Taxonomy and Biogeography of West African Beach Ostracods

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Leendert Witte

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Present address of the author:

Geological Survey of the Netherlands,
Postbus 157,
2000 AD Haarlem,
The Netherlands.

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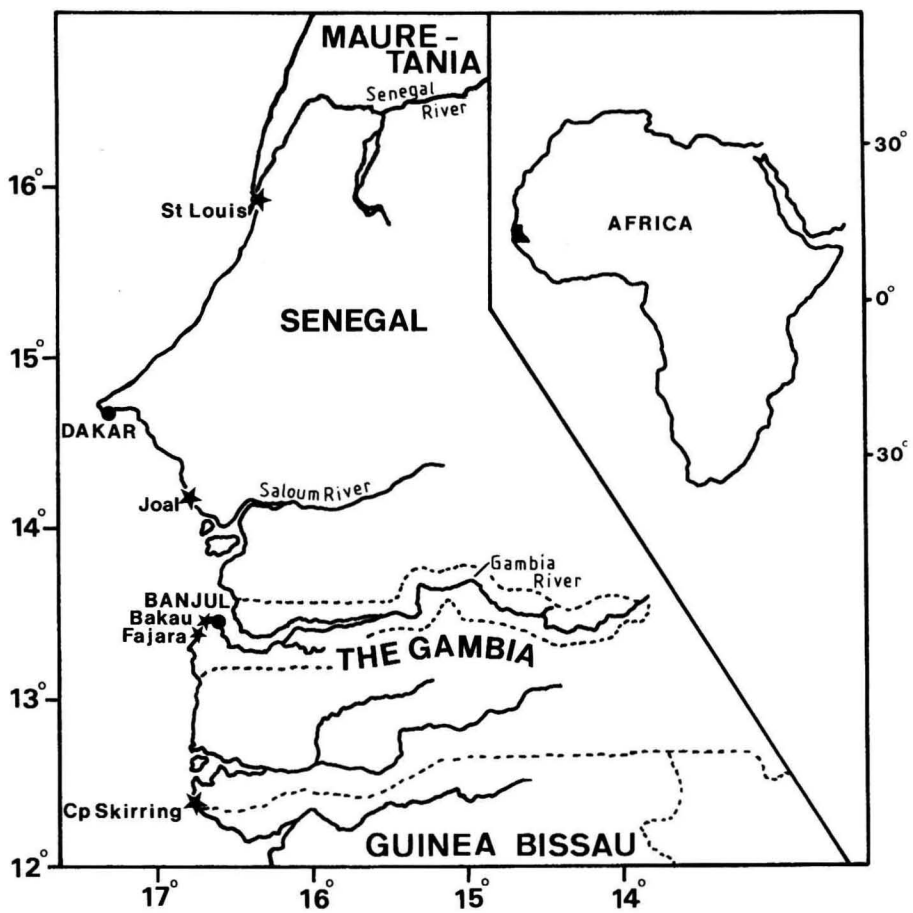
ABSTRACT

This paper describes 59 ostracod species from the beach sand of Senegal and The Gambia. Twenty-six species have previously been described from the West African coast or other areas, 16 are new to science. One new genus, *Pseudoconcha*, is erected.

Some of the new forms are endemic to this part of the West African coast, other species have a virtually worldwide distribution in shallow, tropical waters. The wide areal distribution may either be a pan-Tethyan relict, or did result from recent dispersal by ships.

The beach samples that yielded the ostracods described in this study were collected during the summer of 1983 along the Atlantic coast of Senegal and The Gambia in West Africa (Textfig.1). The northernmost sample was taken a few kilometres south of the town of St. Louis, at the mouth of the Senegal River, which forms the the boundary with Mauretania. The southernmost sample is from Cap Skirring, a seaside resort close to the border with Guinea Bissau. In a straight line, the distance between these localities is a little over 400 kilometres. The other sample locations are Joal beach, circa 100 km south of Dakar, and the beaches of Bakau and Fajara in the Republic of The Gambia. All samples represent the upper one centimetre of sediment and were taken just below the low-water level.

The samples from Cap Skirring, Fajara and Bakau are from wide, open beaches. The sampling locality near St. Louis is situated landward of a long, sandy spit, parallel to the coast, which acts as a barrier between the open ocean



Textfig. 1. Sketchmap showing the Senegalese coastline and sampling sites (stars).

and the outflow from the Senegal River; as a consequence it reflects more brackish conditions than the other sites; the fauna is poor in species with abundant *Miocyprideis*.

Joal beach is protected from direct wave-action by a small island (Fadiouth) and, therefore, its sands are muddier than at the other beaches. For species that also were found on open beaches, the carapace-to-valve-ratio is generally higher in the sample from Joal, reflecting the lower energy environment. In the laboratory, circa 200 grams of wet sediment were washed over a 0.63 mm sieve. The ostracods were hand-picked from the washings and mounted in cardboard slides. The material has been deposited in the collections of the Geological Institute of the University of Amsterdam under numbers S337 to S565, K7523 to K7529, K7539 and K7540; it may be consulted through the Curator of the Artis Geological Museum in Amsterdam. Holotypes and selected paratypes are filed in separate slides, the numbers of which are listed in the taxonomical descriptions.

The systematic section follows, where possible, the classification as given in the 'Treatise on Invertebrate Paleontology, Part Q, Ostracoda' (Moore & Pitrat 1961). Numerous ostracodologists are now joining forces to produce a revised edition of the 'Treatise' within the next few years. Unlike Hartmann & Puri (1974), who published another widely used ostracod classification, the Treatise does not use the Tribe (or *Tribus*) as a category of classification.

Of the 59 species described in this paper, 16 are new; one of them, *Pseudoconcha omatsolai* gen. et sp. nov. was originally described in open nomenclature and assigned to *Phlyctocythere* Keij, 1958. Twelve species are left in open nomenclature, because of lack of sufficient material, and five species were tentatively referred to, or compared to, existing species (cf. and aff. respectively). The remaining 26 species have been previously described. The genus *Kroemmelbeinella* Mostafawi, 1984 is re-evaluated and reduced to the rank of subgenus within *Perissocytheridea* Stephenson, 1938.

Unless otherwise indicated, the size ranges given in the systematic descriptions generally refer to the largest and smallest adult specimens.

Subclass *Ostracoda* Latreille, 1806
Order *Podocopida* G.W. Müller, 1894
Suborder *Platycopina* Sars, 1866
Family *Cytherellidae* Sars, 1866

Genus *Cytherella* Jones, 1849
Type species: *Cytherina ovata* Roemer, 1840

Cytherella eburnea sp. nov.
Pl. 1, figs. 1-7.

Derivation of name. From Latin *eburneus*, meaning ivory-like; alluding to the smooth surface.

Diagnosis. A rather large *Cytherella* species with a smooth carapace that is distinguished from other species by the dorsal outline, straight in the anterior two thirds of its course, and from there declining towards the posterior. Sexual dimorphism very strong.

Holotype. A female carapace, coll. no. S337 (paratypes: one male carapace, two female valves, two male valves, coll. nos. S338-S342).

Description. Shell subelliptical in lateral view with greatest height at approximately two thirds from anterior margin. Male and female shells are identical in their anterior half, but posteriorly females are higher and wider than are males. Ventral margin gently arched in females, slightly concave in males. Dorsal margin raised behind the middle and regularly arched in females; in males obliquely rounded. Surface of shell smooth. With the exception of the dorsal part, in lateral view a thin subperipheral rim following the margin is conspicuous.

Material. Ninety-five carapaces and 224 valves, the majority from juveniles.

Dimensions. Holotype: length 0.75 mm, height 0.43 mm; adult males length 0.73-0.76 mm, height 0.39-0.41 mm; adult females length 0.73-0.75 mm, height 0.39-0.43 mm.

Type locality. Bakau beach (Cape St. Mary), Republic of The Gambia. Lat. 13°29′08″ N, Long. 16°40′15″ W.

Distribution. The Gambia and Senegal.

Remarks. *Cytherella lata* Brady, 1880, reported from several localities on the deeper shelf of the Pacific and Atlantic oceans, is much larger than the new species and is higher anteriorly. The brackish-water species *Cytherella hanaii* Omatsola, 1970 and *C. olosa* Omatsola, 1970 (both from the Lagos Lagoon, Nigeria) are quite similar to *C. eburnea* sp. nov. in dorsal view, but differ in size and lateral outline. Neither shows the strong sexual dimorphism of *C. eburnea* sp. nov. *C. omatsolai* Hartmann, 1974 from Angola has a comparable outline but is considerably smaller. *C.* sp. aff. *punctata* Brady, reported by Babinot & Kouyoumontzakis (1986) from the Congo River outlet, is similar in dorsal view, but shows irregularly distributed coarse pits which are absent in *C. eburnea* sp. nov.

Cytherella joalensis sp. nov.
Pl. 1, figs. 8-15.

Derivation of name. From Joal (Senegal), the type locality.
Diagnosis. A coarsely punctate species of *Cytherella*, females much higher posteriorly than anteriorly, males with a characteristic break in the dorsal outline. A distinct submedian sulcus is present. Extremely strong sexual dimorphism.
Holotype. A female carapace, coll. no. S347 (paratypes one female carapace, two female valves, one male carapace, two male valves, coll. nos. S348-S353).
Description. Carapace in lateral view ovate, greatest height in females at about two thirds from anterior end, with dorsal margin sloping gently anteriorly. Highest point in the males just behind the middle, forming a conspicuous angular elevation in the dorsal outline. Ventral margin almost straight in females, slightly concave in males. Both ends broadly rounded, anterior margin slightly more pointed in females. In dorsal view the carapace is more or less wedge-shaped, with the greatest width near the posterior margin, in females more swollen and abruptly truncated. Ornamentation consists of numerous puncta that are evenly distributed, but, in the females, absent from the central area of the posterior half. The puncta of largest size occur close to the posterior margin; decreasing in size towards the anterior. Just anterior of the middle of the valve, a shallow, elongate, sulcal depression is present. In each valve anterodorsally a small, unornamented, slightly depressed spot is seen in both sexes.
Material. Three samples yielded 13 females, four of which were carapaces. Males (two carapaces and five valves) were found only in the type sample.
Dimensions. Holotype length 0.81 mm, height 0.41 mm; adult females length 0.78-0.81 mm, height 0.41-0.44 mm; adult males length 0.68-0.72, height 0.36-0.38.
Type locality. Joal beach, Senegal. Lat. 14°09′18″ N, Long. 16°50′00″ W.
Distribution. Senegal and The Gambia.
Remarks. The new species differs from *C. punctata* Brady, 1866 in its coarser ornamentation and being more truncate posteriorly in dorsal view. Like the punctate Mediterranean species *C. alvearium* Bonaduce, Ciampo & Masoli, 1976, *C. punctata* is higher anteriorly than posteriorly. *Cytherella sordida* (G.W. Müller, 1894) and *Cytherella ponderosa* sp. nov. are sinuous in lateral view. Sexual dimorphism in *Cytherella joalensis* sp. nov. is more pronounced than it is in most other species of the genus.

Cytherella ponderosa sp. nov.
Pl. 1, figs. 16-21.

Derivation of name. From Latin *ponderosus*, meaning weighty, heavy. Name refers to the thick shell of the species.
Diagnosis. A thick-shelled species of *Cytherella* with subparallel, sinuous dorsal and ventral margins. Ornamentation of numerous, regularly distributed puncta.

Holotype. A male right valve, coll. no. S357 (paratypes: a male left valve, a female left valve, coll. nos. S358, S359).
Description. Carapace subelliptical in lateral view, ventral and dorsal margins almost parallel and slightly concave. Anterior and posterior ends broadly rounded and of nearly equal height. Surface of the valve covered with numerous, closely spaced puncta, with the exception of a small area in the dorsal central part of the valve, corresponding to the muscle scars on the interior. In dorsal view, overlap of the valves is conspicuous, as well as the strong difference between the sexes. Greatest thickness of the carapace near the anterior margin in the female, median in the male.
Material. Two carapaces, one male and one female. Both carapaces were split into two valves, of which the female right valve was lost during study.
Dimensions. Adult male (holotype) length 0.67 mm, height male 0.37 mm, length female 0.72 mm, height female 0.37 mm.
Type locality. Joal beach, Senegal. Lat. 14°09′18″ N, Long. 16°50′00″ W.
Distribution. This species is only known from the type locality.
Remarks. The species shows a rather strong resemblance to *Cytherella sordida* (G.W. Müller, 1894), but in the latter a strong, bar-like, lateral extension ornamented with a series of subparallel ribs is present along the anterior margin. In addition, the new species lacks the irregularly shaped unornamented spots and, in lateral view, the ends are more rounded.

Suborder *Podocopina* Sars, 1866
Superfamily *Bairdiacea* Sars, 1888
Family *Bairdiidae* Sars, 1888

Genus *Paranesidea* Maddocks, 1969
Type species: *Paranesidea fracticorallicola* Maddocks, 1969

Paranesidea multiforma sp. nov.
Pl. 2, figs. 1-8.

Derivation of name. Latin. Referring to the differences in valve outline between individuals of this species.
Diagnosis. Densely pitted *Paranesidea* of typical 'bairdioid' shape. Left valve variable in outline.
Holotype. One carapace, high variant, coll. no. S360 (paratypes three left valves, of various shape, two right valves, coll. nos. S361-S366).
Description. Carapace robust, only slightly caudate. Valves densely covered with shallow, circular pits. An opaque area, ellipsoid in shape, is positioned vertically in the central part of the valve, not always clearly visible. Pitting less pronounced in central part of valve, pits are smaller peripherally.
Valves differ considerably in size; overlap of left valve is pronounced along dorsal margin and central part of ventral margin.
Left valve exceptionally variable in height. In lateral view, some valves are high

and broadly arched, with the greatest height at mid-length, whereas others are lower and more subtrapezoid. Intermediate specimens also occur.
Muscle scar pattern composed of eight subrounded scars, arranged in a rosette, two distinct ventral scars are also present.
Material. Four carapaces and 19 valves, some of which are juvenile.
Dimensions. Holotype length 0.81 mm, height 0.46 mm; left valves, length 0.78-0.80 mm, height 0.41-0.49 mm; right valves length 0.75-0.81 mm, height 0.38-0.40 mm. Of seven adult left valves, three were high (ranging from 0.46 to 0.49 mm), two were low (0.41-0.43 mm) and two were intermediate in height.
Type locality. Bakau beach, The Gambia. Lat. 13°29′08″ N, Long. 16°40′15″ W.
Distribution. Senegal and The Gambia.
Remarks. The different morphological types were initially thought to belong to separate species, but examination of the matching right valves, in which no obvious variation was recognized, made me reject this idea.
Maddocks (1969) divided the large genus *Bairdia* McCoy, 1844 into several new genera, differing in both soft and hard parts. The new species, of which I have no soft parts, shows similarities to any of the genera *Paranesidea*, *Neonesidea* and *Bairdoppilata* Coryell, Sample & Jennings, 1935. Some of the difficulties involved in distinguishing between these genera were discussed by Titterton & Whatley (1988b). The attribution of this new species to *Paranesidea* was prompted primarily by the muscle scar configuration and carapace morphology.

Paranesidea sp. A
Pl. 1, figs. 22-25.

Remarks. A few specimens were found of this species, which is readily recognized by its exaggerated caudal process and finely pitted surface. The muscle scar configuration is typical of the genus: seven circular scars arranged around a central one. In this species, however, two scars, usually the dorsal two, may be fused. *Paranesidea* sp. A shows some similarity to *Bairdia longevaginata* G.W. Müller, 1894, but has an even more pronounced caudal process. The species is probably new, but for a formal description there is not enough material available.
Material and dimensions. This species is known from one locality in The Gambia and one in southern Senegal. One carapace and 11 valves were recovered, the majority of these were juveniles. Length adults 0.80-0.81 mm, height 0.45-0.46 mm.

Paranesidea sp. B
Pl. 2, figs. 9-11.

Remarks. Large, rather elongated species characterized by a strong ventral inflation and a finely punctate surface. Outline of the right valve is similar to that of *Paranesidea multiforma* sp. nov., but *P.* sp. B. is far larger. Right valve frilled; frills or denticulations were not observed in the left valve.
Material and dimensions. One complete carapace and seven valves, many broken

or damaged, in three samples from Senegal and The Gambia. Length 1.07-1.12 mm, height 0.53-0.56 mm.

Genus *Triebelina* van den Bold, 1946
Type species: *Triebelina indopacifica* van den Bold, 1946

Triebelina intermedia sp. nov.
Pl. 2, figs. 12-18.

Tribeline sp [*sic*]; Carbonel *et al.* 1983: pl. 1, fig. 32.
Triebelina sp.; Carbonnel 1986: 215.

Derivation of name. From Latin *intermedia*, referring to the intermediate morphology between the genera *Triebelina* van den Bold, 1946 and *Havanardia* Pokorný, 1968.
Diagnosis. A *Triebelina* species distinguished by a very weakly developed ventrolateral alar process. Surface punctate and with numerous pores. Muscle scar pattern consists of ten scars, similar to that of the type species.
Holotype. A carapace, coll. no. S375 (paratypes: three carapaces, two left valves, two right valves, coll. nos. S376-S385).
Description. In lateral view ventral margin straight, dorsal margin smoothly rounded with the central part almost straight. Dorsal line turning sharply downward at the anterior, meeting the ventral margin almost at a right angle. At the posterior end the shell is lower and more regularly rounded. Left valve higher than the right; in dorsal view a strong overlap, especially near the anterior and posterior, is conspicuous. Towards both ends the arched valves merge into laterally flattened flanges. On both ends of the valve, the initiation of a weakly developed alar process can be seen in this flattened area. The anterior and posterior processes are connected by an edge, along which the ventral and lateral sides of the valve meet at a sharp angle.
Hinge adont, composed of a smooth bar in the right valve that fits into a smooth groove in the left valve.
Material. A total of 15 carapaces and 32 valves, nearly all from the type locality.
Dimensions. Holotype length 0.76 mm, height 0.35 mm; other specimens length 0.72-0.76 mm, height 0.35-0.36 mm.
Type locality. Joal beach, Senegal. Lat. 14°09′18″ N, Long. 16°50′00″ W.
Distribution. Senegal, The Gambia.
Remarks. The new species shows characteristics of *Triebelina* van den Bold, 1946 as well as *Havanardia* Pokorný, 1968, both ornate bairdiid genera (see e.g. Keij 1976). In general shape and internal features, *T. intermedia* resembles some Mediterranean *Triebelina* species (*Triebelina raripila* of Yassini (1979a/b) and '*Bairdia*' n. sp. A of Bonaduce, Ciampo & Masoli (1976)). Adults of the new species are very similar to the penultimate instar of *H. patriciae* Keij, 1973. The adults of *H. patriciae* are slightly larger than those of *T. intermedia* sp. nov., show a finer pitting, and have, as all other *Havanardia* species, very prominent

carinate ventrolateral alae. Hartmann (1974) described the species *Bairdia problematica*, based on one juvenile carapace and three valves from different localities along the southwest African coast. This species seems to be closely allied, but the holotype (an adult right valve) is considerably larger than the largest specimens in my collection.

