; the second is short, the third links with the ventral submarginal rib.

Lectotype. ♂ car., HM no. 1.58.34 (ex slide no. 2.05.39) (this has already been illustrated by Mostafawi, 1992, pl. 2, fig. 44).

Material. The original HM slide no. 2.05.39, labelled '*Cythere demissa*, *Cythere convoluta*, *Cythere perplexa*' contains 7 specimens, 4 of which are *C. demissa*; the other 3 are neither *C. convoluta* nor *C. perplexa*.

Type locality. Mauritius, about 450 miles east of Madagascar, Indian Ocean. Recent in mud.

Dimensions. Length: lectotype ♂ car., HM no. 1.58.34, 0.44 mm; paralectotype ♀ RV, HM no. 1.58.35, 0.46 mm.

Distribution. Widely distributed across the Indo-Pacific and Australia and believed to have been transported by passive dispersal by ships (Witte, 1993) into the Caribbean and Atlantic, although the present authors doubt this. Full details of its distribution are given by Witte (1993, p. 27). Also found in the

Quaternary of the Solomon Islands (Williams MS, 1980) and New Caledonia (Cabioch *et al.*, 1986).

Remarks. Behrens (1991, pls 2, 3) illustrates the female of this species as *Keijia hirundo* (Bonaduce, Masoli & Pugliese, 1976) and the male as *Keijia foveata* (Hartmann, 1978). Moreover, we consider *K. borneoensis* Mostafawi (1992) to be nothing more than an ornamental variant of *K. demissa*.

Genus *Kotoracythere* Ishizaki, 1966

Kotoracythere inconspicua (Brady, 1880)
(Pl. 2, figs 11, 12)

1880 *Cythere inconspicua* sp. nov. Brady: 70, pl. 13, fig. 1a–d.
1890 *Cythere cuneolus* sp. nov. Brady: 500, pl. 2, figs 6, 7.
1954 *Leptocythere inconspicua* (Brady); Keij: 354, pl. 1, fig. 4.
1968 *Leptocythere inconspicua* (Brady); Guha: 60, pl. 4, fig. 10.
1973 *Leptocythere inconspicua* (Brady); Teeter: 47, fig. 1 g–l.
1975 *Morkhovenia inconspicua* (Brady); Teeter: 435, figs 7o–q, 8c
1976 *Munseyella inconspicua* (Brady); Holden: 34, pl. 1, figs 14–16, pl. 11, figs 3–5.
1976 *Cythere inconspicua* Brady; Puri & Hulings: 278, pl. 6, figs 10–12 (lectotype).
1980 *Pectocythere* sp. *ceduna* 120 Hartmann: 123, pl. 3, figs 14–17.
1980 *Kotaracythere* cf. *inconspicua* (Brady); Williams MS: 90, pl. 15, fig. 5.
1981 *Morkhovenia* cf. *inconspicua* (Brady); Hartmann: 120, pl. 10, figs 1–6, text- figs 58–61b.
1981 *Kotoracythere inconspicua* (Brady); Keeler MS: 155, pl. 9, figs 5–7.
1984 *Kotoracythere inconspicua* (Brady); Titterton MS: 430, pl. 14, figs 8, 9; pl. 50, figs 11–20.
1986 *Morkhovenia cuneola* (Brady) (*sic*): McKenzie: pl. 2, fig. 8 (lectotype).
1986 *Morkhovenia inconspicua* (Brady). Cabioch, Anglada & Babinot: 25, pl. 8, fig. 3.
1988 *Kotoracythere inconspicua* (Brady); Watson MS: 214, pl. 41, figs 1–10.
1989a *Kotoracythere inconspicua* (Brady); Zhao & Whatley: 186.
1989 *Kotoracythere inconspicua* (Brady); Whatley & Keeler: 76, pl. 3, fig. 11; pl. 5, figs 6–7.
1990 *Morkhovenia kingstoni* sp. nov. McKenzie, Reyment & Reyment: 11, pl. 3, fig. 1.
1991 *Kotoracythere inconspicua* (Brady); Witte & Van Harten: 434, figs 3a–n, 4a–x, 5a–v.
1991 *Morkhovenia inconspicua* (Brady); Behrens: 113, pl. 4, figs 9, 10.
1993 *Kotoracythere inconspicua* (Brady); Witte: 25, pl. 3, figs 19–22.
1995 *Kotoracythere inconspicua* (Brady); Babinot & Kouyoumontzakis: 28, pl. 1, figs 12, 13.
1995 *Kotoracythere inconspicua* (Brady); Yassini & Jones: 338, figs 287, 288.
1996 *Kotoracythere inconspicua* (Brady); Babinot & Degaugue-Michalski: 361.

Diagnosis. A species of *Kotoracythere* with valves deeply and strongly reticulate; fossae irregular in shape, larger and elongate peripherally centric to margins; smaller, more ovate on posteroventral and posteromedian inflation of valves. Subrectangular in shape in lateral view; hastate in dorsal view. Anterior broadly rounded; posterior narrow, truncated.

Lectotype. ♂ car, BMNH no. 81.5.22, designated by Puri & Hulings (1976).

Material. BMNH slide no. 81.5.22, labelled '*Cythere inconspicua*, *Challenger* station 185, depth 155 fathoms' contains 1 carapace. Puri & Hulings state there should also be a damaged left valve.

Type locality. Torres Strait, between Northeastern Australia and southern New Guinea, dredging at 155 fathoms. Recent, from sand.

Dimensions. Length: lectotype car., BMNH no. 81.5.22, 0.39 mm.

Distribution. Widely distributed in tropical sublittoral environments across the Indo-Pacific (except eastern Pacific) and Australia. Believed to have been transported by passive dispersal by ships (Witte & van Harten, 1991; Witte, 1993), like *K. demissa*, into the Caribbean and Atlantic. Fossil records are: Miocene–Pleistocene of Midway Island; Neogene of the Andaman Islands and Quaternary of the Solomon Islands.

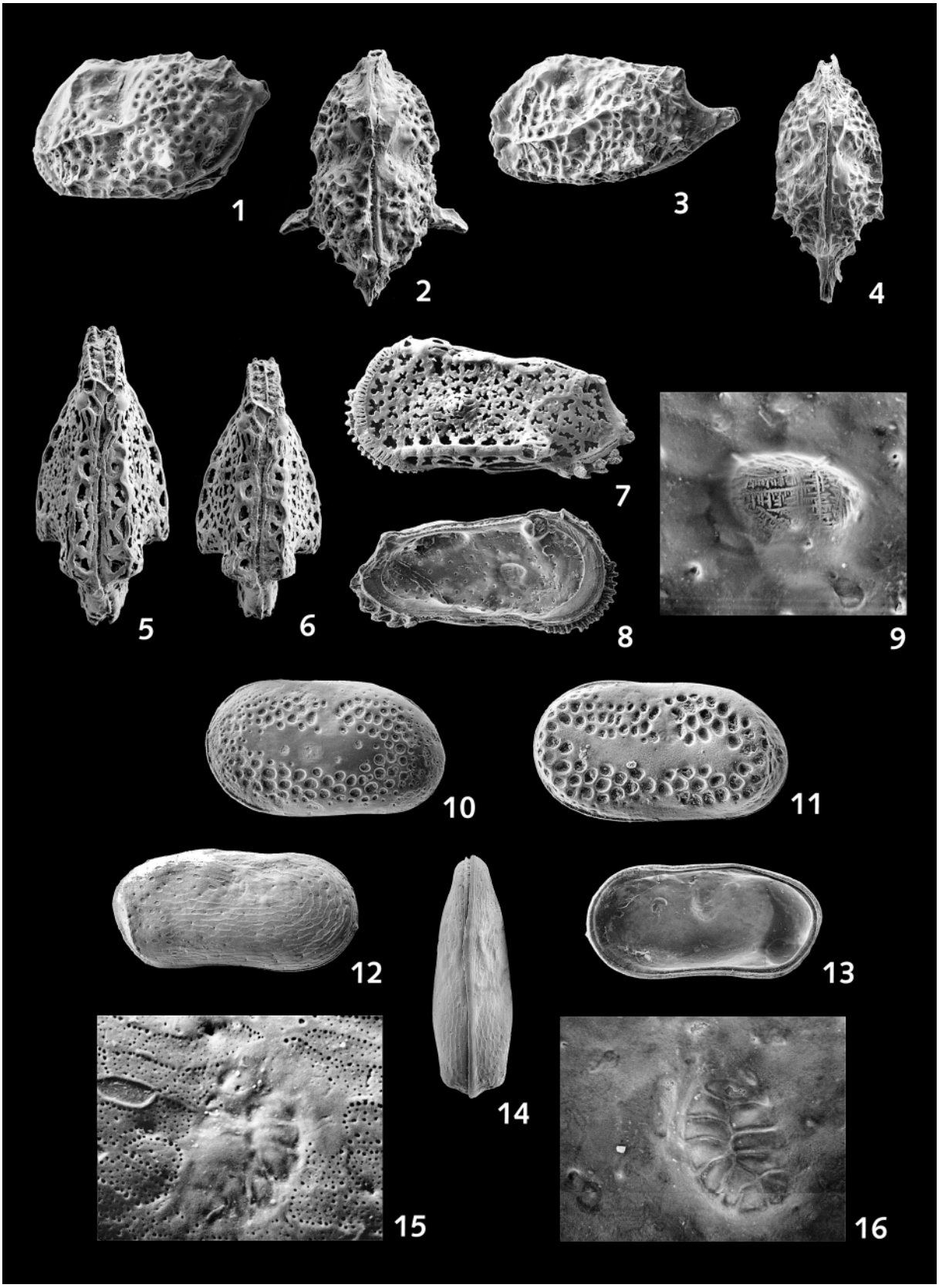
Remarks. One of us (RCW) has seen SEM illustrations of the type species of *Kotoracythere* (*K. abnorma* Ishizaki, 1966), kindly provided by Dr Ishizaki. These demonstrate clearly that *Morkhovenia* is congeneric and, by priority, a junior synonym.