Superfamily *Cytheracea* Baird, 1850
Family *Schizocytheridae* Mandelstam, 1960

Genus *Neomonoceratina* Kingma, 1948
Type species: *Neomonoceratina columbiformis* Kingma, 1948

Neomonoceratina ikoroduensis Omatsola, 1970
Pl. 3, figs. 5-12.

Neomonoceratina ikoroduensis; Omatsola 1970a: 434, pl. 11, figs. 1-12.
Neomonoceratina ikoroduensis Omatsola; Carbonnel 1982: 334, pl. 2, fig. 12.
Neomonoceratina ikkoroduensis Omatsola [*sic*]; Carbonnel 1986: 214.

Remarks. The few adults I found are larger and more ornamented than the specimens described and illustrated by Omatsola (1970a). The great majority of my material consists of what is very likely the penultimate instar. Their ornamentation is identical to that of the holotype as illustrated by Omatsola (1970a), suggesting that the holotype may in fact be a late instar. The males of this species are distinctly larger than the females, which are only slightly higher than the (male) penultimate instars.
Distribution. Nigeria, Senegal and The Gambia.
Material and dimensions. The species was present in three samples, but abundant only in the sample from Bakau. All together 136 carapaces and valves were recovered, circa 80% of these were last instars. Adult males length 0.54-0.56 mm, height 0.30 mm, adult females length 0.47-0.48 mm, height 0.28-0.29 mm. Last instars length 0.44-0.48 mm, height 0.24-0.28 mm.

Neomonoceratina iddoensis Omatsola, 1970
Pl. 3, figs. 13-18.

Neomonoceratina iddoensis; Omatsola 1970a: 436, pl. 12, figs. 1-13.
Neomonoceratina iddoensis Omatsola; Monteillet, Ausseil & Carbonnel 1982: 241; Carbonnel 1986: 214, pl. 1, figs. 5-9, pl. 2, fig. 5.

Remarks. Omatsola (1970a) reported one carapace and three valves from Lagos Lagoon. His specimens are smaller and less ornamented than are mine, but show a conspicuous similarity to what I consider, in the present material, to be the penultimate instar. Sexual dimorphism pronounced; males are considerably larger than females.
Distribution. Nigeria, Senegal and The Gambia.

Material and dimensions. Seventeen specimens, of which two were complete carapaces, in three samples. Adult males length 0.69 mm, height 0.37 mm, adult females length 0.62 mm, height 0.37-0.39 mm.

Family *Pectocytheridae* Hanai, 1957

Genus *Kotoracythere* Ishizaki, 1966
Type species: *Kotoracythere abnorma* Ishizaki, 1966.

Kotoracythere inconspicua (Brady, 1880)
Pl. 3, figs. 19-21.

Cythere inconspicua; Brady 1880: 70, pl. 13, figs. 1a-1d.
Morkhovenia inconspicua (Brady); Teeter 1975: 435, figs. 7o-7q, 8 c; Krutak, Rickles & Gio-Argaez 1980: 188, 195, figs. 4, 7; Bonaduce *et al.* 1980: 144, pl. 5, figs. 10-14; Krutak 1982: 271, pl. 4, figs. 13-16; Palacios-Fest, Gio-Argaez & Krutak 1983: 200, pl. 2, fig. 5; Gou 1990: 26, pl. 3, fig. 37.
Morkhovenia cuneola (Brady); McKenzie 1986: pl. 2, fig. 8; Davis & Horne 1988: p. 42.
Kotoracythere inconspicua (Brady); Titterton & Whatley 1988a: 776; Whatley & Keeler 1989: 76, pl. 5, figs. 5-7; Witte & van Harten 1991: 434, figs. 3A-3N, 4A-4X, 5A-5V.
For complete synonymy see Witte & van Harten (1991).

Remarks. *Morkhovenia inconspicua* has an extremely wide distribution that includes the tropical littoral zones of all oceans, with the exception of the East Pacific. As a fossil it is known only from several places in the Indo-West Pacific. Witte & van Harten (1991) explained the present distribution as due to passive dispersal by ships.
Distribution. Recent: Indo-West Pacific (Sri Lanka, Okinawa, Taiwan, Philippines, South China Sea, Hainan, Singapore, Kalimantan, North Borneo, Butung, Banda, Roti, Seram, Irian Jaya, Java Sea, Papua New Guinea, Northwest Australia, Torres Strait, Lizard Island, Heron Island, Solomon Islands, Western Australia, South Australia, New Caledonia, New Hebrides, Micronesia, Enewetak, Midway, Fiji, Hawaii, Huahiné, Gulf of 'Aqaba, Red Sea, Saudi Arabia, Ethiopia, Quatar, Kenya, Comores, Réunion), West Atlantic (Jamaica, Bahamas, Florida, Barbados, St. Eustatius, Guadeloupe, Trinidad, Venezuela, Veracruz, Alacran Reef, Yucatán, Belize, Brazil), East Atlantic (Senegal, The Gambia). Fossil: Seram (Neogene), Andaman Islands (Pliocene, Miocene), Midway (?Pleistocene, Miocene), Enewetak (Miocene), Okinawa (Pliocene), Taiwan (late Pliocene/early Pleistocene). Additional details are given in Witte & van Harten (1991). After that paper had gone into print, an important new occurrence came to light: Upper Miocene of Fiji (coll. Keij slide 179, Viti Levu, Naindiri).
Material and dimensions. Five carapaces and two valves, all adults, in one

sample from Senegal and one from The Gambia. Length 0.39-0.40 mm, height 0.20-0.21 mm.

Genus *Keijia* Teeter, 1975
Type species: *Cythere demissa* Brady, 1868

Keijia demissa (Brady, 1868)
Pl. 4, figs. 10-12.

Cythere demissa; Brady 1868b: 180, pl. 12, figs. 1, 2.
Cythere demissa Brady; Brady 1890: 497.
? *Leptocythere demissa* (Brady); Hornibrook 1952: 13, 17, 21.
Leptocythere demissa (Brady); Benson 1964: 402; Teeter 1973: 47, figs. 2 a-g; Hanai, Ikeya & Yajima 1980: 144.
Leptocythere cf. *L. demisa* (Brady) [*sic*]; Baker & Hulings 1966: 114, pl. 1, fig. 6.
Callistocythere demissa (Brady); Eagar 1971: 58.
Keijia demissa (Brady); Teeter 1975: 436, pl. 7, figs. r, s, pl. 8, fig. e; Krutak 1982: 272, pl. 3, figs. 17-20; Bonaduce *et al.* 1983: 481, 482; Whatley & Zhao 1987: 353, pl. 5, figs. 27, 28; Hartmann 1988: 789; Whatley & Keeler 1989: 73, pl. 4, figs. 12-14; Zhao & Whatley 1989: 171; Gou 1990: 26, pl. 3, fig. 38: Mostafawi 1992: 140, pl. 2, fig. 44.
Aenigmocythere hirundo; Bonaduce, Masoli & Pugliese 1978: 380, pl. 4, figs. 6-11.
Pectocythere (?) foveata; Hartmann 1978: 144, textfigs. 619, 620, pl. 14, figs. 12, 13; Hartmann & Kühl 1978: pl. 19, figs. 12, 13.
Hemicytheridea anterocostata; Titterton 1984: 415, pl. 14, figs. 5, 6, pl. 51, figs. 1-10.
Keijia cf. *demissa* (Brady); Tabuki & Nohara 1990: 369, pl. 1, fig. 10.
Keijia sp.; Dias-Brito, Moura & Würdig 1988: 474, pl. 2, fig. 43: Bentley 1988: 441, pl. 1, fig. i.
? *Keijia novilunaris*; Zhao, Wang & Zhang 1985: 211, pl. 21, figs. 14-18.
Keijia foveata (Hartmann); Howe & McKenzie 1989: 32, figs. 71-73, 158; Weissleader *et al.* 1989: appendix 1.
Keijia borneoensis; Mostafawi 1992: 140, pl. 2, figs. 41-43.
non *Cythere demissa*; Brady 1880: 66, pl. 12, figs. 7 a-j (= *Mckenziartia* sp., see Bentley 1988)
non *Leptocythere demissa* (Brady); Key 1954a: 354, pl. 1, fig. 3.

Remarks. The distribution pattern of *Keijia demissa* shows a remarkable resemblance to that of *Kotoracythere inconspicua*, but fossil records are less numerous and, due to some taxonomic confusion, in part less reliable. In the Atlantic Ocean, it is the only representative of the genus, whereas in the West Pacific several closely related species are found. Sexual dimorphism is prominent, but males are only very rarely observed, which may suggest that the species practises facultative parthenogenesis. *Keijia demissa* probably gained its wide dis-

tribution primarily through passive dispersal by ships, in the same way as *Kotoracythere inconspicua* and *Tanella gracilis* Kingma, 1948.

Distribution. *Keijia demissa* is reported from the Recent of: Gulf of Aqaba, Red Sea (Bonaduce, Masoli & Pugliese 1978, Bonaduce *et al.* 1983), Gulf of Suez (Teeter 1973), Mauritius (Brady 1868b), Réunion (Whatley & Keeler 1989), Mozambique (Teeter 1973, 1975), Indonesia (Teeter 1973, Whatley & Zhao 1987), Malaysia (Zhao & Whatley 1989), Chinese Sea (Gou 1990), Okinawa (Tabuki & Nohara 1990), Philippines (Teeter 1973), Hawaii (Teeter 1973), Fiji, Samoa and New Caledonia (Brady 1890), Australia (Hartmann 1978, Bentley 1988, Howe & McKenzie 1989), several Micronesian Islands (Weissleader *et al.* 1989), Florida (Teeter 1975), Belize (Teeter 1973, 1975), Gulf of Mexico (Teeter 1973, Krutak 1982), Puerto Rico (Baker & Hulings 1966) and also from Brazil (Dias-Brito, Moura & Würdig 1988). Apart from West Africa (Senegal and The Gambia), I found new occurrence of the species in samples from St. Eustatius (Caribbean), numerous Indonesian localities (Buton, Roti, Java, Kalimantan), Singapore and Mombasa (Kenya). Fossil occurrences (Oligocene-Holocene) are reported from New Zealand (Hornibrook 1952) and Australia (in numerous papers by Chapman and Chapman & Crespin; for references see De Decker & Jones 1978). Some of these reports may be based on misidentifications, however (see McKenzie 1982a). Of importance is its presence in the Tertiary (unspecified) of Sarawak (coll. Keij, slide 203, Keduru).

Material and dimensions. One valve and ten carapaces, of which four were juvenile, in the sample from Joal, and a single carapace in each of the Gambian samples. Adults length 0.47-0.49 mm, height 0.23-0.24 mm.

Family *Leptocytheridae* Hanai, 1957

Genus *Leptocythere* Sars, 1925
Type species: *Cythere pellucida* Baird, 1850

Leptocythere culpata sp. nov.
Pl. 4, figs. 1-9.

Leptocythere sp1; Carbonel *et al.* 1983: pl. 1, fig. 19.

Derivation of name. From Latin *culpatus* = reprehensible. Name is inspired by the difficulties encountered in the recognition of this species, due to its extreme variability.

Diagnosis. Elongate, medium sized species of *Leptocythere*, with a strong ornament that shows wide variation.

Holotype. Male carapace, coll. no. S379 (paratypes seven carapaces, males and females, of various ornamentation, coll. nos. S398-S404).

Description. Carapace elongate, dorsal margin arched, ventral margin almost straight or slightly concave. Anterior end rounded, posterior end more truncate; the posterodorsal corner more or less angular. Posterior margin laterally compressed, flangelike. Ornament ranges from a pattern of rounded and elongate

pits to an irregular mesh-work of polygonal fossae. In the reticulate specimens two subhorizontal riblets are visible. Anterior half of shell ornamented less regularly and showing various ribs, more or less paralleling the margin. Fused puncta tend to form irregular depressions. Reticulate ornament in females often suppressed in posteroventral area; such specimens show, more pronounced than do others, a knoblike protuberance just behind the middle. Eye node more or less visible, depending on the type and intensity of the ornamentation.
Median sulcus clearly visible, variable in shape. Just in front of it is an elevated area which is mostly somewhat less ornamented.
Sexual dimorphism strong; females roughly the same length as males, but considerably higher. The dimorphism is also expressed in the ornamentation; the majority of the females lack ornamentation in part of the posterior half of the shell.
Material. This species was abundant in the sample from Joal, where a total of 70 carapaces were found: 29 males, three juveniles and 38 females. In a sample from Bakau one male and three juvenile carapaces.
Dimensions. Holotype length 0.49 mm, height 0.22 mm; adult males length 0.45-0.49 mm, height 0.20-0.22 mm; adult females length 0.42-0.45 mm, height 0.22-0.23 mm.
Type locality. Joal beach, Senegal. Lat. 14°09'18" N, Long. 16°50'00' W.
Distribution. Senegal and The Gambia.
Remarks. *L. culpata* sp. nov. is one of many species of this cosmopolitan genus in which a remarkable variation in ornament can be observed between individuals from the same population. Kühl (1980) reported the same for *L. lacertosa* and *L. psammophila* from the North Sea, Maybury & Whatley (1980) for *L. maxima* (Pliocene of Cornwall), Carbonnel (1969) for *L. pentagonalis* (Miocene of France), Whatley, Whittaker & Wall (1971) for *L. lacertosa* and *L. ilyophila*, Sissingh (1972) for *L. multipunctata* and Athersuch, Horne & Whittaker (1989) for *L. pellucida*, *L. lacertosa* and *L. porcellanea*.
L. culpata sp. nov. shows a strong similarity in ornamentation to the northern Argentine form *Leptocythere* sp. nov. A of Whatley & Moguilevsky (1975); the new species, however, is more elongate.

Genus *Callistocythere* Ruggieri, 1953
Type species: *Cythere littoralis* G.W. Müller, 1894

Callistocythere littoralis (G.W. Müller, 1894)
Pl. 3, figs. 19-22-25.

Cythere littoralis; G.W. Müller 1894: 353, pl. 28, fig. 18.
Leptocythere crispata (Brady); Sars 1925: 176, pl. 80, fig. 3.
Callistocythere pallida (G.W. Müller); Yassini 1969: 40, pl. 15, fig. 23, pl. 17, fig. 7.
Callistocythere littoralis (G.W. Müller); Barbeito-Gonzalez 1971: 274, pl. 9, figs. 1f, 2f; Uffenorde 1972: 68, pl. 7, fig. 96; Breman 1975: 51, pl. 7, fig. 96; Bonaduce, Ciampo & Masoli 1976: 39, textfig. 21, pl. 11, figs. 1-7;

Athersuch & Whittaker 1980: 61-66 (incl. plates); Aranki 1987: 51, pl. 2, fig. 8-10; Bonaduce, Masoli & Pugliese 1988: 452; Athersuch, Horne & Whittaker 1989: 108, fig. 41a, 41b, pl. 2, fig. 4; Trier 1990: 578.
For more references see Athersuch & Whittaker 1980 and Athersuch, Horne & Whittaker 1989.

Remarks. Within its wide area of distribution this species shows considerable variation in ornament. The strong rib that runs subparallel to the posterior margin in my specimens is often reduced in material from other localities, and sometimes almost absent. Size and shape of the other ribs, and the pitted areas, appear to be variable as well (Breman 1975, Bonaduce, Ciampo & Masoli 1976, Athersuch & Whittaker 1980, Athersuch, Horne & Whittaker 1989).
Since males have never been found this species it is believed to reproduce by parthenogenesis (Athersuch, Horne & Whittaker 1989). This mechanism is a good pre-adaptation to air-transport by birds (see Whatley 1990, 1992). An important migration route for many wading birds being from Scandinavia to West Africa, this may be an explanation of the extensive north-south range in the distribution of *C. littoralis*.
C. arcuata Bonaduce, Masoli, Minichelli & Pugliese, 1980 from the Red Sea is remarkably similar, and differs only in minor details of the ornament; it is possible that both species are conspecific.
Distribution. *C. littoralis* is widespread along the Mediterranean and East Atlantic coasts. As a fossil it is reported from the Pleistocene of Italy and the Pliocene of Spain and Greece. The northernmost report is from Norway (Sars 1866, see Athersuch & Whittaker 1980). The West African locality reported here is the southernmost occurrence so far.
Material and dimensions. The species was only found in the sample from Joal, where it was represented by 18 carapaces and one valve, all adults. Length 0.39-0.40 mm, heigth 0.20-0.23 mm.

Genus *Tanella* Kingma, 1948
Type species: *Tanella gracilis* Kingma, 1948

Tanella gracilis Kingma, 1948
Pl. 4, figs. 13-15.

Tanella gracilis; Kingma 1948: 88, pl. 10, figs. 7a-7d.
Tanella gracilis Kingma; Morales 1966: 64, pl. 7, figs. 1a-c; Guha 1970: 209; Teeter 1973: 47, pl. 2, figs. l-p; Jain 1976: 128, pl. 2, figs. g-i; Jain 1978: 97, fig. 2, J 1-4; Hartmann 1978: 80, textfigs. 108-113, pl. 4, figs. 4-13; Hartmann & Kühl 1978: p. 223, pl. 19, figs. 65-68; Keij 1979: 61, pl. 1, figs. 7, 8; Hartmann 1980: 126, textfig. 47, pl. 7, figs. 11-18; Hartmann 1981: 103, textfigs. 4, 5, pl. 3, figs. 7-14; Titterton & Whatley 1988a: 770, textfig. 7; Zhao & Whatley 1989: 170; Whatley & Keeler 1989: 72, pl. 3, fig. 17, pl. 4, figs. 1-3; Howe & McKenzie 1989: 31; Mostafawi 1992: 139, pl. 2, fig. 40.

Tanella cf. *gracilis* Kingma; Bate 1971: 246, pl. 1, fig. 1, pl. 2, figs. 1-3; Al-Abdul Razzaq, Shublaq & Al-Sheikh 1982: 62, fig. 7 (figure captions interchanged); Weissleader *et al.* 1989, appendix 1.
Tanella africana; Hartmann 1974: 267, pl. 34, figs. 252-256, pl. 150, fig. 3.
Tanella aff. *gracilis* Kingma; Paik 1977: 40, pl. 2, figs. 35-37, pl. 8, fig. 150.
Tanella seminis; Bonaduce, Masoli & Pugliese 1978: 379, pl. 4, figs. 1-5; Bonaduce *et al.* 1983: 481.
Tanella sp.; Garbett & Maddocks 1979: 874, textfig. 33, pl. 1, figs. 9, 10.
Tanella sp. cf. *gracilis* Kingma; Whatley & Zhao 1988: 6, pl. 6, figs. 5, 6.
Tanella sp.1.; Dias-Brito, Moura & Würdig 1988: 480, pl. 1, fig. 13.
Tanella gracilis darwini; Howe & McKenzie 1989: 31, fig. 93.
Tanella gracilis darwini Howe & McKenzie; Gou 1990: 26, pl. 3, fg. 36.

Remarks. *Tanella gracilis* is widely distributed in the Indo-West Pacific, and was also reported from the the West Atlantic, including the Caribbean. Fossils are only known from Java and Sumatra. Although less documented, its distribution is reminiscent of *Kotoracythere inconspicua*. For *Tanella gracilis* a similar biogeographical history, origin in the Indonesian/Philippine region and transoceanic dispersal by ships, is suggested.
Within the Indo-West Pacific, the species is known to exhibit a considerable variation in the intensity of the ornament (Hartmann 1974, 1978, 1980, 1981, Hartmann & Kühl 1978, Jain 1976, 1978, Whatley & Zhao 1988) which has, in some cases, led to the distinction of separate morphotypes, subspecies and species.
Distribution. Recent: Gulf of Mexico (Morales 1966, Teeter 1973, Garbett & Maddocks 1979), Florida (Teeter 1973), Gulf of Manaar (Guha 1970), Bay of Bengal, India (Jain 1976, 1978), Indonesia (Teeter 1973), Malay Peninsula (Zhao & Whatley 1989), Gulf of Aden (Teeter 1973), Persian Gulf (Bate 1971, Teeter 1973, Paik 1977, Al-Abdul Razzaq, Shublaq & Al-Sheikh 1982), Gulf of Oman (Paik 1977), Red Sea, Gulf of Aqaba, Gulf of Suez (Teeter 1973, Bonaduce, Masoli & Pugliese 1978, Bonaduce *et al.* 1983), Australia (Hartmann 1978, 1980, 1981, Howe & McKenzie 1989), Southeast Africa, Mozambique (Hartmann 1974), Brazil (Dias-Brito, Moura & Würdig 1988), Réunion (Whatley & Keeler 1989), Micronesia (Weissleader *et al.* 1989), Solomon Islands (Titterton & Whatley 1988a), Hainan (Gou 1990), West Africa. I also have found the species in samples from Pakistan, Singapore and Brunei and in numerous samples from Indonesia (Kalimantan, Java, Roti), the Persian Gulf (Iran, Oman, Bahrein) and the Red Sea (Ethiopia, Saudi Arabia).
As a fossil (Upper and Lower Pliocene, Pleistocene) the species is known from Sumatra and Java (Kingma 1948 and Keij 1979).
Material and dimensions. Four carapaces in the sample from Bakau, and two in that from Joal. Length 0.41-0.43 mm, height 0.18-0.19 mm.

Family *Cytherideidae* Sars, 1925
Subfamily *Cytherideinae* Sars, 1925

Genus *Cyprideis* Jones, 1857
Type species: *Candona torosa* Jones, 1850

Cyprideis torosa (Jones, 1850)
Pl. 5, figs. 1-6.

Candona torosa; Jones 1850: 27, pl. 3, fig. 6.
Cyprideis torosa (Jones); Jones 1857: 21, pl. 2, figs. 1a-1i; Elofson 1941: 256; Wagner 1957: 39, pl. 14; Kollman 1960: 160, textfig. 2a, pl. 3, fig. 1, pl. 12, figs. 1-5, 9, 11, pl. 13, figs. 5, 6, pl. 19, figs. 12, 13, 17, pl. 20, fig. 12; Sandberg 1964: 91, pl. 10, figs. 18-20, pl. 11, figs. 1-10; Kilenyi & Whittaker 1974: 21-32 (incl. plates); Breman 1975: 53, pl. 6, fig. 77; Bonaduce, Ciampo & Masoli 1976: 61, pl. 34, figs. 8, 9; Bassiouni 1979: 100, pl. 5, figs. 14-15; Yassini 1979a: 106,; Yassini 1979b: 382, pl. 4, fig. 6; Tsapralis 1981: 88, pl. 3, figs. 3, 4; Llano 1981: 90, pl. 1, fig. 6; Carbonel *et al.* 1983: 38, pl. 1, fig. 1; Carbonnel 1983, 211; Bonaduce, Masoli & Pugliese 1988: 452; Zangger & Malz 1989: 162, pl. 3, figs. 11-12; Athersuch, Horne & Whittaker 1989: 114, fig. 44a-44k; Trier 1990: 574.
Cyprideis torosa torosa; Sissingh 1972: 87.
Cyprideis mandviensis ? Jain; Monteillet, Ausseil & Carbonnel 1982: 241.
Cyprideis cf. *mandviensis* Jain; Carbonnel 1982: 327, pl. 2, figs. 1-3.
See Sandberg (1964) and Athersuch, Horne & Whittaker (1989) for more references and synonymies.

Remarks. *Cyprideis torosa* is known to exhibit considerable intraspecific variation in ornamentation, shape and size. The majority of the specimens from West Africa are nearly smooth; some finely punctate specimens, however, were found in the same samples. This observation is in agreement with Sandberg's (1964) opinion that surface ornamentation in *Cyprideis* species is an unstable character, and hardly usable for species identification.
Distribution. *Cyprideis torosa* is widespread and found in waters that range in salinity from fresh to hypersaline. Kilenyi & Whittaker (1974) confirmed an earlier report of the species from Lake Turkana, Kenya. Longitudinally, *Cyprideis torosa* ranges from Iceland to Kenya. Van Harten (1990) associated this species' vast distribution with passive dispersal by birds.
Material and dimensions. The species was present in two samples from Senegal. A total of 44 specimens were found, the majority were juveniles. Length of adult males 0.96-1.02 mm, height 0.46-0.50 mm, length adult females 0.85-0.90 mm, height females 0.47-0.49 mm.

Cyprideis nigeriensis Omatsola, 1972
Pl. 4, figs. 16-23.

Cyprideis nigeriensis; Omatsola 1970a, 411, pl. 1, figs. 1-12, pl. 2, figs. 1-8.
Cyprideis nigeriensis Omatsola; Monteillet, Ausseil & Carbonnel 1982: 241; Carbonnel 1982: 336, pl. 2, figs. 4-5; Carbonnel 1986: 214.

Remarks. None of the adult specimens in my collection showed nodes as Omatsola (1970a) explicitely reported for this species. Nodes were only present in some of the juveniles. The hinge of this species was reported by Omatsola (1970a) to be atypical for the genus, and to consist of three elements, of which the median one is undivided and smooth. Such a hinge would make the generic assignment of *Cyprideis nigeriensis* questionable. The hinge of the specimens from Senegal is of the quadripartite type characteristic of *Cyprideis*.
Apart from this species two more *Cyprideis* species were previously reported from the Southwest African coast; *C. remanei* Klie, 1940 and *C. limbocostata* Hartmann, 1974. Hartmann (1974) considers these three species to be closely related.
Distribution. Senegal and Nigeria.
Material and dimensions. Eight carapaces and 27 valves were found in two samples from Senegal. Length adult males 0.88-0.91 mm, height 0.41-0.43 mm; length adult females 0.82-0.84 mm, height 0.44-0.46 mm.

Genus *Miocyprideis* Kollman, 1960
Type species: *Miocyprideis janoscheki* Kollman, 1960

Miocyprideis leybarensis Carbonnel, 1986
Pl. 5, figs. 7-15.

Miocyprideis sp.; Carbonnel 1982: 338, pl. 2, figs. 6-9; Monteillet, Ausseil & Carbonnel 1982: 241.
Miocyprideis leybarensis; Carbonnel 1986: 215, pl. 1, figs. 1-4, pl. 2, figs. 1-4.

Remarks. Several of the species Kollman (1960) and later authors included in *Miocyprideis* Kollman, 1960 were subsequently transferred to *Bishopina* Bonaduce, Masoli & Pugliese, 1978. The two genera are closely related and have a number of characters in common. *Bishopina* species are smaller and have a more rounded shape (Wouters 1981), whereas the number of toothlets in the median element of the hinge is considerably lower (nine versus around twenty in *Miocyprideis*, see Malz & Ikeya 1986). This West African species has around 25 denticles which confirms its assignment to *Miocyprideis*. The species shows a strong resemblance to *M. janoscheki* Kollman, 1960, from which it differs in the absence of marginal denticulations and the different pattern of ornamentation in the anterior zone. Moreover, in dorsal view *M. leybarensis* does not have a laterally compressed, flangelike marginal area such as do most other *Miocypri-*

deis. The ecological preferences of this primarily brackish-water species were treated by Carbonnel (1982, 1986).

Distribution. Senegal.

Material and dimensions. Adults length 0.74-0.77 mm, height 0.42-0.44 mm. Twenty-nine specimens were found, mainly in the sample from St. Louis.

Subfamily *Perissocytherideinae* van den Bold, 1963

Genus *Perissocytheridea* Stephenson, 1938
Type species: *Cytheridea? matsoni* Stephenson, 1935

Subgenus *Kroemmelbeinella* Mostafawi, 1984
Type species: *Kroemmelbeinia coae* Mostafawi, 1983

Emended diagnosis. A subgenus of *Perissocytheridea* containing thick-shelled ostracods with a subtrapezoid outline and a smooth, pointed caudal process that is strongly compressed laterally. In dorsal view, transition between carapace and caudal process abrupt. Ornamentation varying from almost smooth to coarsely reticulate. Eyespots absent or insignificant.

Some species have reversed overlap (RL), others normal (LR). Hinge antimerodont, smaller valve with two terminal teeth that are divided into 4-7 toothlets, connected by a narrow crenulate groove. Larger valve complementary elements. Very prominent sexual dimorphism with the males considerably longer.

Central muscle scar pattern consists of four oval adductor scars arranged in a subvertical row, distance between second and third scar often larger than between the others. Frontal scar and mandibular scar clearly discernable. Numerous sieve-type normal pores are present, inner lamella moderately wide, anterior marginal pore canals around 15. Three marginal pore canals are present on the interior of the caudal process.

Remarks. All the species previously referred to the genus *Kroemmelbeinella* have reversed overlap (right valve larger than left) and a merodont hinge with the terminal teeth in the left valve, a condition initially considered to be diagnostic of the genus. However, in my material, a new species was present with LR overlap and terminal teeth in the right valve. Reversal of hinge and valve occurs within many genera, or even species, of Ostracoda, and does not warrant generic separation. Van den Bold (1966) reports that in *Cytheropteron* sp. A from the Neogene of Gabon, which is considered here to belong in *P. (Kroemmelbeinella)*, some specimens have the terminal teeth in the left valve, while others have them in the right valve. Some Pacific *Perissocytheridea* are similar in outline and overlap to the West African forms and are here placed in *Kroemmelbeinella*. Examples are *P. japonica* Ishizaki, 1968 and *P. inabai* Okubo, 1983. The latter species was well illustrated recently by Tabuki & Nohara (1990); the outline of the valve and the shape of the caudal process clearly separate this form from other *Perissocytheridea*. «*Cytheropteron*» sp. A van den Bold, reported from the coast of Zaïre by Babinot & Kouyoumontzakis (1986), also belongs in *P. (Kroemmelbeinella)*. It is more or less similar in outline and

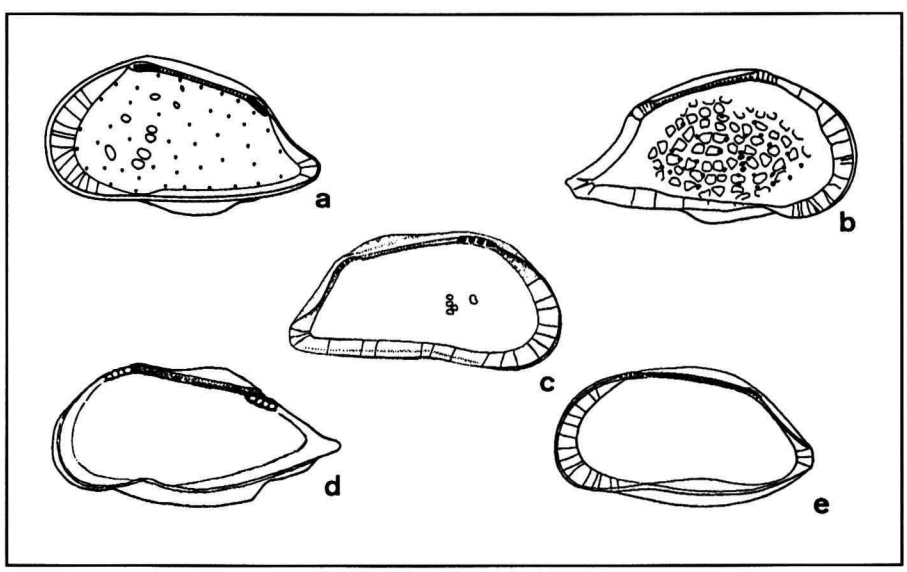
ornamentation to the Neogene species from Gabon and has a normal merodont hinge (Textfig.2). The genus *Loxocythere* Hornibrook, 1952 contains several species that resemble *Perissocytheridea* in numerous aspects; representatives of the former genus, however, are distinguished by a smooth, rather than crenulate, median hinge element.

Hartmann & Puri (1974) placed *Perissocytheridea* in the Family Cytheridae, Subfamily Cytherinae. Also *Kroemmelbeinella* was placed by its original author in the Cytherinae. Ishizaki (1968), however, assigned *Perissocytheridea* to the Family Cytherideidae, Subfamily Cytherideinae. Reversal of hinge and overlap is not unusual within this subfamily and provides an additional argument in favour of Ishizaki's (1968) point of view.

Perissocytheridea (Kroemmelbeinella) perfidiosa sp. nov.
Pl. 10, figs. 11-19.

Derivation of name. From Latin *perfidiosus*, meaning treacherous. Name refers to the structure of the hinge, which sets this species apart from all others previously assigned to *Kroemmelbeinella*.

Diagnosis. In dorsal view *Perissocytheridea (K.) perfidiosa* sp. nov. has a quadrate posterior end that abruptly proceeds into a laterally flattened caudal



Textfig. 2. Outline and internal features of species attributed to *Perissocytheridea (Kroemmelbeinella)* Mostafawi, 1984. Redrawn from the original authors.

a. *Perissocytheridea (K.) caoe* (Mostafawi, 1983), right valve, 85x. Pliocene, Greece.

b. *Perissocytheridea (K.) libidinosa* (Witte, 1986), left female valve, 83x. West Africa.

c. *Perissocytheridea (?K.) estuaria* Benson & Maddocks, 1964, left female valve, 96x. South Africa.

d. *Perissocytheridea (K.) japonica* Ishizaki, 1968, right valve, 107x. Japan.

e. *Perissocytheridea* sp. (= *Cytheropteron* sp. A van den Bold, 1966), right valve, 81x. Neogene, Gabon.

process. Shell surface pitted. Left valve larger than the right, positive terminal hinge elements in the right valve.

Holotype. A female left valve, coll. no. S518 (paratypes: a female right valve, a female left valve, two male right valves, one male left valve, coll. nos. S519-S523).

Description. Strongly calcified valves with subtrapezoidal outline and distinct laterally compressed pointed caudal process. Surface pitted, arrangement of pits irregular and variable between individuals. Central muscle scars consist of four adductor scars in a vertical row, with a kidney-shaped frontal scar. The hinge is merodont; it differs from that of other West African members of the subgenus, found in the same samples, in that it is a perfect mirror image.

Left valve slightly larger than the right, right valve with two strong terminal elements, each divided in five toothlets, and connected by a crenulated bar. Left valve with reciprocal elements, a distinct accommodation groove is present.

Type locality. Bakau beach, The Gambia. Lat. 13°29′08″ N, Long. 16°40′15″ W.

Distribution. So far, only known from the type locality.

Material. Fourteen valves, viz. 4 from the type sample and another ten from an additional sample from the same locality.

Dimensions. Holotype length 0.49 mm, height 0.30 mm; adult females length 0.48-0.49 mm, height 0.28-0.30 mm, adult males length 0.55-0.57 mm, height 0.28-0.29 mm.

Remarks. Initially, the specimens assigned to *Perissocytheridea (K.) perfidiosa* sp. nov. were thought to represent a reversed morphotype of *P. (K.) ebutemettaense* (Omatsola, 1970); a more thorough comparison revealed marked differences in the outline of the valves. In *P (K.) ebutemettaense* the caudal process is less pointed, and the central swelling, seen from the anterior, is gently rounded, whereas in the new species it is more angular and reminiscent of an alar process. The accommodation groove in comparable valves, the right one in *P. (K.) ebutemettaense*, the left in *P. (K.) perfidiosa* sp. nov., is more developed in the latter species, which, in lateral view, results in a more angular outline of the complementary valve. In addition, the new species is markedly smaller and has a coarser ornamentation.

Perissocytheridea (Kroemmelbeinella) ebutemettaense (Omatsola, 1970)
Pl. 10, fig. 23, 24.

Cytheropteron ebutemettaense; Omatsola 1970a: 430, pl. 10, figs. 1-15.
Cytheropteron ebutemattaense Omatsola [*sic*]; Monteillet, Ausseil & Carbonnel 1982: 241.
Eocytheropteron ebuttaemetaense (Omatsola) [*sic*]; Carbonnel 1986: 214.
Kroemmelbeinella ebutemettaense (Omatsola); Witte 1986a: 110, pl. 1, figs. 9-11.
non *Cytheropteron ebuttemataense* Omatsola [*sic*]; Carbonnel 1982: 334, pl. 1, figs. 1, 2. (= *K. libidinosa*).

Remarks. The surface of the valves of *P. (K.) ebutemettaense* is very similar to that of the preceding species, but the pitting is much finer. The primary distinction, however, is the reversal of the hinge.
Distribution. *Perissocytheridea (K.) ebutemettaense* was initially reported from Nigeria (Lagos Lagoon; Omatsola 1970a). I found it in two samples, one from The Gambia and one from Senegal.
Material and dimensions. A total of 21 specimens, both adults and juveniles, were found. Adult males length 0.58-0.65 mm, height 0.29-0.31 mm, adult females length 0.52-0.55 mm, height 0.29-0.31 mm.

Perissocytheridea (Kroemmelbeinella) libidinosa (Witte, 1986)
Pl. 10, figs. 20-22.

Cytheropteron ebuttemataense Omatsola [*sic*]; Carbonnel 1982: 334, pl. 1, figs. 1, 2.
Kroemmelbeinella libidinosa; Witte 1986a: 107, pl. 1, figs. 1-8.

Remarks. *P. (K.) libidinosa* is characterized by its strong ornamentation, in which it differs greatly from the other West African species in the genus. In ornamentation, and to a lesser degree also in outline, it resembles *Perissocytheridea estuaria* Benson & Maddocks, 1964, from South Africa, a species that most probably also should be assigned to *Kroemmelbeinella* (Textfig.2).
Distribution. Senegal, The Gambia.
Material and dimensions. A total of 57 specimens were recovered from the standard samples, the majority loose valves from successive instars. Length of adult males 0.81-0.86 mm, height 0.40-0.43 mm; adult females 0.68-0.73 mm, height 0.39-0.42 mm.

Family *Neocytherideidae* Puri, 1957

Genus *Pontocythere* Dubowski, 1939
Type species: *Pontocythere tchernjawskii* Dubowski, 1939

Pontocythere sp. A
Pl. 5, figs. 20-25.

Remarks. A *Pontocythere* species with strong, smooth valves. Normal pores with distinct setae are regularly distributed over the surface of the carapace. In the anterior part of the shell small wartlike knobs are present, arranged in more or less concentric rows. This ornamentation continues ventrally as faint riblets parallel to the margin.
Hinge typical for the genus; in the right valve the anterior tooth extends exceptionally far forwards. The posterior tooth and the posterior part of the anterior tooth are crenulate. Males and females differ considerably in length.
Material and dimensions. This species was present only in the sample from Bakau, where three carapaces were found, one male and two females. Length male 0.71 mm, height 0.28 mm; length females 0.67 mm, height 0.27 mm. For examination of the internal features two carapaces (the male and one female) were split into two valves.