Family **Trachyleberididae** Sylvester-Bradley, 1948
Subfamily **Trachyleberidinae** Sylvester-Bradley, 1948
Genus *Cletocythereis* Swain, 1963

Cletocythereis rastromarginata (Brady, 1880)
(Pl. 3, figs 5–9)

1880 *Cythere rastromarginata* sp. nov. Brady (*pars*): 82, pl. 16, fig. 2a–d (*non* fig. 1a–d).
1967 *Cythere rastromarginata* Brady; McKenzie (*pars*): pl.13, fig. 2.
1967 *Cletocythereis bradyi* sp. nov. Holden: 40, text-fig. 31a–c.
1972 *Cletocythereis rastromarginata* (Brady); Benson: 112, pl. 3 (lectotype).
1976 *Cythere rastromarginata* Brady; Puri & Hulings: 286, pl. 9, figs 9–14 (lectotype, figs 10–14; paralectotype, fig. 9).
1976 *Cletocythereis bradyi* Holden; Holden: 28, pl. 4, fig. 13.
1980 *Cletocythereis rastromarginata* (Brady); Malz: 389, pl. 1, figs 5–7; pl. 2, figs 8–13.
1981 *Cletocythereis rastromarginata* (Brady); Hartmann: 108, pl.5 , figs 15, 16.
1984 *Cletocythereis* sp. cf. *C. bradyi* Holden; Titterton MS: 461, pl. 15, fig. 4; pl. 53, figs 10–17.
1987 *Cletocythereis rastromarginata* (Brady); Yassini & Jones: 824, figs 4.5–4.7.
1988 *Cletocythereis rastromarginata* (Brady); Watson MS: 233, pl. 44, figs 7, 10 (=lectotype); figs 8, 9 (=paralectotype).
1990 *Cletocythereis rastromarginata* (Brady); McKenzie, Reyment & Reyment: 20, pl. 6, fig. 9.
1995 *Cletocythereis rastromarginata* (Brady); Yassini & Jones: 355, figs 375, 377, 379, 381.
non 1988 *Cletocythereis rastromarginata* (Brady); Watson MS: 233, pl. 44, figs 1–6 [=*C. watsonae* Jellinek, 1993].
non 1991 *Cletocythereis rastromarginata* (Brady); Behrens: 50, pl. 12, figs 1–m [=*C. watsonae* Jellinek, 1993].
non 1994 *Cletocythereis* sp. cf. *C. rastromarginata* (Brady); Neil: pl. 1, fig. 10; pl. 2, figs 1, 2.
non 1995 *Cletocythereis rastromarginata* (Brady); Whatley & Roberts: 360, fig. 26. [=*C. watsonae* Jellinek, 1993]

Diagnosis. Subrectangular in shape in lateral view, hastate in dorsal view; ventrolateral alae well developed. Surface of valves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reticulate, concentric about a small subcentral tubercule; small pointed ingrowths so fossae are stellate. Broad anterior rim of densely spaced, small, deep fossae. Short, strong posteroventral marginal ridge. Strong rib along crest of ventrolateral alae, crossed by reticulae so appearing nodose on anterior half. Inner lamella moderately wide, avestibulate.