Genus *Copytus* Skogsberg, 1939
Type species: *Copytus caligula* Skogsberg, 1939

Copytus fusiformis (Yassini, 1979)
Pl. 5, figs. 16-19.

Neocytherideis fusiformis; Yassini 1979a: 108, pl. 9, figs. 7, 8, 11.
Neocytherideis fusiformis Yassini; Llano 1981: 95, pl. 2, fig. 13; Carbonel *et al.* 1983: 38, pl. 1, fig. 7.

Remarks. This species was attributed originally to the genus *Neocytherideis* Puri, 1952. Representatives of that genus have a subcilindrical, elongated shape, but none of the known species shows this feature as prominently as *C. fusiformis*. In Yassini's (1979a) material the muscle scars were not visible. They are well preserved in my material and differ from what is described for *Neocytherideis*, where a row of four adductor scars is normally present. In the species reported here, the scars are clustered forming a small round group, such as reported by Skogsberg (1939) for the genus *Copytus*. The Indo-Pacific species *Copytus rara* McKenzie, 1967 (see also Hartmann 1978), *Copytus* sp. cf. *rara* (in Jain 1978) and particularly *C. tubulata* (nomen nudum) in Labutis (1977) show a remarkable similarity to the West African *C. fusiformis*, not only in the extreme spindle-shape, but also in the ribbed and thickened shell structure in the anterior part.
The species was reported from the Pliocene of Southwest Algeria (Yassini 1979a), and from the shelf off Morocco (Llano 1981). Its extremely elongated

shape gives this ostracod a unique appearance and makes it hard to confuse with any other ostracod species.
Bertels & Martinez (1990) reported *Copytus* sp. n. from Argentina and Dingle (1992) *Neocytherideis boomeri* from South Africa; both species show overall strong resemblance to *C. fusiformis* but are less elongate.
Distribution. Fossil: Southwest Algeria (Pliocene); Recent: Morocco (Llano 1981), Senegal (Carbonel *et al.* 1983) and The Gambia.
Material and dimensions. In both samples from The Gambia the species was present in small numbers; a total of two carapaces and 11 valves, all adults, were found. Length varies between 0.93-1.02 mm, height 0.26-0.28 mm.

Family *Trachyleberididae* Sylvester-Bradley, 1948
Subfamily *Trachyleberidinae* Sylvester-Bradley, 1948

Genus *Cletocythereis* Swain, 1963
Type species: *Cythere rastromarginata* Brady, 1880

?*Cletocythereis* sp. aff. *C. bradyi* Holden, 1967
Pl. 5, figs. 26, 27.

aff. *Cythere rastromarginata*; Brady 1880: 81, pl. 16, figs. 2 a-d.
aff. *Cletocythereis bradyi*; Holden 1967: 40, figs. 31 a-c.
aff. *Cletocythereis bradyi* Holden; Ishizaki 1968: 40, pl. 18, fig. 9; Holden 1976: 28, pl. 4, fig. 13.

Remarks. This species has several characters (e.g. shell outline and ornamentation) in common with *C. bradyi* from the Indo-Pacific. There are, however, obvious differences as well. In *C. bradyi* the anterior margin is lined with a rim of deep, short grooves perpendicular to the margin, a feature that is also present in the closely related Indo-Pacific species *C. rastromarginata* (see e.g. Hartmann 1981). The species reported here completely lacks such an ornament. In addition it has a much higher, less sharply edged, ornamented alar process without openings. Malz (1980) states that the genus *Cletocythereis* is characterized by a peculiar hinge feature: a projecting outer tooth in the left valve. This is not seen in the one valve I found. The characteristic, elongated shape of the shell, however, seems not to be consistent with any other genus known from the Atlantic. Some species of the Mediterranean genus *Grinioneis* Liebau, 1975 show a comparable ornamentation, but these are more tumid in lateral, and considerably wider in dorsal view. Lack of sufficient material prevented a formal description of this unique species. Following Hartmann & Puri (1974), the genus *Cletocythereis* Swain, 1963 is placed within the Family Trachyleberidae, although there are also arguments for an assignment to the Hemicytheridae (see Malz 1980).
Distribution. Senegal. The genus *Cletocythereis* s.s. has not been reported before from the Atlantic. Whatley (pers. comm. 1992) found the genus in the Pliocene of The Netherlands.
Material and dimensions. One single left valve (perforated by predation, prob-

ably gastropod) was found in the sample from Joal. Length 0.80 mm, height 0.35 mm.

Genus *Grinioneis* Liebau, 1975
Type species: *Hermanites paijenborchiana* Keij, 1957

Grinioneis sp. aff. *Hermanites foveolatus* Omatsola, 1972
Pl. 7, figs. 17-19.

aff. *Hermanites foveolata*; Omatsola 1972: 88, textfigs. 24, 25, pl. 20, figs. 1-11, pl. 21, figs. 1-7.

Remarks. Only a few badly preserved valves were found of this species. The present material differs from that described by Omatsola (1972) mainly in the shape of the muri; the fossae in his specimens are ingrown, whereas in my material they are open. Other differences are the less developed subcentral tubercle and the very narrow inner lamella in the Senegal material.
Distribution. Senegal only. Omatsola reported *Hermanites foveolata* from the western Niger Delta.
Material and dimensions. Four valves were found in the sample from Joal, all but one were more or less damaged. Length 0.79 mm, height 0.43 mm.

Genus *Chrysocythere* Ruggieri, 1962
Type species: *Chrysocythere cataphracta* Ruggieri, 1962

Chrysocythere foveostriata (Brady, 1870)
Pl. 6, figs. 8-12.

Cythere foveostriata; Brady 1870: 247, pl. 32, figs. 14-17.
Chrysocythere foveostriata (Brady); van den Bold 1966: 162, pl. 2, fig. 1 a, b, pl. 5, fig. 3 a, b; Omatsola 1972, 75, pl. 15, figs. 1-15.

Remarks. This species was described in 1870 by Brady in material from the coast of Senegal. Van den Bold (1966) reported its presence in the Miocene of Gabon, and Recent of the Nigerian coast. Omatsola (1972) made detailed observations on several features of this species from the Niger Delta, where it appeared to be very abundant. Its distribution there was presumed to be controlled by substrate; on the finer sediments in the Niger Delta the species was absent. Omatsola (1972) distinguished two subspecies, different in size. These subspecies were in part present in the same samples, which would rather point to polymorphism. The closely related species *C. boldi* Omatsola, 1972 from Nigeria is distinguished by the greater height of the shell.
Tölderer-Farmer (1985) carried out a detailed study on the effects of ecological parameters on the surface ornamentation of ostracods in the mangrove of Senegal. Her conclusions are to a large extent based on observations on this species.
Distribution. West African coast: Nigeria (van den Bold 1966, Omatsola 1972), Ivory Coast, Sierra Leone (Omatsola 1972), Senegal (Brady 1870).
The species was abundant in both samples from The Gambia.

Material and dimensions. A total of 13 carapaces and 85 valves of both sexes (adults and juveniles) were found. Length adult males 0.74-0.75 mm, height 0.33-0.35 mm; length adult females 0.67-0.70 mm, height 0.34-0.36 mm.

Genus *Neocaudites* Puri, 1960
Type species: *Neocaudites nevianii* Puri, 1960

Remarks. Species of this genus are minor, but characteristic elements in Recent and fossil faunas from the East Coast of America and the Caribbean. The most widely recorded species is *Neocaudites triplistriatus* (Edwards, 1944), which inhabits the inner sublittoral environment of the Atlantic American coast in the area between latitudes 18°30′ and 34°51′ N (see Hazel 1971). As a fossil, this species is known from The Pliocene and Pleistocene in Virginia and the Carolinas (Hazel 1971, 1977; Valentine 1971), and from the Late Miocene and Pliocene in the Caribbean region (van den Bold 1977). Originally, Edwards (1944) described the species from the Duplin Marl, which was then believed to be of Miocene age. Now a Pliocene age is accepted for this formation (see Hazel 1977). *Neocaudites* was long considered to be a typical Caribbean genus (McKenzie 1967). From the Pacific, a small number of species are reported (Midway, Hawaii and Clipperton Island; Holden 1967, 1976; Allison & Holden 1971). However, these forms differ considerably from the Atlantic species and are attributed here to *Falsocythere* Ruggieri, 1972, which genus was originally described from the Mediterranean. The genus *Neocaudites* was first reported from the West African coast by Omatsola (1972). Of the three species he described, one was later transferred to *Falsocythere* (see Ruggieri 1973b), and is conspecific with *F. terryi* (Holden, 1967), also present in my West African samples. The other two (*N. tuberculata* and *N. rectangularis*) are probably endemic African species. In two samples from The Gambia, two carapaces and three valves were found of yet another *Neocaudites* species, reported here as *N. lindersae* sp. nov. It seems that *Neocaudites* should be regarded as an Atlantic genus, with *N. triplistriatus* an ancestral, relatively 'conservative' species. On either side of the Atlantic new species evolved, but the genus was particularly succesfull on the Western side of the Atlantic, where most likely in the Pleistocene *N. atlantica* arose and managed to establish itself alongside *N. triplistriatus*. After this, *N. atlantica* was probably introduced in the African fauna, either by natural means or shipping.

Neocaudites atlantica Cronin, 1979
Pl. 6, figs. 13-16.

Neocaudites sp. A.; Valentine 1971: pl. 3, figs. 38, 42.
Neocaudites atlantica; Cronin 1979: 147, pl. 16, figs. 4-7.

Remarks. From the American Atlantic coast a few species of *Neocaudites* are described that appear to be very close to *N. atlantica*, as well as to one another. These are *Neocaudites nevianii* Puri, 1960, *N. triplistriatus* (Edwards, 1944) and

N. variabilis Hazel, 1983. The variability within *Neocaudites* species has been recognized by a number of authors, and it was suggested more than once that in some cases two or more names were in use for the same species. When Puri (1960) described *N. nevianii* from the Gulf of Mexico, he admitted that this species resembled Edwards' fossil *N. triplistriatus* in many respects, the main difference being the course of the longitudinal rib. Consiberable confusion exists: Morales (1966) stated that *N. triplistriatus* reported by Van den Bold (1963) from the Upper Miocene of Trinidad is in fact *N. nevianii*. Hazel (1983) considers the typespecies of the genus, *N. nevianii*, to represent the males of *N. triplistriatus*. *Rectotrachyleberis* cf. *R. triplistriata* in Puri (1954) was considered to be *N. nevianii* by Morales (1966), while Swain (1968) lists this name as synonymous with *Neocaudites triplistriata*. In 1952 Swain reported *Trachyleberis?* cf. *T.? triplistriata*. Van den Bold (1963) considered this form not conspecific to *N. triplistriata*, but Swain (1968) wrote a note on this and re-established the synonymy. Cronin (1979) described *N. atlantica* and included in this species *Neocaudites* sp. A of Valentine (1971). Hazel (1983), however, considered Valentine's species to be identical to his own new species *N. variabilis*.
The species reported here was initially considered *N. triplistriatus*, but identified by T. Cronin (written comm. 1985) as *N. atlantica*.
Distribution. Recent: West Africa. Pleistocene to Recent: North American East Coast.
Material and dimensions. Thirty-five specimens, all adults and most of them carapaces, were found in three samples. Length females 0.51-0.52 mm, heigth 0.27-0.29; length males 0.58-0.60 mm, height 0.28-0.29 mm.

Neocaudites lindersae sp. nov.
Pl. 6, figs. 1-7.

Derivation of name. The species is named for my wife Bianca Linders, in appreciation of her assistance during fieldwork in Africa and in recognition of her continuous support during my study of Ostracoda.
Diagnosis. A species of *Neocaudites* in which both the ventrolateral and median ribs are conspicuously protruding. The species has well developed eye tubercles and a characteristic ornamentation of irregular fossae along the anterior margin.
Holotype. A carapace, coll. no. S432 (paratypes one carapace, three valves, coll. nos. S433-S436).
Description. Carapace subquadrate in lateral view, anterior end gently rounded, posterior end pointed, posterior process consisting of four to five blunt, intergrown, flat spines. Ventral and dorsal margins slightly sinuous medially. Ventrolateral rib well developed and broad when seen in dorsal view. The knoblike, posterodorsal termination of the median rib is distinctly protruding laterally and ornamented with a number of large, deep fossae.
Ornamentation conspicuous, slightly variable between individuals. In the posterior part of the shell, close to the margin, some long, deep fossae are present that have a characteristic irregularly curled shape.

Area between ribs covered with rounded puncta of moderate size. Eleven to fourteen denticles occur along the anterior margin. In the few specimens available, no distinction could be made between sexes.

Material. One carapace was found in the sample from Joal, one carapace and three valves in that from Bakau.

Dimensions. Holotype length 0.60 mm, height 0.30 mm; other specimens length 0.58-0.60 mm, heigth 0.29-0.31 mm.

Type locality. Bakau beach, The Gambia. Lat. 13°29′08″ N, Long. 16°40′15″ W.

Distribution. Senegal and The Gambia.

Remarks. *Neocaudites lindersae* sp. nov. is somewhat similar to *N. angulata* Hazel, 1983, from the Plio-Pleistocene of North Carolina, but is distinguished by its smaller size, pronounced eye tubercles and its typical ornamentation in the anterior area of the valve. A more or less comparable pattern of ribs can be seen in *N. rectangularis* Omatsola, 1972 (Recent, Nigeria), but this species has complex marginal denticles and a rounded posterior end. *N. tuberculata* Omatsola, 1972, another species from Nigeria, is markedly smaller and has a broad, strong bar along the anterior margin; also, the eye tubercles are less developed. *Phacorhabdotus hazeli* Omatsola, 1972 from Nigeria and *Phacorhabdotus* aff. *hazeli* in Babinot & Kouyoumontzakis (1986) from Zaïre which are probably congeneric lack the strong ornament of the other African *Neocaudites*. *N. pulchra* Teeter, 1975, from the coast of Belize, has an overall similarity to the new species, but is considerably larger and has a coarser ornamentation.

Genus *Falsocythere* Ruggieri, 1972
Type species: *?Occultocythereis maccagnoi* Ciampo, 1971

Falsocythere terryi (Holden, 1967)
Pl. 6, figs. 22-26.

Neocaudites terryi; Holden 1967: 43, figs. 33a -33d.
Costa (?) sp.; Puri, Bonaduce & Gervasio 1969: 406, pl. 1, fig. 10.
Occultocythereis sp. 1; Bonaduce & Masoli 1970: 51, 54.
Occultocythereis(?) sp.; Barbeito-Gonzalez 1971: 283, pl. 16, figs. 1a, 2a, 3a, 4a, 5a, 6a, 7a, 8a, pl. 47, figs. 9-11.
Caudites sp. B; Bate 1971: 245, pl. 1, fig. 1.
?Occultocythereis maccagnoi; Ciampo 1971: 27, pl. 2, figs. 7-9, pl. 3, fig. 1, pl. 7, fig. 1.
Neocaudites purii; Omatsola 1972: 104, pl. 32, figs. 1-14.
Falsocythere maccagnoi (Ciampo); Ruggieri 1972: 91; Ruggieri 1973a: 219, 227; Ruggieri 1973b: 223, figs. 1, 2; Bonaduce & Pugliese 1975: 130; Bonaduce, Ciampo & Masoli 1976: 51, pl. 26, figs. 6-9; Ciampo 1976: 5, 6; Yassini 1979a: 100, pl. 2, fig. 22; Bonaduce *et al.* 1980: 156, pl. 4, figs. 5-8; Tsapralis 1981: 95, pl. 1, fig. 7; Bonaduce *et al.* 1983: 481.
Falsocythere terryi (Holden); Ruggieri 1973b: 224.
Falsocythere purii (Omatsola); Ruggieri 1973b: 223.

Neocaudites terryi Holden; Holden 1976: F29; Titterton 1984: 465, pl. 15, figs. 5, 6, pl. 53, figs. 18-23.
?*Caudites* sp. A; Paik 1977: 42, pl. 6, figs. 110, 111.
Neocaudites purii Omatsola; Carbonel *et al.* 1983: 38, pl. 6.; Babinot & Kouyoumontzakis 1986: 9; Carbonnel 1986: 214.
Neocaudites aff. *maccagnoi* (Ciampo); Guernet & Fourcade 1988: 143, pl. 4, fig. 7.

Remarks. *Falsocythere terryi* (Holden, 1967) has a very wide distribution, not only in the Recent but also fossil. It originated in the Tethyan ocean, were it became a relatively rare, but widespread species. Its presence today in each of the biogeographical provinces of the tropical littoral realm suggests a long period of evolutionary stasis following the break-up of Tethys. The species has been reported under several names, notably *Falsocythere maccagnoi* (Ciampo, 1971) and *Neocaudites terryi* Holden, 1967. When Ruggieri (1972) erected the genus *Falsocythere*, only the type species ?*Occultocythereis maccagnoi* Ciampo, 1971 (= *F. terryi*), from the Pleistocene of Taranto, was assigned to it. This species has later been reported from a number of localities in the Mediterranean region, from Pliocene (Yassini 1979a) to Recent. In a re-evaluation of the genus, Ruggieri (1973b) included *Neocaudites purii*, described by Omatsola (1972) from the Niger Delta, noting that the Mediterranean and African specimens might be conspecific. My West African specimens, which are geographically intermediate between Nigeria and the Mediterranean, show that the pattern of the punctation is virtually constant, but that size and complexity of the puncta may vary considerably between individuals. Omatsola's (1972) Nigerian specimens seem smoother than those from The Gambia, and, in this respect, more comparable to most specimens I examined from the Mediterranean. West Africa, however, is not the only locality outside the Mediterranean where the species is found. Bonaduce *et al.* (1980) reported it as *F. maccagnoi* from the Gulf of Eilath, as one of the very few ostracodes that are known to inhabit both the Mediterranean and the Red Sea (see also Bonaduce *et al.* 1983). Paik (1977) reported the species as ?*Caudites* sp. B from the Bahia shelf (Persian Gulf). The similarity in numerous details between *Neocaudites terryi* (originally from Hawaii, but widespread in the Indo-Pacific area) and *Falsocythere maccagnoi* has been noted before (Ruggieri 1972, 1973b, Omatsola 1972). Specimens from the West Pacific, the Mediterranean and West Africa that I examined are in my opinion conspecific. Apparently, *F. terryi* is widely distributed in tropical shallow-waters. The morphological differences between *Falsocythere* and *Neocaudites* were reviewed and elucidated by Ruggieri (1973b). The main feature to separate these genera is the number of marginal pore canals. *Neocaudites* from America are currently being studied by T. Cronin, who kindly provided preliminary results. Cronin (1988) identified the species *N. subimpressus*, *N. scottae* and *N. pacifica* (from the Western Atlantic and the Eastern Pacific) as conspecific, and subsequently rejected the latter two names as synonyms. Caribbean specimens of *N. subimpressus* that I examined showed this species to belong in

Falsocythere; moreover, there are strong indications that the Eastern Atlantic/ Mediterranean /Indo-West Pacific species *Falsocythere terryi* is conspecific with the Eastern Pacific/ Caribbean species *F. subimpressus*. *F. subimpressus* was described by Allison & Holden (1971) as *N. pacifica* (with two subspecies *N. p. pacifica* and *N. p. minima*) from Clipperton Island (in the Eastern Pacific biogeographical province), and this occurrence is crucial, both geographically and taxonomically. The illustrated specimens are less ornamented than most Pacific *F. terryi* and seem very close to, for instance, specimens from the Mediterranean, whereas most Caribbean representatives are more coarsely pitted. At this moment, in order not to anticipate pending research, I prefer to keep *Falsocythere terryi* and *F. subimpressus* apart. In both, the intensity of the ornament is highly variable, although the pattern of the depressions and their relative position to the pores is identical. Important issues to address are the origins of the variation in ornamentation and size (environmentally controlled?) and the separation of (geographical and/or stratigraphical) subspecies. The genus *Neocaudites* should probably be restricted to such species as *N. atlantica*, *N. neviani*, *N. triplistriatus*, which are all Atlantic. The genus thus defined originated in the Western Tethys (oldest record is *N. triplistriatus* from the Miocene of Maryland) and never became wide-spread. *Falsocythere*, on the other hand, had a circumtropical distribution, and, with fossil occurrences in the Mediterranean area, several Caribbean Islands, the United States and both West and Central Pacific islands, seems to have been widespread already in the Tethyan Ocean. This difference in origin, and apparent phylogenetic separation in post-Tethyan times, justifies the separation of the two genera.