Lectotype. LV, BMNH no. 80.38.105, designated by Benson (1972, p. 112).

Material. All the material is from Honolulu and is exclusively the alate form: BMNH nos. 1974.335–337, topotypes, 3 cars.; BMNH nos. 1988.383–385, ex slide no. 80.38.104, paralectotypes, 3 cars.; BMNH no. 80.38.105, lectotype, LV; HM nos. 2.09.25, 2.09.26.

Type locality. Honolulu, Hawaii, Recent, dredged at 40 fathoms, off reefs. The information on localities given by Brady (1880; see below) must be wrong. All the extant types are from Honolulu and all are alate.

Dimensions. Length: lectotype♂ LV, BMNH no. 80.38.105, 0.77 mm; paralectotype ♂ car., BMNH no. 1988.384, 0.77 mm; paralectotype♀ car., BMNH no. 1988.383, 0.68 mm.

Distribution. Pleistocene of Midway Island and SubRecent? of the Hawaiian Islands (Holden, 1967). Recent off Hawaii, the Solomon Islands and the eulittoral of the coast of southeast Australia.

Remarks. Brady (1880) figured two forms of a new species, *Cythere rastromarginata*: an alate form which he thought to be a female and a non-alate form which he considered to be male. Brady did not designate a holotype and his syntypes were said to come from 'males' (non-alate), recovered from 'reefs off Honolulu' and from off east Moncoeur Island in the Bass Strait, east of New Zealand, and the alate females from west of North Island, New Zealand.

Holden (1967) believed, correctly, that Brady had mistakenly equated the alate and non-alate forms as separate sexes of the same species. Since Brady's original description was based upon the non-alate form, Holden decided that this should retain the name *rastromarginata* and that the alate form should be designated as a new species *Cletocythereis bradyi*. Unfortunately, Holden did not designate a lectotype of *rastromarginata* himself. This was done by Benson (1972), who selected an alate form from 'off reefs at Honolulu'; Puri & Hulings (1976) re-illustrate this lectotype and also figure an alate paralectotype. This action, therefore, renders *C. bradyi* a junior objective synonym of *C. rastromarginata*. Had Holden (1967) himself seen Brady's material he would have noted that all the specimens from off Honolulu were alate and that Brady had made a mistake concerning his syntype localities.

Family **Schizocytheridea** Mandelstam, 1960
Genus *Neomonoceratina* Kingma, 1948

Neomonoceratina entomon (Brady, 1890)
(Pl. 3, figs 1–4)

1890 *Cytherura entomon* sp. nov. Brady: 509, pl.3, figs 26, 27, 27a.
1954 *Paijenborchella* (*Neomonoceratina*) *entomon* (Brady); Keij: 358, pl. 3, figs 10–11.
1963 *Neomonoceratina entomon* (Brady); Van Morkhoven: 371, figs 611–613.
1984 *Neomonoceratina* sp. cf. *N. entomon* (Brady); Titterton MS: 445, pl. 14, figs 13–15; pl. 53, figs 1–7.
1986 *Neomonoceratina entomon* (Brady); McKenzie: pl. 2, fig. 4 (lectotype).
1988 *Neomonoceratina entomon* (Brady); Watson MS: 219, pl. 42, figs 5–8.
1988 *Neomonoceratina entomon* (Brady); Zhao & Whatley: 571, pl. 2, fig. 16.
1997 *Neomonoceratina* cf. *N. entomon* (Brady); Dewi: 59, figs 48–50.

Diagnosis. A species of *Neomonoceratina* with 2 ventral, delicate, sinuous ridges from posteroventral spine to anterior, a median ridge across median sulcus. Intercostate areas strongly reticulate and anteroventral margin with narrow flange. Dimorphic, male more elongate and less inflated with median rather than subdorsal caudal process and less well developed posteroventral spine.