Distribution. (data in part courtesy of T. Cronin, U.S. Geological Survey).

Falsocythere terryi: Mediterranean area, West African coast (Senegal, The Gambia, Nigeria, Congo, Ghana, Ivory Coast), Indo-West Pacific (Hawaii, Comores, Solomon Islands, Papua New Guinea, Indonesia, Miocene of Midway, Miocene to Pleistocene of Marshall Islands). Also Red Sea and Persian Gulf.

Falsocythere subimpressus: United States (Pleistocene South Carolina, Pliocene and Pleistocene of Florida, Caribbean, Virgin Islands, Bahamas, Belize, Oligocene-Miocene of Dominican Republic, Gulf of Mexico, Eastern Pacific (Clipperton Island), Panama (Pliocene).

Material and dimensions. Five male and three female carapaces were found in two Gambian samples. Length females 0.54-0.56 mm, height 0.28-0.29 mm. Length males 0.55-0.57 mm, heigth 0.27-0.28 mm.

Apart from the variation in ornamentation mentioned in the remarks, size appears to be variable as well. For *Falsocythere maccagnoi* and *F. purii* lengths of 0.51 to 0.63 mm are reported in literature (Ruggieri 1973b).

Falsocythere simplex (Omatsola, 1972)
Pl. 7, figs. 1, 2.

Neocythereis? simplex; Omatsola 1972: 57, pl. 2, figs. 1-10, pl. 5.
Falsocythere simplex (Omatsola); Ruggieri 1973b: 225.

Remarks. Ruggieri (1973b) placed this small, rather smooth species in the genus *Falsocythere* based on internal shell characters.
Distribution. Nigeria and The Gambia.
Material and dimensions. Five carapaces were found in two samples from The Gambia. Length 0.46-0.48 mm, heigth 0.25-0.26 mm.

Subfamily *Cytherettinae* Triebel, 1952

Genus *Loculicytheretta* Ruggieri, 1954
Type species: *Cythere pavonia* Brady, 1866

Loculicytheretta morkhoveni Witte, 1986
Pl. 8, figs. 1-4.

Loculicytheretta sp.; van Morkhoven 1963: 133, fig. 201.
Loculicytheretta sp. nov. Morkhoven; Bismuth *et al.* 1978: 234, 245, pl. 2, fig. 23.
Loculicytheretta sp1; Carbonel *et al.* 1983: 38, pl. 1, fig. 18.
Loculicytheretta morkhoveni; Witte 1986b: 90, pl. 1, figs. 4, 7-11, pl. 2, figs. 1-11.

Remarks. This species is distinguished from the Mediterranean species *L. pavonia* (Brady, 1866) by the possession of six loculi per valve in the females. The discontinuous distribution pattern of the genus *Loculicytheretta* is related to a reversal of the flow regime in the Mediterranean in the Early Pliocene (Witte 1986b).
Distribution. Senegal, The Gambia and Guinea.
Material and dimensions. Twenty-nine specimens from The Gambia (males, females and juveniles) and one female carapace from Cap Skirring (Senegal). Length males 0.63-0.67 mm, height 0.30-0.33mm, length females 0.65-0.71 mm, height 0.33-0.36 mm.

Subfamily *Pterygocytherinae* Puri, 1957

Genus *Ruggieria* Keij, 1957
Type species: *Ruggieria micheliniana* (Bosquet)

Ruggieria sp. A
Pl. 7, fig. 6.

? *Ruggieria sp.* Keen; Carbonel *et al.* 1983: pl. 2, fig. 49.

Remarks. Several species of *Ruggieria* are known from the West African coasts (Keen 1975, Omatsola 1970a). The single specimen I found in my material

differs from these with respect to the shape and position of the lateral ribs. It may represent a new species but lack of sufficient material does not allow a formal description.

Material and dimensions. One carapace was found in the sample from Joal. Length 0.85 mm, height 0.45 mm.

Genus *Keijella* Ruggieri, 1967
Type species: *Cythere hodgii* Brady, 1866

Keijella sp. aff. *Ruggieria indoiranica* Jain, 1981
Pl. 7, figs. 3-5.

aff. *Ruggieria indoiranica*; Jain 1981: 114, pl. 3, figs. 3, 5, 6. (in part).
aff. *Keijella apta*; Whatley & Zhao 1988: 12, pl. 7, figs. 10-12.

Remarks. *Keijella* was introduced by Ruggieri (1967) as a subgenus of *Ruggieria* Keij, 1957, and distinguished from the nominate subgenus by the possession of a narrow vestibulum. Doruk (1973b) raised *Keijella* to a separate genus, and considered the absence of a ventral carina, details of the ornamentation and hinge structure as diagnostic (see also Jain 1978). My specimens show a distinct vestibulum and rather strong ornamentation, justifying their assignment to *Keijella* rather than to *Ruggieria*. Jain (1981) described *Ruggieria indoiranica* from the Southwest coast of India, and distinguished two form groups within it, which were supposed to represent the sexes. In one group the carapace is short and tumid, and the ornamentation consists primarily of ribs. Specimens of the second group (supposed to be males) have a longer carapace and more reticulate ornamentation. My specimens show a strong similarity to Jain's second group, although they are smaller and the reticulate pattern is less pronounced. My material is distincly dimorphic, which suggests that Jain's (1981) two groups represent different taxonomical units rather than intraspecific variation. *Ruggieria (Ruggieria)* sp. A of Paik (1977), *?Leguminocythereis* sp. of Jain (1978) and *Keijella nealei* of Bhatia & Khumar (1979), which Jain (1981) listed in synonymy with *Ruggieria indoiranica*, all represent high-shelled forms and their synonymy probably refers to similarity to the first formgroup of Jain (1981). *Keijella apta* Whatley and Zhao, 1988 from Malaysia is very similar to both Jain's species and the West African form.

Material and dimensions. A total of 14 valves and one carapace. Length females 0.66-0.70 mm, height 0.32 mm, length males 0.64-0.65 mm, height 0.30 mm.

Family *Hemicytheridae* Puri, 1953
Subfamily *Aurilinae* Puri, 1973

Genus *Mutilus* Neviani, 1928
Type species: *Cythereis laticancellata* Neviani, 1928

Mutilus falcatus sp. nov.
Pl. 7, figs. 12-16.

Mutilus sp. LA 59.; Liebau 1991: 162, pl. 94, figs. 6, 9.

Derivation of name. From Latin *falcatus*, meaning furnished with scythes; name inspired by the course of the main ridge.
Diagnosis. A species of the genus *Mutilus* distinguished by a strong ornamentation consisting of one long continuous rib and two arched median ribs; the lower one of these is divided in two at mid-length. Ribs connected by low transverse riblets, thus forming a coarse, irregular reticulation.
Holotype. A left valve, coll. no. S448 (paratypes three right valves, one of which broken, coll. nos. S449-S451).
Description. Carapace subquadrate in lateral view and strongly calcified. Greatest height at about one third from the anterior. Anterior end broadly rounded, posterior end truncate with a well-developed posteroventral caudal process. Surface of the valves heavily sculptured. Two strong median ribs are present, the upper one is arched and sloping towards the anterior, the lower one is more horizontal, wide in the anterior part of the shell and divided in two at about its mid-length. A main rib, parallel to the dorsal margin, extends to the anterior and to the posterior. The marginal ribs being continuous with one another, a long, subcircular whorl is formed, with the open end posteroventrally. The dorsal part of this rib extends towards the anterior into a marginal rib that forms two angles in the anteroventral area, and subsequently continues into the ventral rib. Posteroventrally this rib turns gently upward to about one third of the height of the shell. Towards the posterior, the dorsal rib bends strongly downward to a position slightly anterior to the termination of the ventral part of the main rib. Anterodorsally, a low and broad eye spot interrupts the course of this long roundgoing main rib. Ribs are connected by numerous lower and less marked riblets, thus forming a characteristic irregular reticulate pattern. Left valve only slightly higher than the right, but dorsal line more straight. The posteroventral caudal process is well developed and pointed in the right valve, blunter and less pronounced in the left. The overlap is well marked, particularly in the caudal area. Hinge typical of the genus, median bar slightly crenulate. Sexual dimorphism not observed.
Material. Two valves and one carapace were found in a sample from Joal. The carapace was split into two valves.
Dimensions. Holotype length 0.62 mm, height 0.38 mm; other specimens length 0.60-0.62 mm, height 0.38 mm.
Type locality. Joal beach, Senegal. Lat. 14°09′18″ N, Long. 16°50′00″ W.

Distribution. Only known from the type locality.

Remarks. The new species is quite similar in ornamentation to a number of species that are currently attributed to the genus *Radimella* Pokorn, 1968. The latter is distinguished from *Mutilus* by the possession of auxiliary denticles in the hinge of the right valve, as well as three instead of one divided adductor muscle scars. In the few specimens of *M. falcatus* sp. nov. that I had at my disposal, the muscle scar pattern was not well discernable. However, no trace of auxiliary hinge denticles was found. The genus *Ambostracon* Hazel, 1962 has an outline comparable to both *Mutilus* and *Radimella*, but is distinguished by the hinge configuration and the intensity of the ornamentation. According to Hartmann (1979, p. 234) *Radimella* and *Ambostracon* deserve, at the most, the status of subgenera.

Genus *Aurila* Pokorný, 1955
Type species: *Cythere convexa* Baird, 1850

Aurila voraginosa sp. nov.
Pl. 7, figs. 23-26.

Derivation of name. From Latin *voraginosus*, full of pits or holes. Name refers to the coarsely punctate ornamentation of this new species.

Diagnosis. Species of *Aurila* with an ornamentation consisting of deep, conical puncta of variable shape and size which merge into a narrow reticular field peripherally. Characteristic ribs along the posterior, ventral and anterior margins.

Holotype. A female carapace, coll. no. S452 (paratypes one carapace, two left valves, two right valves, coll. nos. S453-S457).

Description. Carapace subquadrangular, earshaped. Valves heavily calcified, greatest height at about one third from the front. Anterior end broadly rounded, posterior end obliquely truncate, with a small but distinct caudal process. Great difference in shape between left and right valve. Left valve considerably higher than right valve, with a rounded dorsal margin; dorsal line of right valve almost straight. Overlap strong, in particular in caudal and hinge areas. Accommodation groove present in left valve.

In dorsal view the carapace is subquadrangular, greatest width in the middle. Surface covered with puncta, close to one another, more or less round, in the anteroventral part more elongate. A small area in the centre, corresponding to the position of the muscle scars in the interior, is almost smooth. A narrow reticulate zone surrounds the central punctate area peripherally.

Strong anterior marginal rib starts from the eyespot, a second, shorter one paralleling it along most of its course; these ribs are connected by transverse riblets and give the anterior marginal area of the shell a reticulate ornamentation. A thin, sharp, submarginal rib starts in the anterodorsal corner and extends along the ventral margin towards the caudal process. There, it abruptly turns upwards, follows the posterior margin to become less distinct towards the posterior cardinal corner, from where it proceeds as a faintly indicated dorsal rib.

Eye tubercle small but distinct. Muscle scar pattern typical of the genus: three

frontal scars and four adductor scars, the dorsomedian one of which is divided in two. Hinge typical for the genus, frontal element strongly developed. Sexual dimorphism present.

Material. This species was present in four samples; 47 specimens, carapaces and valves, were found.

Dimensions. Holotype (female) length 0.64 mm, height 0.41 mm; adult males length 0.63-0.66 mm, height 0.41-0.43 mm, females length 0.63-0.66, height 0.40-0.42.

Type locality. Joal beach, Senegal. Lat. 14°09'18" N, Long. 16°50'00" W.

Distribution. Senegal and The Gambia.

Remarks. *Malzella* Hazel, 1983 includes some species which are quite close in ornamentation to the new species, in particular because these forms also possess marginal ribs. However, this genus is reported to have muscle scars identical to those of *Radimella* Pokorn, 1969, viz. two divided adductor scars. The hinge which lacks auxiliary denticles refers the new species to *Aurila* as well.

Aurila and *Mutilus* are primarily distinguished by the intensity of the ornamentation. Opinions on the validity of this division differ, however. Transitional ornamentation occurs, and since other characters that are reported to be distinctive all appear to be gradual, some authors consider *Aurila* to be a subgenus in *Mutilus* (van Morkhoven 1963, Hartmann 1974), or a synonym (Doruk 1973a).

The Mediterranean and Atlantic species *A. punctata* (von Münster, 1830) has a punctate ornament that is similar to that of *A. voraginosa* sp. nov. This species, that has also been recorded from the Neogene of Gabon (van den Bold 1966), lacks the marginal ribs which are diagnostic of the new species. Such ribs are also absent in another punctate *Aurila* known from West Africa, *A. punctoreticulata* Omatsola, 1972 (Nigeria). In addition, the latter species is larger and more elongate. *A. dayii* Benson & Maddocks, 1963 from South Africa is also punctate, but differs in having a less angular outline, with a poorly developed caudal process.

Subfamily *Orioninae* Puri, 1973

Genus *Caudites* Coryell & Fields, 1937
Type species: *Caudites medialis* Coryell & Fields, 1937

Caudites africanus Omatsola, 1972
Pl. 7, figs. 20-22.

Caudites africana; Omatsola 1972: 102, pl. 31, figs. 1-14, textfig. 33.
Caudites africana Omatsola; Carbonel *et al.* 1983: 38, pl. 1, fig. 10.

Remarks. The specimens of *C. africanus* from Senegal and The Gambia are larger than those from Nigeria (Omatsola 1972). The predominantly Mediterranean *C. calceolatus* (Costa, 1853) differs slightly in the configuration of the posterior ribs and is somewhat larger still. Intraspecific variation in ornamenta-

tion was observed within my West African material, as well as in Mediterranean *C. calceolatus*. It seems possible these two forms are conspecific and should be considered geographical subspecies.

Distribution. Senegal, The Gambia and Nigeria.

Material and dimensions. Twenty-six specimens, valves as well as carapaces, both male and female, were found in three samples. Length males 0.57-0.59 mm, heigth males 0.24-0.25 mm, length females 0.56-0.58 mm, heigth females 0.23-0.24 mm.

Subfamily *Leguminocytherinae* Howe, 1961

Genus *Campylocythereis* Omatsola, 1970

Type species: *Campylocythereis sandbergi* Omatsola, 1970

Campylocythereis sp. A

Pl. 7, fig. 17-21.

? *Puriana* cf *terrasilis* Omatsola; Carbonel *et al.* 1983: 38, pl. 1, fig. 33.

Remarks. The arrangement of the muscle scars and the structure of the hinge are similar to those in *C. sandbergi* Omatsola, 1970, from Nigeria. In my specimens, however, the ornamentation is weaker, and the sexual dimorphism more pronounced.

Material and dimensions. This species was present only in the sample from Bakau, and no more than one carapace and six valves were found. Length ?female 0.65 mm, height 0.33 mm, length ?males 0.58-0.63 mm, heigth 0.26-0.28 mm.

Genus *Reymentia* Omatsola, 1970

Type species: *Reymentia ijebuorum* Omatsola, 1970

Reymentia microdictyota Omatsola, 1970

Pl. 7, figs. 8-11.

Reymentia microdictyota; Omatsola 1970a: 416, pl. 4, figs. 1-15.

Distribution. Omatsola (1970a) reported the species from brackish and marine waters in Nigeria. I found it in one of the samples from Cape St. Mary (The Gambia).

Material and dimensions. Females length 0.42-0.44 mm, height 0.22-0.23 mm, length males 0.42-0.43 mm, height 0.21-0.22 mm. Ten carapaces and two valves were found in the Bakau sample.

Genus *Basslerites* Howe, 1937
Type species: *Basslerella miocenicus* Howe, 1935

Basslerites elongatus Omatsola, 1972
Pl. 7, fig. 7.

Basslerites elongata; Omatsola 1972: 84, pl. 18, figs. 1-12, textfigs. 19, 20.
Basslerites elongata Omatsola; Carbonnel 1986: 214.

Distribution. Niger Delta and Senegal.
Material and dimensions. Only one slightly damaged carapace was found in the sample from Joal. Length 0.46 mm, heigth 0.21 mm.

Family *Loxoconchidae* Sars, 1925
Subfamily *Loxoconchinae* Sars, 1925

Genus *Loxoconcha* Sars, 1866
Type species: *Cythere rhomboidea* Fischer, 1855

Loxoconcha lacunensis Omatsola, 1970
Pl. 8, figs. 5-8.

Loxoconcha lacunensis; Omatsola 1970a: 418, pl. 6, figs. 1 -10.

Remarks. This coarsely punctate to reticulate species was reported by Omatsola (1970a) from Lagos Lagoon, Nigeria, where it was found at salinities ranging from 0.7-28.5 .
Distribution. Senegal, The Gambia and Nigeria.
Material and dimensions. Thirty-six carapaces from Bakau, where the species was particularly abundant, and Fajara. Length males 0.35-0.37 mm, females 0.33-0.35 mm, height 0.20-0.22 mm.

Loxoconcha sp. aff. *L. tumida* Brady, 1869
Pl. 8, figs. 9, 10.

aff. *Loxoconcha tumida*; Brady 1869: 48, pl. 8, figs. 11, 12.
aff. *Loxoconcha tumida* Brady; Bonaduce, Ciampo & Masoli 1976: 110, pl. 60, figs. 1-7; Breman 1975: 66, pl. 9, fig. 130.
For more reports and synonymies see Breman (1975).

Remarks. This species closely resembles *Loxoconcha tumida* in ornamentation and development of the eye tubercle but is smaller and has a slightly different, less angular outline.
Distribution. *L. tumida* is common throughout the Mediterranean.
Material and dimensions. One (female?) carapace, the right valve of which was broken, was found in the sample from Bakau; length 0.40 mm, heigth 0.33 mm.

Genus *Loxocorniculum* Benson & Coleman, 1963
Type species: *Cythere fischeri* Brady, 1869

Loxocorniculum visendum sp. nov.
Pl. 8, figs. 11-15.

Derivation of name. From Latin *visendus*, meaning worth seeing, referring to the fine, lace-like ornamentation in the marginal areas.
Holotype. A male right valve, coll. no. S469 (paratypes: one male left valve, one female right valve, one female left valve, one juvenile valve, coll. nos. S470-S473).
Diagnosis. A species of *Loxocorniculum* with two well developed anteromedian ribs and fine reticulation in the anterior and posterior marginal areas.
Description. Carapace of medium size, heavily calcified and subquadrate in shape. Dorsal line straight, ventral margin slightly sinuous. Lower part of anterior margin gently rounded, upper part obliquely truncate. Posterior end rounded, with a short and blunt caudal process protruding backward. Two prominent, short anteromedian ribs, perpendicular to the margin. Strong posterodorsal horn-shaped protuberance in both valves of both sexes. Hinge gongylodont with median element crenulate. Surface coarsely but regularly reticulate; towards the anterior, this pattern gradually becomes finer and, in the marginal areas, changes into a very fine punctation. Broad, prominent eye spot. Anteriorly and posteriorly a moderately wide inner lamella is present. Muscle scar pattern consists of a subvertical row of four scars. The frontal scar is crescent-shaped, its open end pointing forward. Fulcral point adjacent to the two dorsalmost adductor scars. Sexual dimorphism prominent, the males being markedly larger than the females.
Distribution. Only known from The Gambia. The genus is predominantly American, and many species have been described from the Caribbean region. Teeter (1975), who did not acknowledge the genus *Loxocorniculum* in his study on the ostracod fauna of Belize (see Remarks), stated that 'the number of *Loxoconcha* which are possessing posterodorsal hornlike protuberances is extremely numerous'. *Loxocorniculum* is also common in the East and West Pacific.
Material. Six valves, two males, two females and two juveniles, in two samples from The Gambia.
Dimensions. Holotype length 0.62 mm, height 0.36 mm; Length females 0.56 mm, height 0.35 mm, length males 0.62 mm, height 0.34-0.36 mm.
Type locality. Bakau beach, The Gambia. Lat. 13°29′08″ N, Long. 16°40′15″ W.
Remarks. There is considerable controversy about the validity of the genus *Loxocorniculum* Benson & Coleman, 1963, which is distinguished from *Loxoconcha* Sars, 1866 by the presence of posterodorsal protuberances. Intermediate forms occur, which is the reason why some authors consider it a synonym (e.g. Teeter 1975), a subgenus (e.g. Bate, Whittaker & Mayes 1981), or a species group (e.g. Hartmann 1974).
The only species that has a comparable ornamentation in the anterior marginal

area is *Loxoconcha oculocrista* Teeter, 1975. Teeter (1975) considers this species conspecific to *Loxocorniculum fischeri* (Brady, 1969) as illustrated in fig. 24 of Benson & Coleman (1963) from the Gulf of Mexico. This illustrated specimen, however, shows less marked similarities to the new species. A number of other species having features in common with *Loxoconcha oculocrista* and *Loxocorniculum visendum* sp. nov. are described from the Caribbean (Teeter 1975). These are all slightly smaller and differ in details of the ornamentation and development of the eye ribs.
Hartmann (1974) reported *Loxoconcha algicola* from Mozambique. This species, clearly a *Loxocorniculum*, and similar in outline to the new species, lacks the anteromedian ribs.

Genus *Paracytheromorpha* Maybury & Whatley, 1986
Type species: *Paracytheromorpha rimafossa* Maybury & Whatley, 1986

Paracytheromorpha sp. A
Pl. 3, figs. 1-4.

Remarks. The typical outline and laterally flattened, broadly rounded anterior end suggest a close relationship to species such as *Cytheromorpha nana* Bonaduce, Ciampo and Masoli, 1975 from the Mediterranean Sea, which should probably also be assigned to this genus (see Maybury & Whatley 1986).
Material and dimensions. One (male?) carapace and one single (female?) left valve were found in the sample from Joal. Length of carapace 0.38 mm, height 0.18 mm; length of valve 0.35 mm, height 0.18 mm.

Genus *Gambiella* Witte, 1985
Type species: *Gambiella caelata* Witte, 1985

Gambiella caelata Witte, 1985
Pl. 2, figs. 19-22.

Gambiella caelata; Witte 1985: 141-148 (incl. plates).

Remarks. Only a few, but widely scattered records are known of the genus *Gambiella* Witte, 1985; they suggest that it occurs worldwide in the tropical littoral realm. Most reports are from the Indo-West Pacific, but the genus is also present along the West Atlantic margin. In the Eastern Pacific province a species was reported from Clipperton Island (Allison & Holden 1971). A beachsand sample from Bermuda (coral debris), which I recently studied, yielded two specimens that belong to the genus, and represent at least one new species.
Distribution. Senegal and The Gambia.
Material and dimensions. Three carapaces and six valves in the standard sample from Bakau. Length 0.41-0.45 mm, height 0.18-0.20 mm.

Genus *Pseudoconcha* gen. nov.

Derivation of name. From *concha*, the second half of the genus name *Loxoconcha*, and the suffix *pseudo*. Name is inspired by the similarity in the shape of the valves of the new genus and the genus *Loxoconcha*. Gender: feminine.

Type species: *Pseudoconcha bucculenta* sp. nov.

Diagnosis. Carapace of 'loxoconchoid' shape. The genus is characterized by the possession of a unique, bipartite hinge.

Description. Carapace of moderate size, elongate; subrhomboidal or ovate in outline. Dorsal margin gently arched or straight, ventral margin straight or slightly sinuous. Anterior end rounded, posterior end upwardly rounded; posterodorsally a caudal process is present, sometimes indistinct. Slight sexual dimorphism with the females wider and shorter. Valves inflated, posteroventrally laterally flattened, anteriorly also more or less flattened and forming a flange. Surface punctate, puncta may be arranged in more or less concentric rows. Moderately wide inner lamella; widest anteriorly, slightly narrower ventrally and posteriorly. Small vestibulum at each end.

Ten to fifteen simple straight marginal pore canals, numerous sieve-type normal pores regularly distributed over surface of valve. Eyespots present, not always distinct. Left valve slightly larger than right valve. Muscle scars consist of a row of four adductor scars and one or two frontal scars that are less distinct and of variable shape. Rounded, elevated fulcral point. Hinge consists of bars and grooves. The anterior half of the hinge in the right valve is formed by a strong bar, with a groove below; in the posterior half of the hinge the position of the groove and the bar are interchanged. Configuration of the hinge in the left valve complementary.

Remarks. Three species are included in the new genus, *P. bucculenta* sp. nov., *P. omatsolai* sp. nov. and *P. hartmanni* (Omatsola, 1970). The latter was originally attributed to the genus *Phlyctocythere* Keij, 1958. Omatsola (1970a) already remarked that the hinge of his species was different from that described for *Phlyctocythere*, which is adont. The valves of representatives of that genus are weakly calcified and more or less translucent, and differ in outline (more similar to *Loxoconchella*). *Australoloxoconcha* Hartmann, 1974 from South Africa and Mozambique is similar to *Pseudoconcha* gen. nov. in many respects, but differs in having a hinge that consists of a sharply toothed bar and a terminal socket in the left, and a groove in combination with a multiple tooth in the right valve. *Bytholoxoconcha* Hartmann, 1974 has a hinge comparable to *Pseudoconcha* gen. nov., but the possession of five adductor scars is reported to be diagnostic. *Bytholoxoconcha* is monotypic; the typespecies *B. limicola* Hartmann, 1974 is based on one specimen from Angola. Further examination of the type is needed to reveal the relationship between these genera. *Palmoconcha* Swain, reported from both the Pacific and the Atlantic (see Horne & Whatley 1985), is also punctate and similar in outline, but has a gongylodont hinge. The soft parts of *Pseudoconcha* gen. nov. were described by Omatsola (1970a).

Pseudoconcha bucculenta sp. nov.
Pl. 8, figs. 20-26.

? *Phlyctocythere hatmanni* Omatsola [*sic*]; Monteillet, Ausseil & Carbonnel 1982: 241.

? *Phlyctocythere hartmanni* Omatsola; Carbonnel 1986: 214.

Derivation of name. The name of this species, from Latin *bucculentus* = puffy cheeked, is inspired by the shape of the carapace, which is more or less inflated in dorsal view.

Diagnosis. A large species of *Pseudoconcha* gen. nov. with subrhomboidal to ovate outline and punctate surface.

Holotype. A carapace, coll no. S474 (paratypes two carapaces and two valves, coll. nos. S475-S478).

Description. Carapace relatively large, subovate in outline, greatest height in the posterior half. Dorsal margin slightly rounded, sloping down towards the anterior. Anterior end rounded, cardinal angle weak. Posterior end with a short, not very distinct caudal process.

Surface covered with regularly distributed round pits, ornamentation absent along the margins. Eyespot weakly indicated on the outside of the valve, interiorly a distinct eye socket is seen. Carapace inflated in dorsal view, greatest width around the middle. Lateral flattening along anterior margin indistinct.

Muscle scars consist of a subvertical row of four adductor scars and two frontal scars, one elongate, the other one, positioned more to the anterodorsal, rounded. A strong fulcral point is seen adjacent to the upper adductor scar.

Sexual dimorphism not very prominent, in dorsal view females are slightly wider.

Material. Fifty-two specimens, from Joal and St. Louis.

Dimensions. Holotype length 0.51 mm, height 0.32 mm; other specimens length 0.50-0.52 mm, height 0.32-0.34 mm.

Type locality. Joal beach, Senegal. Lat. 14°09′18″ N, Long. 16°50′00″ W.

Distribution. Senegal.

Remarks. The species is quite similar to *P. hartmanni* (Omatsola, 1970) from the Lagos Lagoon, Nigeria, but considerably larger and it lacks the ornamentation of sharp spines and papillae. *P. omatsolai* sp. nov. is also smaller, has subparallel dorsal and ventral margins, and a stronger caudal process. *P. bucculenta* sp. nov. has not been recovered from open-beach samples.

Pseudoconcha omatsolai sp. nov.
Pl. 9, figs. 1-7.

Phlyctocythere sp.; Omatsola 1970a: 428, pl. 9, figs. 1-6.

Derivation of name. For M. Ebi Omatsola, in recognition of the valuable contributions he made to the knowledge of the West African ostracods.

Diagnosis. A species of *Pseudoconcha* gen. nov. characterized by its elongate

shape, subparallel ventral and dorsal margins, distinct caudal process and fine pitting.

Holotype. A male carapace, coll. no. S481 (paratypes: two male carapaces, two female carapaces, two female valves, coll. nos. S482-S486).

Description. Carapace rhomboidal, elongate, valves moderately calcified, both ends rounded, posterior end with a short but distinct caudal process. Lateral flattening of caudal process extends towards the posterior part of ventral margin. Ventral and dorsal margins subparallel. Hinge straight, bipartite, as described for the genus. Surface of the valves finely pitted, pits round and numerous. Ornament lacking in the area of the muscle scars and on the caudal process. Eye spot unornamented and clearly discernable. Anteriormost part of the valves laterally compressed forming a flangelike rim. Left valve slightly larger than right, overlapping around almost the entire margin.

Material. Eight carapaces and two valves in the type sample.

Dimensions. Holotype length 0.43 mm, height 0.23 mm; adult females length 0.42-0.44 mm, height 0.23-0.24 mm, males are slightly more elongate.

Type locality. Joal beach, Senegal. Lat. 14°09′18″ N, Long. 16°50′00″ W.

Distribution. Nigeria (Omatsola 1970a), Senegal.

Remarks. This species is quite similar to a number of *Loxoconcha* species, but easily distinguished by its different hinge. The two other West African species that are attributed to the genus have a more rounded outline and a less pronounced caudal process.

Family *Cytheruridae* G.W. Müller, 1894
Subfamily *Paracytherinae* Puri, 1957

Genus *Paracytheridea* G.W. Müller, 1894
Type species: *Paracytheridea depressa* G.W. Müller, 1894

Paracytheridea tschoppi van den Bold, 1946
Pl. 8, figs. 18, 19.

Paracytheridea tschoppi; van den Bold 1946b: 85, pl. 16, figs. 6, 7; Kingma 1948: 74, pl. 7, fig. 12; Key 1954b: 220, pl. 4, fig. 4; van den Bold 1957: 245, pl. 4, fig.7; Benson & Coleman 1963: 33, pl. 6, figs.7, 9, 10, textfigs. 20 a, b; van den Bold 1967: 313; van den Bold 1968: 76, pl. 4, figs. 8 a-d; Allison & Holden 1971: 191, figs. 17, 18, 19; van den Bold 1971: 333; van den Bold 1972: 434, table 5; Maddocks 1974: 211, pl. 4, figs. 1-6, 9, 12, 13, 18, 19; Teeter 1975: 471, figs. 17o, 18a; Krutak & Rickles 1979: 269; Hanai, Ikeya & Yajima 1980: 188; Llano 1982: 80, pl. 1, fig. D7; Palacios-Fest, Gio-Argaez & Krutak 1983: pl. 3, figs. 13, 14; Cronin 1988: 884; Weissleader *et al.* 1989: appendix 1.

Paracytheridea vanwessemi; van den Bold 1946: 86, pl.16, fig.13.

Paracytheridea vandenboldi Puri; Swain 1955: 625, pl. 62, figs. 2a, 2b; Morales 1966: 54, pl. 6, fig. 7.

Paracytheridea sp. 1.; Drooger & Kaasschieter 1958: 91.

Paracytheridea granti LeRoy; Swain 1967: 70, pl. 4, figs. 10, 11a, 11b, pl. 5, figs. 2a, 2b, 4a-4c, 5, textfig. 47a.

Paracytheridea cf. *P. tschoppi* van den Bold; Krutak 1982: 274, pl. 5, figs. 10-14; Dias-Brito, Moura & Würdig 1988: 480, pl. 2, fig. 50; van den Bold 1990: 221.

Paracytheridea sp1; Carbonel *et al.* 1983: 38, pl. 1, fig. 12.

? *Paracytheridea remanei*; Hartmann 1964: 65, pl. 23, figs. 114-120, pl. 24, figs. 121-124.

? *Paracytheridea remanei* Hartmann; Hartmann 1978: 108, pl. 10, figs. 10-14; Howe & McKenzie 1989: 26, figs. 70, 155.

? *Paracytheridea luandensis*; Hartmann 1974: 307, pl. 74, figs. 559-570, pl. 151, fig. 5.

? *Paracytheridea reunionensis*; Whatley & Keeler 1989, p. 67, pl. 1, figs. 15, 17-19.

? *Paracytheridea* cf. *reunionensis* Whatley & Keeler; Mostafawi 1992, p. 152, pl. 5, fig. 111.

Remarks. This is one of several Recent ostracod species of which the fossil record shows evidence of a Tethyan origin followed by a long period of evolutionary stasis. Both as a fossil and living at the present day it is widespread in the Atlantic and the Pacific (see e.g. Cronin 1988 and Weissleader *et al.* 1989). It is also reported from a number of boreholes in Panama (van den Bold 1972). Van den Bold (1946) first described this species from the Miocene of Cuba and it is now known to occur widely in the Caribbean region, both fossil and Recent. In addition to its Atlantic distribution (Gulf of Mexico and Caribbean, Brazil, West Africa (The Gambia), it is also widely reported from the Indo-Pacific: Micronesia, Indonesia, Pliocene of Okinawa. The synonymy given is probably incomplete; the species may have been recorded under even more different names. I compared my material with specimens from the Western Atlantic (Bermuda, Florida, St.Eustatius), from Indonesian islands (Banda, Roti, Kalimantan), the Pliocene of Okinawa and the Upper Miocene of Fiji. They are all conspecific. Benson & Coleman (1963) and Van den Bold (1968) commented on the variation within the species.

Distribution. West African coast (The Gambia), Brazil, Caribbean and adjacent areas (Texas, Florida, Mexico, Trinidad, Belize, Cuba, Dominican Republic; both fossil and Recent), Panama (Miocene), Colombia, Eastern Pacific (California, Clipperton Island), Western Pacific: Java (Pliocene and Pleistocene), several Indonesian Islands, Okinawa (Pliocene), several Micronesian Islands, Fiji (Upper Miocene), Réunion and Solomon Islands (pers. comm. R. Whatley, 1992). Most likely also Australia and the Red Sea.

Material and dimensions. Eleven valves in the sample from Bakau (The Gambia). Length of supposed males 0.55 mm, height 0.26 mm. Some specimens, supposedly females, have the same length but a height of 0.29 mm.

Paracytheridea sp. A
Pl. 8, fig. 17.

Remarks. This species is larger than most other species of the genus. The bulbous posterodorsal swelling is reminiscent of *P. anapetes* Ahmad, 1977; the ornamentation and the development of the eye tubercle, however, are different.
Material and dimensions. Two left valves in the sample from Joal and one damaged left valve in that from Fajara. Length 0.62-0.63 mm, height 0.28-0.30 mm.

Paracytheridea sp. B
Pl. 8, fig. 16.

Remarks. Lack of sufficient material prevented a formal description of this species.
Material and dimensions. A single right valve (sample from Joal). Length of 0.53 mm and a height of 0.24 mm.

Subfamily *Cytherurinae* G.W. Müller, 1894

Genus *Semicytherura* Wagner, 1957
Type species: *Cythere nigrescens* Baird, 1838

Remarks. Two species were tentatively placed in this genus, based mainly on the course of the inner lamella. They differ, however, from typical *Semicytherura* in several respects. The hinge lacks a crenulate median element and shows more affinity to that of *Cytherura* Sars, 1866. Yet, the latter genus is characterized by the possession of a narrow inner lamella. The 'marginal notches' reported here for both of the West African *Semicytherura* species, are unique features not reported before in the Cytheruridae, nor in any other ostracod taxon. The notches are somewhat reminiscent of the 'marginal ripplets' found by Van Harten (1979) on the inside of the inner lamella in *Ilyocypris* (Brady & Norman, 1889). The notches differ from these ripplets in size and shape, and are located on the anterior, not posterior margin of the shell. They may serve a similar purpose, however. In conjunction with the open ended caudal process they may ensure a continuous water flow through the carapace when closed.
The differences from other Cytheruridae, especially the presence of the notches, may eventually justify the erection of a new genus to accommodate them.

Semicytherura duracina sp. nov.
Pl. 9, figs. 8-20.

? *Hemicytherura sp1*; Carbonel *et al.* 1983: 38, fig. 3.

Derivation of name. From Latin *duracinus*, meaning covered with a hard skin; name is inspired by the solidity of the valves.
Diagnosis. This species possesses 'marginal notches' and is further distinguished

by its long upturned caudal process and pronounced ornament consisting of broad and deep fossae varying in shape from round to polygonal. Sexual dimorphism strong.

Holotype. A male? carapace, coll. no. S492 (paratypes one male? carapace, one female? carapace, two female? valves, two male? valves, coll. nos. S493-S498).

Description. Carapace rather small, valves heavily calcified. Shape in lateral view ovate, posterior end with a well-developed, subcentrally positioned, caudal process, the end of which is gently turned upward. When the valves are closed, a rounded, tubelike opening remains in the caudal process. Anterior inner lamella wide with a conspicuous inward turned loop in its median part.

Muscle pattern consists of a vertical row of four elongate scars and a rounded antennal scar. A large, rounded, deep fulcral point occurs between the antennal scar and the upper central scar. Hinge strong, anterior element with three lobes and a twofold posterior tooth in the right valve.

Sexual dimorphism probably pronounced, unambiguous females, however, were not found (see Remarks). A peculiar feature, that is called here 'marginal notches', present on the interior margin.