Lectotype. Carapace, HM no. 1.15.16, designated by McKenzie (1986, pl. 2, fig. 4) (erroneously listed by him as HM no. B461, see Davis & Horne, 1988).

Material. HM slide no. 1.15.16, lectotype. HM slide no. 2.14.04, also from Nouméa, New Caledonia, contains 3 carapaces, 2 of which are designated paralectotypes (renumbered 1.15.23, 1.15.24). HM slide no. 2.14.17, Sava Sava Bay, Vanua Levu, Fiji, Recent, at 4 fathoms, fine coral sand – contains a single specimen.

Type locality. Port of Nouméa, New Caledonia, Recent at 3–6 fathoms.

Dimensions. Length: lectotype ♀car., HM no. 1.15.16, *c.* 0.48 mm; paralectotype ♀ car., HM no. 1.15.24, 0.45 mm; paralectotype ♀ car., HM no. 1.15.23, 0.47 mm; paralectotype ♂ car., HM no. 1.15.25, 0.48 mm.

Distribution. The species is of common occurrence in Indonesian waters. It also occurs in the Solomon islands, New Caledonia and Fiji.

Remarks. The material of Titterton MS and Watson MS, from the Solomon Islands and the Java Sea respectively, differ slightly

Explanation of Plate 3

Figs 1–4. *Neomonoceratina entomon* (Brady, 1890): **1, 2**, paralectotype (Hancock Museum no. 1.15,24, ex slide 2.14.04), ♀ carapace, external view of LV and dorsal view, respectively; **3, 4**, paralectotype (Hancock Museum no. 1.15,25, ex slide 2.14.04). ♂ carapace, external view of LV and dorsal view, respectively; all ×85. From Port of Nouméa, New Caledonia. **Figs 5–9**. *Cletocythereis rastromarginata* (Brady, 1880): **5**, paralectotype (BMNH no. 1988.384, ex slide 80.38.104), ♂ carapace, dorsal view; **6**, paralectotype (BMNH no. 1988.383, ex slide 80.38.104), ♀ carapace, dorsal view; **7–9**, lectotype (BMNH no. 80.38.105), ♂ LV external and internal views, and detail of muscle scars, respectively; **5–7**, ×62, **8**, ×56, **9**, ×275. From off reefs at Honolulu, Hawaii. **Figs 10, 11**. *Cytherella semitalis* Brady, 1868: **10**, paralectotype (Hancock Museum no. 1.58.37, ex slide 2.05.34), ♂ LV external view; **11**, lectotype (Hancock Museum no. 1.58.36, ex slide 2.05.34), ♀ LV external view; both ×76. From Port Pamalang, Java. **Figs 12–16**. *Cytherelloidea venusta* (Brady,1880): **12, 13, 15, 16**, lectotype (BMNH no. 80.38.180), RV external and internal views, external detail of ornament over central muscle scar area and internal details of muscle scars, respectively; **14**, paralectotype (BMNH no.1988.382, ex slide 1961.12.4.1), carapace, dorsal view; **12**, ×56, **13**, ×54, **14**, ×62, **15, 16**, ×250. From off reefs at Honolulu, Hawaii.

from the type material in that they possess a small, crenulate postero-dorsal rib.

Suborder **Platycopina** Sars, 1866
Family **Cytherellidae** Sars, 1866
Genus *Cytherella* Jones, 1849

Cytherella semitalis Brady, 1868
(Pl. 3, figs 10, 11)