Material. In the type sample, from Bakau, nine carapaces were found. In the samples from Fajara and Joal the species was represented by two and three specimens respectively.

Dimensions. Holotype length 0.40 mm, height 0.23 mm; adult? males length 0.38-0.43 mm, heigth 0.22-0.24 mm, adult? females length 0.40-0.42 mm, height 0.22-0.24 mm.

Type locality. Bakau beach, The Gambia. Lat. 13°29′08″ N, Long. 16°40′15″ W.

Distribution. Senegal and The Gambia.

Remarks. Within the studied material, three morphs were distinguished, a long one with swollen posterior (supposedly male, pl. 9, fig. 9), a short one with a suboval outline in dorsal view (supposedly female, pl. 9, fig. 12), and a form with characteristics of both, again showing variation (pl. 9, figs. 15 and 17). Although considerable variation in valve size and shape was reported before for species of Cytheruridae (e.g. *Cytherura fenulata* in Cronin 1979), normal variation seems not sufficient to explain the pluriformity in shape of *C. duracina* sp. nov. The presence of an inner lamella in all three morphs suggests that they are adults; it cannot be excluded, however, that, with the exception of one male (pl. 9, figs. 9 and 10), the specimens from the type locality represent penultimate instars, which are of almost adult size and in which sexual dimorphism is already well recognizable. The question whether these forms are penultimate instars or adults (which would classify the larger form as adult and post-adult respectively) relates to the stage (or stages) where reproduction occurs. Alternatively, two types of females may be present, distinguished by different modes of reproduction (sexual and parthenogenetic). An essentially comparable polymorphism was observed in *Loxoconcha uranouchiensis* from Japan by Kamiya (1992). Careful analysis of external and internal features in relation to population structure showed sympatric speciation resulting from heterochrony (paedomorphosis) to be the explanation. It shows ever so well that examination of a

relatively low number of hard parts alone will not suffice to solve problems related to the sometimes complicated reproduction strategies of Ostracoda.
Another complication regarding this species is the presence within one sample of a related form, for the time being regarded as a separate species and reported here as *S.* sp. A. This ostracod, with an overall finer ornamentation, shows some peculiar similarities to *S. duracina* sp. nov. in details of the ornament, in particular in the periphery of the shell. Males and females of this form have the same length, and differ only in the width of the posterior part of the carapace (pl. 9, figs. 21 and 24). This observation supports the idea that no adult females of *S. duracina* sp. nov. were present in my material.

Semicytherura sp. A
Pl. 9, figs. 21-24.

Semicytherura sp1; Carbonel *et al.* 1983: pl. 38, fig. 4.

Remarks. This species is characterized by a regular pattern of horizontal riblets and small rounded pits. Sexual dimorphism obvious, the supposed males considerably wider in the posterior part of the shell.
Clear marginal notches, identical with those in *S. duracina* sp. nov., from which it is distinguished by its much finer ornamentation. It seems possible, however, that this form is a variant of the previous species.
Material and dimensions. Four specimens from Bakau, one supposed female, one supposed male and two penultimate instars.
Length ?male 0.46 mm, height 0.20 mm; length ?female 0.46 mm, height 0.21 mm.

Genus *Gibboborchella* Gründel, 1976
Type species: *Paijenborchellina kuznetsovai* Omatsola, 1969

Gibboborchella kuznetsovae (Omatsola, 1969)
Pl. 10, figs. 4-9.

? *Paijenborchellina* sp.; Reyment 1963a: 271, pl. 11, figs. 1-3.
Paijenborchellina kuznetsovai; Omatsola 1969: 100, pl. 5, figs. 1-11.
Paijenborchellina sp1; Carbonel *et al.* 1983: 38, pl. 1, fig. 12.
Paijenborchellina aff. *kutznetzovai* Omatsola [*sic*]; Carbonnel 1986: 214.

Remarks. Omatsola (1969), in establishing the species, observed that sexual dimorphism is expressed only in the lateral swelling of the female carapace. In my specimens, however, sexual dimorphism is extremely prominent, suggesting that in Omatsola's material (eight adult valves) only one sex was present. The supposed males, which are greatly outnumbered by the females in my material, have a longer carapace that is more swollen at the posterior. The end of the valve is bluntly pointed, and lacks the distinct caudal process that is present in the females. A few related species, which show a comparably strong sexual dimorphism and possess a similar caudal process, are found in the Indian Ocean. Gurney (1979a,

1979b) described *Paijenborchellina alata* and *Paijenborchellina venusa* from the Persian Gulf; Jain (1981) reported *Paijenborchellina indoarabica* and Guha (1974) *P. kutchensis* from India. To my knowledge, the genus is not found east of the Bay of Bengal and is absent from the Pacific. The disjunct distribution of the genus may result from an original distribution that was rather local and restricted to the southern central part of Tethys.

Distribution. Nigeria (Niger Delta), Senegal, The Gambia and probably Gabon.

Material and dimensions. Forty-one valves and 24 carapaces were found. Of these, four carapaces and 14 valves were males, one was juvenile, the rest were females. Length females 0.65-0.68 mm, height 0.28-0.30 mm. Length males 0.68-0.70 mm, height 0.31-0.32 mm.

Genus *Kangarina* Coryell & Fields, 1937
Type species: *Kangarina quellita* Coryell & Fields, 1937

Kangarina abyssicola (G.W. Müller, 1894)
Pl. 9, figs. 25, 26.

Cytheropteron abyssicolum; G.W. Müller 1894: 302, pl. 20, figs. 5, 11, pl. 21, figs. 6-9.
Cytheropteron (Kangarina) abyssicola G.W. Müller; Ruggieri 1952: 77, pl. 6, fig. 9.
Kangarina abyssicola coarctata; Ruggieri 1953b: 53, fig. 16, 16a; Ruggieri 1962: 55, pl. 6, fig. 8; Nascimento 1983: 432.
Kangarina abyssicola (G.W. Müller); Ruggieri 1953b: 53, fig. 15, 15a; Keij 1955: 134, fig. 11; Medioli 1960: 214, fig. 3; van den Bold 1963: 397, pl. 10, fig. 1; Mistretta 1967, 63, pl. 1, fig. 5; Guha 1968: 62, pl. 4, fig. 12; van den Bold 1971: 335; Sissingh 1972: 143; Bonaduce, Ciampo & Masoli 1976, 84, pl. 17, fig. 16; Breman 1975: 75, pl. 10, fig. 144; Jain 1978: 128, figs. 5 G1, 2; Yassini 1979a: 114, pl. 9, fig. 12; Yassini 1979b: 385, pl. 6, fig. 17; Colalongo & Pasini 1980: 58, pl. 22, fig. 2; Tsapralis 1981: 113, p. 10, figs. 4, 5, 6; Malz & Jellinek 1984: 150; Guernet & Fourcade 1988: 145, pl. 4, fig. 12; Paik & Lee 1988: 554.
Mangarina abyssicola (G.W. Müller) [*sic*]; Paik & Lee 1988: 548.

Remarks. The differences between the separate species of *Kangarina* are only slight (see e.g. McKenzie 1974). I observed in my material that variation between individuals within one sample may be considerable, however. This suggests that several published species, that apparently differ only slightly from *K. abyssicola*, may be in fact conspecific. Although the taxonomic noise may obscure the real distribution of this species, it seems there are sufficient data to suggest a Tethyan origin, followed by a long period of stasis in each of the biogeographical provinces it inhabited. Its evolutionary history may be similar to that of *Paracytheridea tschoppi* van den Bold, 1946 and *Falsocythere terryi* (Holden, 1967).

Distribution. *Kangarina abyssicola* shows a quite unique distribution pattern; the

species is present in all of the four biogeographic regions of the shallow-waters of the tropical oceans. The majority of the reports, including numerous fossil occurrences, are from the Mediterranean and East Atlantic. Those from other regions are only few and scattered: Upper and Middle Miocene, Pleistocene and Recent of Trinidad (van den Bold 1963), Neogene of Andaman Islands (Guha 1968), possibly Nicaragua (*Hemicytherura* cf. *H. abyssicola* in Swain 1969), Indian West Coast (Jain 1978), Korea (Paik & Lee 1988). Hanai, Ikeya & Yajima (1980), probably following a suggestion by Guha (1968), included *K.* sp. Kingma, 1948 from Java and Sumatra in *K. abyssicola* (G.W. Müller, 1894). More recently, the species was reported from Miocene and Pliocene cores of ODP leg 101, off the Bahamas (Guernet & Fourcade 1988).

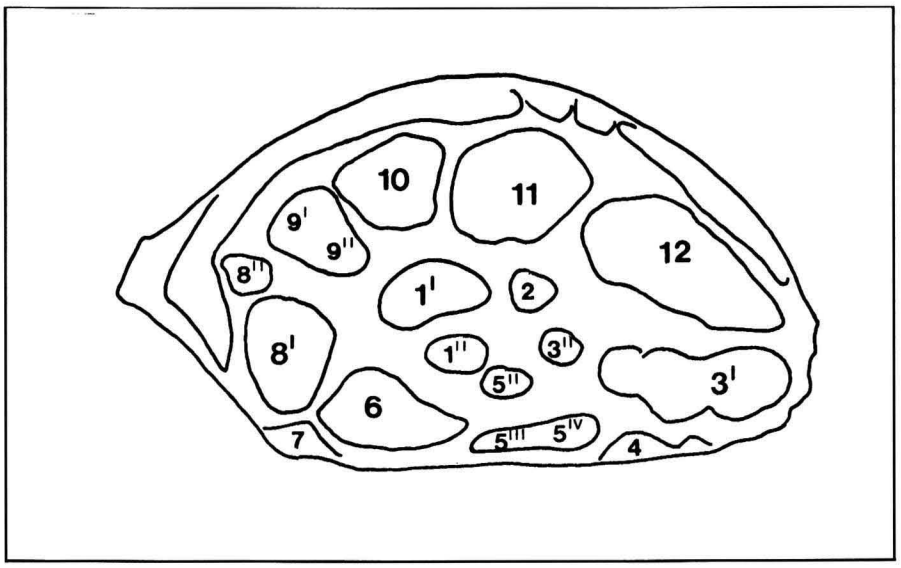
Material and dimensions. The species was found in small numbers (two carapaces and three valves in total) in the three southernmost samples (Bakau, Fajara and Cap Skirring). Length 0.33-0.34 mm, height 0.20-0.21 mm.

Genus *Hemicytherura* Elofson, 1941
Type species: *Cythere cellulosa* Norman, 1865

Hemicytherura cellulosa (Norman, 1865)
Pl. 10, figs. 1, 3.

Cythere cellulosa; Norman 1865: 22, pl. 5, figs. 17-20.
Cytherura cellulosa (Norman, 1865); Brady 1868a: 446, pl. 29, figs. 47-50; Brady, Crosskey & Robertson 1874: 200; Sars 1928: 216, pl. 100, fig. 2.
Cytheropteron (Hemicytherura) cellulosum (Norman, 1865); Elofson 1941: 314.
Hemicytherura cellulosa (Norman, 1865); Ruggieri 1953a: 48, fig. 1, 1a, 2, 14; Wagner 1957: 76, pl. 34; Yassini 1969: 94; Whittaker 1973: 77-84 (incl. plates); Bless 1973: 147, pl. 4, figs. 59, 60; Hoskin 1975: 91, figs. 1, 2, pl. 1, figs. 5, 6; Rosenfeld 1977: 32, pl. 8, figs. 97, 98; Whittaker 1981: 1-6 (incl. plates); Horne 1982: 74, pl. 1, fig. 1; Llano 1981: 115, p. 2, fig. 34; Athersuch, Horne & Whittaker 1989: 204, fig. 81a-81j, pl. 6, fig. 9; Trier 1990: 574.
For more references see Yassini (1969) and Athersuch, Horne & Whittaker (1989).

Remarks. Hoskin (1975) studied the ornamentation pattern in this species and two related forms, and introduced a numerical notation system for the fossae. Applicaton of this system to the specimens from West Africa shows slight variations in the ornamentation within the collected material. The basic fossal pattern (as given in Textfig. 3), however, is virtually constant. The most frequent deviation was the subdivision of fossa no. 1^{I} into two or three separate fossae. Such specimens show a strong similarity to *H. parvifossata* Hartmann, 1974 from Southwest Africa.
The majority of my specimens, however, show no subdivision of this fossa and differ markedly in this respect from those illustrated in Whittaker (1981). In



Textfig. 3. Outline of *Hemicytherura cellulosa* (Norman, 1865) with fossae arrangement and numerical notation after Hoskin (1975).

details of the ornamentation *Hemicytherura* species exhibit considerable variation; the presence of undivided fossa 1^{I} in *H. cellulosa* is also reported from British waters by Hoskin (1975), and this falls apparently within the normal range of variation. The arrangement of the fossae in the central area of the valve shows in fact more similarities to that of *H. videns* (G.W. Müller, 1894) (see Athersuch 1981). Furthermore, *H. cellulosa* from West Africa differs from illustrated material from northern Europe in that the fossae 5^{III} and 5^{IV} and 9^{I} and 9^{II} are fused. These features are also common in *H. videns* from the Mediterranean Sea, and illustrate again the similarity in ornamentation between these two species. The differences, however, are obvious: *H. videns*, has a more subquadrangular outline and a longer caudal process that is more angular. The presence of sexual dimorphism in the material is marked, females being distinctly higher than are the males.

Distribution. The species has been recorded from Atlantic coastal waters of Europe (Great Britain, Ireland, Norway, Skagerak, Baltic Sea, The Netherlands, France, Spain) and North Africa (Morocco). As a fossil it is known from the Quaternary of The Netherlands, Scotland, Wales and Ireland. Occurrence in the Mediterranean area (Ruggieri 1953a) is questionable. The present record from West Africa is the southernmost to date.

Material and dimensions. Thirty-six carapaces and five valves of both males and females. Length males 0.29-0.30 mm, height males 0.16-0.17 mm, length females 0.29-0.30 mm, height females 0.17-0.18 mm.

The West African specimens are slightly smaller than those from the Baltic Sea (Rosenfeld 1977) and southern England (Whittaker 1973).

Hemicytherura sp. A
Pl. 10, fig. 10.

Remarks. This species differs considerably from all other Mediterranean and Atlantic species, both in outline and ornamentation. In lateral view the almost parallel dorsal and ventral margins are conspicuous.
Material and dimensions. One single carapace in the sample from Fajara. Length 0.32 mm, height 0.16 mm.

Family *Xestoleberidae* Sars, 1928

Genus *Xestoleberis* Sars, 1866
Type species: *Cythere aurantia* Baird, 1838

Xestoleberis cf. *communis* G.W. Müller, 1894
Pl. 11, figs. 13-16.

cf. *Xestoleberis communis*; G.W. Müller 1894: 338, pl. 25, figs. 32, 33, 39, pl. 26, figs. 1, 6.

cf. *Xestoleberis communis* G.W. Müller; Barbeito-Gonzalez 1971: 317, pl. 39, figs. 1d, 2d, 3d; Breman 1975: 75, pl. 3, fig. 36; Bonaduce, Ciampo & Masoli 1976: 124, pl. 72, figs. 1-5; Athersuch 1979: 141, fig. 2 (3); Bonaduce, Masoli & Pugliese 1988: 452; Zangger & Malz 1989: 170, pl. 2, figs. 4-5.
For more references see Breman (1975).

Remarks. My specimens are very similar to Mediterranean *X. communis*, but it seems not justified to consider them conspecific because differences in hard parts between species of this genus are often only slight. *Xestoleberis communis* is widely distributed, both fossil and Recent, in the Mediterranean.
Within my material minor variation was observed in the shape of the carapace and the smoothness of the surface.
Distribution. Senegal and The Gambia.
Material and dimensions. Eighty-nine specimens, most of these valves, were found. Length 0.54-0.58 mm, height 0.35-0.38 mm.

Family *Paradoxostomidae* Brady & Norman, 1889

Genus *Cytherois* G.W. Müller, 1884
Type species: *Cytherois virens* G.W. Müller, 1884
(=*Paradoxostoma fischeri* Sars, 1866)

Cytherois sp. A
Pl. 11, figs. 7-12.

Remarks. This species is larger than all other *Cytherois* spp., including *C. fischeri*, to which it shows the greatest similarity. Another difference between these species is that the anterior end is less pointed in *C. fischeri*.

Material and dimensions. Length 0.63-0.67 mm, height 0.26-0.28 mm. Six carapaces and five valves in a sample from Joal.

Superfamily *Cypridacea* Baird, 1845
Family *Paracyprididae* Sars, 1923

Genus *Aglaiocypris* Sylvester-Bradley, 1946
Type species: *Aglaia pulchella* Brady, 1868

?*Aglaiocypris gambiensis* sp. nov.
Pl. 11, figs. 1-6.

? *Cytheridea africana* n. sp.; Brady 1870: 247, pl. 32, figs. 3, 4.
? *Bythocypris* sp.; Rosenfeld & Bein 1978: 15, fig. 2, pl. 1, fig. 16.
Aglaiocypris sp1; Carbonel *et al.* 1983: 40, pl. 2, fig. 2.
Aglaiocypris sp.; Babinot & Kouyoumontzakis 1986: 10, pl. 1, figs. 7-9.
Aglaiella sp.; Carbonnel 1986: 215, pl. 3, figs. 1-3, pl. 4, figs. 1-7.

Derivation of name. The species is named after the Republic of The Gambia, where the samples in which it was extremely abundant were collected.
Diagnosis. A large species, tentatively assigned to *Aglaiocypris*, characterized by the outline of the shell which has its maximum height in the posterior one third. Inner lamella moderately wide anteriorly, very narrow ventrally and posteriorly.
Holotype. A left valve, coll. no. S530 (paratypes three carapaces, two left valves, three right valves, coll. nos. S531-S538).
Description. Carapace elongate, greatest height in posterior one third. Both ends broadly and almost equally rounded. Surface of valves smooth; moderately numerous, small, scattered open normal pores are present. Short marginal pore canals, simple and straight. Sexual dimorphism not apparent.
Characteristic muscle scar pattern consisting of a central group of 8 scars and two mandibular scars. The single frontal scar is L-shaped, with the longer leg nearly vertical. Inner lamella well developed in the anterior region, almost absent in the posteroventral and posterior parts. Left valve slightly larger than the right, overlapping near the anterior and posterior ends of the dorsal margin. Hinge adont, a smooth groove in the left valve corresponding with the dorsal border of the right valve.
Material. Three hundred specimens, most of them valves, in two samples from The Gambia. Two samples from Senegal yielded no more than 23 specimens in total.
Dimensions. Holotype length 1.01 mm, height 0.46 mm; other specimens length 0.92-1.04 mm, height 0.41-0.46 mm.
Type locality. Bakau beach, The Gambia. Lat. 13°29′08″ N, Long. 16°40′15″ W.
Distribution. Senegal and The Gambia.
Remarks. This species was very abundant in the sample from Fajara, where it makes up some 80% of the fauna. The generic assignment of the species on the basis of shell characteristics only is problematic, and the attribution of the new species to *Aglaiocypris* is tentative. McKenzie (1979, 1982b, 1983) made a com-

parison of some closely allied and difficult to distinguish genera, such as *Ghardaglia* Hartmann, 1974, *Coralliaglia* Hartmann, 1974, *Aglaiella* Daday, 1910, *Phlyctenophora* Brady, 1880, *Aglaiocypris* Sylvester-Bradley, 1947, *Tasmanocypris* McKenzie, 1979 and *Gerdocypris* McKenzie, 1983. The new species, of which only hard parts were found, has features in common with all of these genera; the muscle scar pattern, however, is different and may even suggest a position within the Bairdiacea (pers. comm. McKenzie 1985). The bairdiacean genus *Triangulocypris* Teeter, 1975, separated from *Bythocypris* Brady, 1880 by its triangulate rather than subguadrate outline, contains several species that show similarities in both outline and, less so, in muscle scars. *Aglaiocypris croneisi* Teeter, 1975 from the Caribbean, also has a comparable outline, but is smaller, has well-developed inner lamellae and a different type of normal pore. *'Aglaia' complanata* (Brady & Robertson, 1870, *sensu* G.W. Müller, 1894) from the Gulf of Naples differs also from ?*Aglaiocypris gambiensis* sp. nov. in being much smaller and having a well developed posterior inner lamella. McKenzie (1982b, 1983) considered this species not to belong in *Aglaiocypris* s.s. and erected *Gerdocypris* to accommodate it and *Gerdocypris eulitoralis* (Hartmann, 1974). The latter species, originally described as aff. *Aglaiocypris eulitoralis*, from Angola, differs from the new species in size, muscle scar pattern and development of the inner lamella. Moreover, the valves are considerably thinner and more fragile (pers. comm. McKenzie 1985).
The new species was previously reported from the Congo River outlet by Babinot & Kouyoumontzakis (1986). *Bythocypris* sp. in Rosenfeld & Bein (1978), from off Cap Blanc (Mauretania) is probably conspecific.