1868 *Cytherella semitalis* sp. nov. Brady: 72, pl. 18, figs 23, 24.
1880 *Cytherella semitalis* Brady; Brady: 175, pl. 44, fig. 2a–e.
1890 *Cytherella semitalis* Brady; Brady: 517, 521.
1916 *Cytherella semitalis* Brady; Fyan: 1214, figs 15,16.
1941 *Cytherella semitalis* Brady; Chapman: 204.
1948 *Cytherella leyroyi* sp. nov. Kingma: 62, pl. 6, fig. 2a, b.
1948 *Cytherella semitalis* Brady; Kingma: 63, pl. 6, fig. 6a, b.
1978 *Cytherella* sp. cf. *C. semitalis* Brady; Jain: 90, fig. 2a.
1988 *Cytherella semitalis* Brady; Whatley & Zhao: 334, pl. 1, figs 7–10.
1988 *Cytherella semitalis* Brady; Taylor MS: 120, pl. 8, figs 17, 18.
1988 *Cytherella semitalis* Brady; Titterton & Whatley: 770, text-fig. 14.
1989 *Cytherella semitalis* Brady; Howe & Mckenzie: 4, fig. 37.
1989a *Cytherella semitalis* Brady; Zhao & Whatley: 186.
1992 *Cytherella semitalis* Brady; Mostafawi:133, pl. 1, fig. 4.
1993 *Cytherella semitalis* Brady; Yassini, Jones & Jones: 383, pl. 1, figs 14–16; pl. 8, fig. 156.
1995 *Cytherella semitalis* Brady; Whatley, Cooke & Warne: 72, pl. 1, figs 1–4.
1997 *Cytherella semitalis* Brady; Dewi: 55, figs 11–13.
non 1984 *Cytherella semitalis* Brady; Titterton MS: 546, pl. 62, figs 9–17.

Diagnosis. Adults conspicuously dimorphic; female strongly inflated posteriorly and wider than male. Surface of valves with large, deep fossae around a smooth, elongate median and muscle scar area; not extending to margins except anteriorly and posteriorly where fossae are smaller, weaker and more dense. Size of fossae varies between individuals but there are essentially 3 rows both dorso- and ventro-medianly.

Lectotype. ♀RV, HM no. 1.58.36 (ex slide 2.05.34).

Material. HM slide no. 2.05.34, labelled 'Port Pamalang, Java', contains 6 specimens, 3 valves of which are *C. semitalis*, the other 3 of *Cythere cancellata*. BMNH slide nos. 80.38.178, 80. 38. 179 (locality not recorded) contain 2 specimens, one may be *C. semitalis*, the other is a *Cytherelloidea*.

Type locality. North-Watcher Island, north of Java.

Dimensions. Length: lectotype ♀ LV, HM no. 1.58.36, 0.54 mm; paralectotype ♂ LV, HM no. 1.58.37 (ex slide 2.05.34), 0.51 mm.

Distribution. Pliocene of Timor and Sumatra. Recent of India, Indonesia, Singapore, Borneo, northern and eastern Australia and Papua New Guinea.

Genus *Cytherelloidea* Alexander, 1929

Cytherelloidea venusta (Brady, 1880)
(Pl. 3, figs 12–16)

1880 *Cytherella venusta* sp. nov. Brady: 176, pl. 28, fig. 4a–d.
1976 *Cytherella venusta* Brady; Puri & Hulings: 313, pl. 24, figs 11–13 (lectotype).

Diagnosis. A species of *Cytherelloidea* possessing a weak, delicate ornament with polygonal fossae aligned concentric to margins. The solae of the fossae comprise a dense, secondary punctatation.

Lectotype. ♀RV, BMNH no. 80.38.180.

Material. BMNH slide no. 80.38.180 contains the lectotype designated by Puri & Hulings (1976); it was a slide that supposedly also originally contained a male and a juvenile valve. A paralectotype, a male carapace (BMNH no. 1988.382, ex slide 1961.12.4.11), was also designated by them.

Type locality. Honolulu, Hawaii, 40 fathoms, off reefs. Recent

Dimensions. Length: lectotype ♀ RV, BMNH no. 80.38.180, 0.71 mm; paralectotype ♂ car., BMNH no. 1988.382, 0.65 mm.

Distribution. Recorded only from type locality.

Remarks. *Cytherelloidea* sp. aff. *C. venusta* of Titterton (1984 MS) from the Recent of Guadalcanal, Solomon Islands and of Whatley & Keeler (1989) from St Pierre Harbour, Réunion Island differ in possessing a more deeply etched reticulation marginally. *Cytherelloidea* sp. aff. *venusta* Watson, 1988 MS, from the Java Sea possesses a crenulate posterior margin, the posterior extremity is above mid-height and the delicate polygonal fossae are less elongate.

POSTSCRIPT

The Aberystwyth Micropalaeontology Collections together with copies of associated MSc and PhD theses – including those of Hughes (1977), Keeler (1981), Taylor (1988), Titterton (1984), Watson (1988) and Williams (1980), listed above – have now been transferred to the Department of Palaeontology, The Natural History Museum, London.

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