Genus *Aglaiella* Daday, 1910
Type species: *Aglaiella stagnalis* Daday, 1910

Aglaiella sanctamariae sp. nov.
Pl. 11, figs. 17-22.

Aglaiella sp.; Carbonel *et al.* 1983: 38, pl. 1, fig. 2.

Derivation of name. Name is derived from the type locality, Cape St. Mary (The Gambia).
Diagnosis. A rather small species of the genus *Aglaiella*, characterized by its complex muscle scar arrangement, with a dorsal muscle scar that is divided in two.
Holotype. A left valve, coll. no. S543 (paratypes: two carapaces, two left valves, three right valves, coll. nos. S544-S550).
Description. Carapace elongate, dorsal margin smoothly arched, greatest height at approximately the middle. Ventral margin almost straight but faintly sinuate in the middle. Anterior end broadly rounded, posterior end more pointed. Valves strongly calcified, surface smooth. Posterior vestibulum larger than anterior one, connected along the ventral region.
Marginal porecanals numerous, long and irregular. Hinge adont, a groove along the dorsal margin of the left valves receives the dorsal border of the right valve. Left valve larger than right valve, overlap conspicuous at both ends of the dorsal margin.

Material. Ninety valves and two carapaces in two samples from Cape St. Mary, The Gambia. In a sample from Joal (Senegal) eight valves were found.
Dimensions. Holotype length 0.79 mm, height 0.35 mm; other specimens length 0.78-0.85 mm, height 0.34-0.37 mm.
Type locality. Bakau beach, Cape St. Mary, Republic of The Gambia. Lat. 13°29′08″ N, Long. 16°40′15″ W.
Distribution. Senegal and The Gambia.
Remarks. The attribution to *Aglaiella* is based mainly on the strong resemblance the new species shows to *Aglaiella railbridgensis* Benson & Maddocks, 1964, from Knysna Estuary, South Africa. The new species differs from *A. railbridgensis* in that it lacks the small toothlike rising in the hinge groove of the left valve. Another important difference is the muscle scar pattern. From fig. 7 in Benson & Maddocks (1964) the presence of a single large dorsal muscle scar can be inferred. In *A. sanctamariae* sp. nov., two dorsal scars can be seen in the same position. For this reason the species was at first thought to belong to *Phlyctenophora*, which has an almost identical muscle scar arrangement. The generic assignment of the species *A. railbridgensis* was confirmed by Hartmann (1974), who examined specimens from the type locality. McKenzie (1982b) considers *Aglaiella sensu* Benson & Maddocks (1964) and *Aglaiaella sensu* Hartmann (1974) to be distinct from *Aglaiella* s.s. *Aglaiella kenmckenziei* Hartmann, 1974, from the Angolan beaches, is slightly larger than *A. railbridgensis*, but the main differences are in the morphology of the soft parts. Both species have valves that are larger than those of *A. sanctamariae* sp. nov.
According to Hartmann (1974), the large muscle scar in *A. kenmckenziei* is only faintly subdivided. His illustrations show a left valve that has an undivided muscle scar, whereas the right valve shows the dorsal adductor to clearly consist of two separate elements wich resemble that of *A. sanctamariae* sp. nov.
The genera that belong in the family Paracyprididae differ mainly in the soft parts; using hard parts alone a distinction is often impossible to make. Especially the shells of the Indo-Pacific genera *Phlyctenophora* and *Tasmanocypris* are very similar to those of *Aglaiella*. *Aglaia rara* (G.W. Müller, 1894) from the Gulf of Napels, which probably is a true *Aglaiella*, differs from *A. sanctamariae* sp. nov. in being more pointed posteriorly and having a more sinuate ventral margin, as well as a different muscle scar pattern.

Genus *Paracypris* Sars, 1866
Type species: *Paracypris polita* Sars, 1866

Paracypris sp. A.
Pl. 11, figs. 23-26.

Remarks. This species is easily recognized by the conspicuous, strongly bifurcating marginal pore canals and the relatively small anterior vestibulum.
Material and dimensions. One carapace, split in two valves, from Joal (Senegal) and three loose valves from Bakau. Length 0.85-0.91 mm, height 0.36-0.38 mm.

ACKNOWLEDGEMENTS

This study on shallow water ostracods was a continuation of a study on deep water ostracods that started on board R/V 'Meteor' during 'Geotropex '83', an expedition to the West African waters. I thank the 'Deutsche Forschungs Gemeinschaft' for allowing me to participate; without this cruise, the subject would never have come to me. Many colleagues, in particular Robin Whatley and Heinz Malz, expressed an interest in the subject and helped with material, advice and hospitality; for this they are thanked. I also thank Tom Cronin for patiently replying to my letters and contributing to this study with both material and preliminary results. Most of the work was carried out when I was a research student at the University of Amsterdam and, later, at the Free University in Amsterdam, were Dick van Harten and Jan van Hinte were my supervisors. I am most grateful to both of them, not only for improving the manuscript, but also for their continuous encouragement. A.J. Keij's collection of ostracod faunal slides from numerous remote localities (donated to D. van Harten, Free University, Amsterdam) was indispensible in providing the necessary basis to compare West African ostracods to taxa from elsewhere.

PLATE 1

Cytherella eburnea sp. nov.
fig. 1. dorsal view of male carapace, Bakau, 45×;
fig. 2. dorsal view of female carapace, Bakau, 45×;
fig. 3. female left valve, Bakau, 45×;
fig. 4. male left valve, Bakau, 45×;
fig. 5. female left valve, internal view, Bakau, 43×;
fig. 6. male right valve, Bakau, 45×;
fig. 7. male right valve, internal view, Bakau, 43×.

Cytherella joalensis sp. nov.
fig. 8. female left valve, Bakau, 39×;
fig. 9. left view of male carapace, Joal, 41×;
fig. 10. dorsal view of male carapace, Joal, 41×;
fig. 11. right view of male carapace, Joal, 41×;
fig. 12. dorsal view of female carapace, Joal, 41×;
fig. 13. female right valve, Joal, 37×;
fig. 14. male left valve, internal view, Joal, 41×;
fig. 15. female right valve, internal view, Joal, 41×.

Cytherella ponderosa sp. nov.
fig. 16. female left valve, damaged dorsally, Joal, 42×;
fig. 17. dorsal view male carapace, Joal, 41×;
fig. 18. dorsal view female carapace, slightly damaged, Joal, 41×;
fig. 19. right view of male carapace, Joal, 42×;
fig. 20. left view of male carapace, Joal, 42×;
fig. 21. internal view of male left valve, Joal, 42×.

Paranesidea sp. A.
fig. 22. muscle scar arrangement, right valve, Bakau, 180×;
fig. 23. right valve, Bakau, 35×;
fig. 24. left valve, internal view, Cap Skirring, 35×;
fig. 25. left valve, Cap Skirring, 35×.

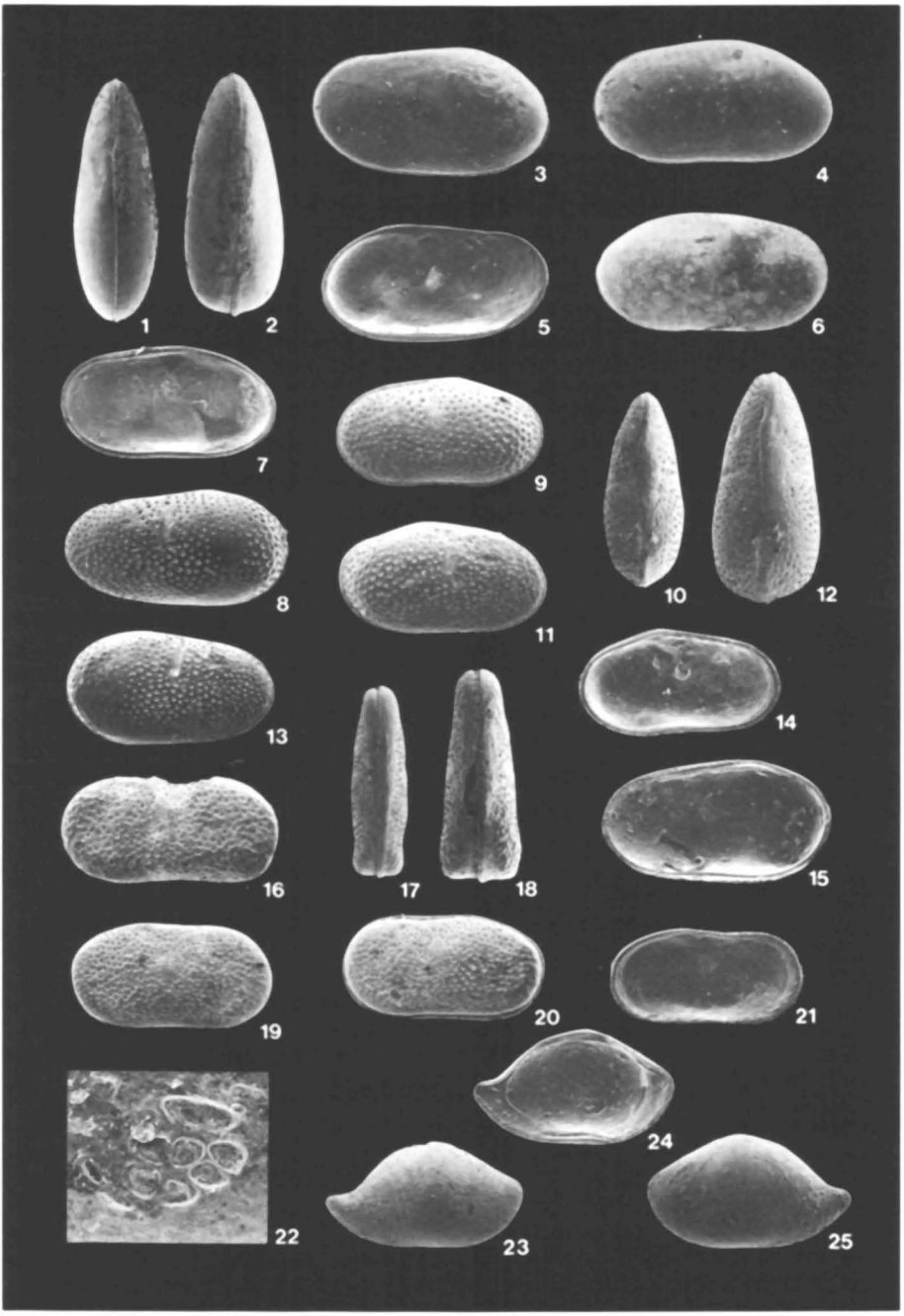

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PLATE 2

Paranesidea multiforma sp. nov.
fig. 1. left view of carapace, high variety, Bakau, 42×;
fig. 2. right view of carapace, idem, Bakau, 42×;
fig. 3. muscle scar arrangement, left valve, Bakau, 180×;
fig. 4. right valve, internal view, Bakau, 42×;
fig. 5. internal view of left valve, high variety, Bakau, 33×;
fig. 6. internal view of left valve, intermediate specimen, Bakau, 33×;
fig. 7. internal view of left valve, low variety, Bakau, 33×;
fig. 8. left valve, low variety, Bakau, 33×.

Paranesidea sp. B.
fig. 9. internal view of right valve, Bakau, 34×;
fig. 10. right valve, Bakau, 34×;
fig. 11. left valve, Bakau, 34×.

Triebelina intermedia sp. nov.
fig. 12. oblique dorsal view of carapace, anterior to the right, Joal, 38×;
fig. 13. internal view of right valve, Joal, 38×;
fig. 14. dorsal view of carapace, anterior to the right, Joal, 38×;
fig. 15. internal view of left valve, Joal, 38×;
fig. 16. left valve, Joal, 38×;
fig. 17. right valve, Joal, 38×;
fig. 18. muscle scar arrangement, right valve, Joal, 260×.

Gambiella caelata Witte, 1985
fig. 19. right valve, Bakau, 70×;
fig. 20. dorsal view, Bakau, 70×;
fig. 21. internal view of left valve, Bakau, 70×;
fig. 22. left valve, Bakau, 70×;
fig. 23. muscle scar arrangement, left valve, Bakau, 324×.

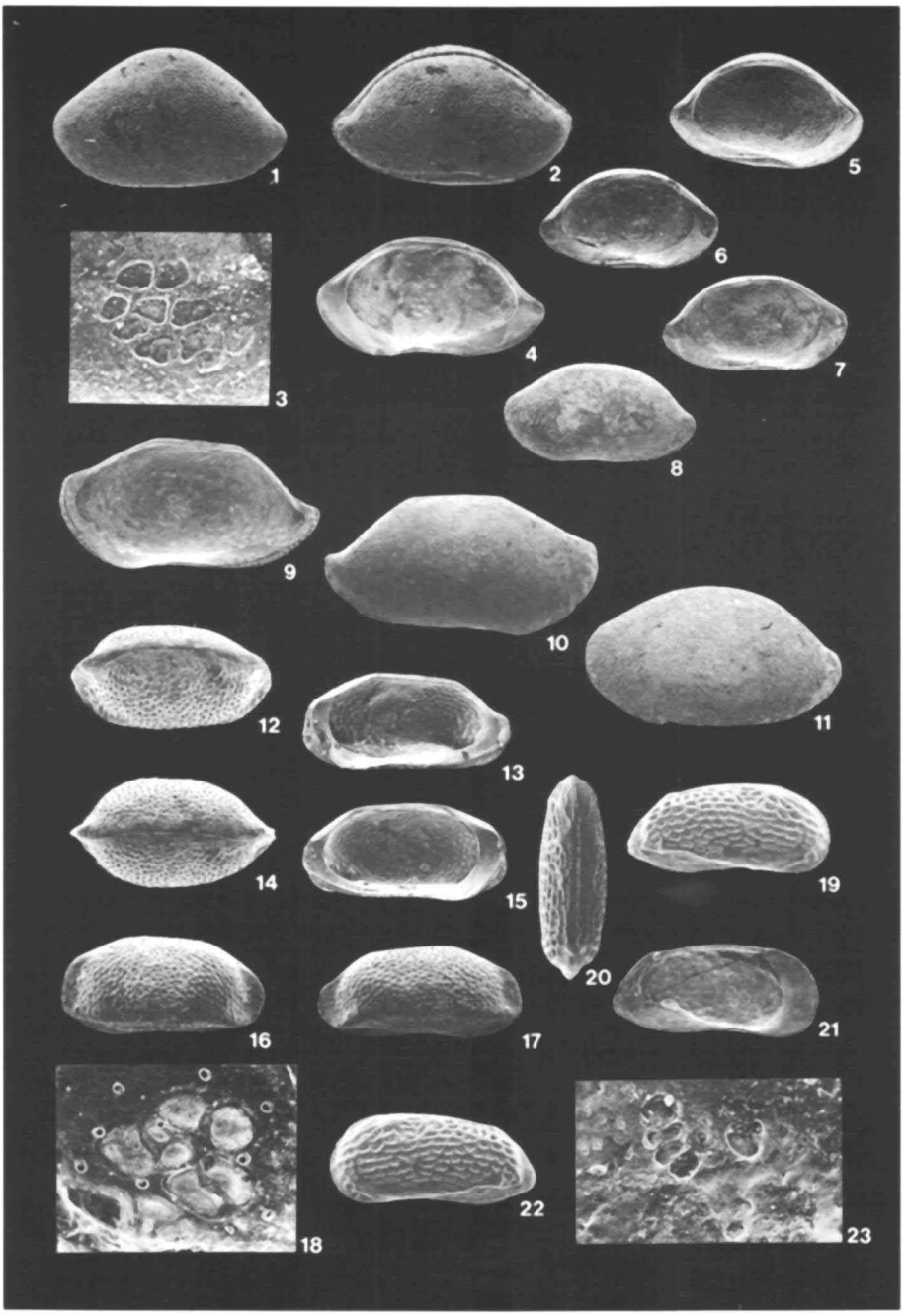
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PLATE 3

Paracytheromorpha sp. A.
fig. 1. left view of male? carapace, Joal, 71×;
fig. 2. internal view of left female? valve, Joal, 84×;
fig. 3. dorsal view of male? carapace, Joal, 73×;
fig. 4. left female? valve, Joal, 68×.

Neomonoceratina ikoroduensis Omatsola, 1970
fig. 5. left view of female carapace, Bakau, 69×;
fig. 6. dorsal view of female carapace, Bakau, 69×;
fig. 7. right view of carapace, penultimate instar, Bakau, 65×;
fig. 8. right view of female carapace, Bakau, 73×;
fig. 9. internal view of male left valve, Bakau, 62×;
fig. 10. right view of male carapace, Bakau, 59×;
fig. 11. internal view of female right valve, Bakau, 62×;
fig. 12. internal view of male right valve, Bakau, 62×.

Neomonoceratina iddoensis Omatsola, 1970
fig. 13. male left valve, Joal, 48×;
fig. 14. female left valve, internal view, Joal, 42×;
fig. 15. right view of female carapace, Joal, 55×;
fig. 16. male right valve, internal view, Joal, 41×;
fig. 17. male right valve, Fajara, 48×;
fig. 18. dorsal view of female carapace, Joal, 48×.

Kotoracythere inconspicua (Brady, 1880)
fig. 19. dorsal view of carapace, Joal, 73×;
fig. 20. left valve of carapace, Fajara, 73×;
fig. 21. internal view of left view, Fajara, 73×.

Callistocythere littoralis (G.W. Müller, 1894)
fig. 22. left view of carapace, Joal, 65×;
fig. 23. right view of carapace, Joal, 69×;
fig. 24. internal view of right valve, Joal, 68×;
fig. 25. muscle scar arrangement, right valve, Joal, 350×.

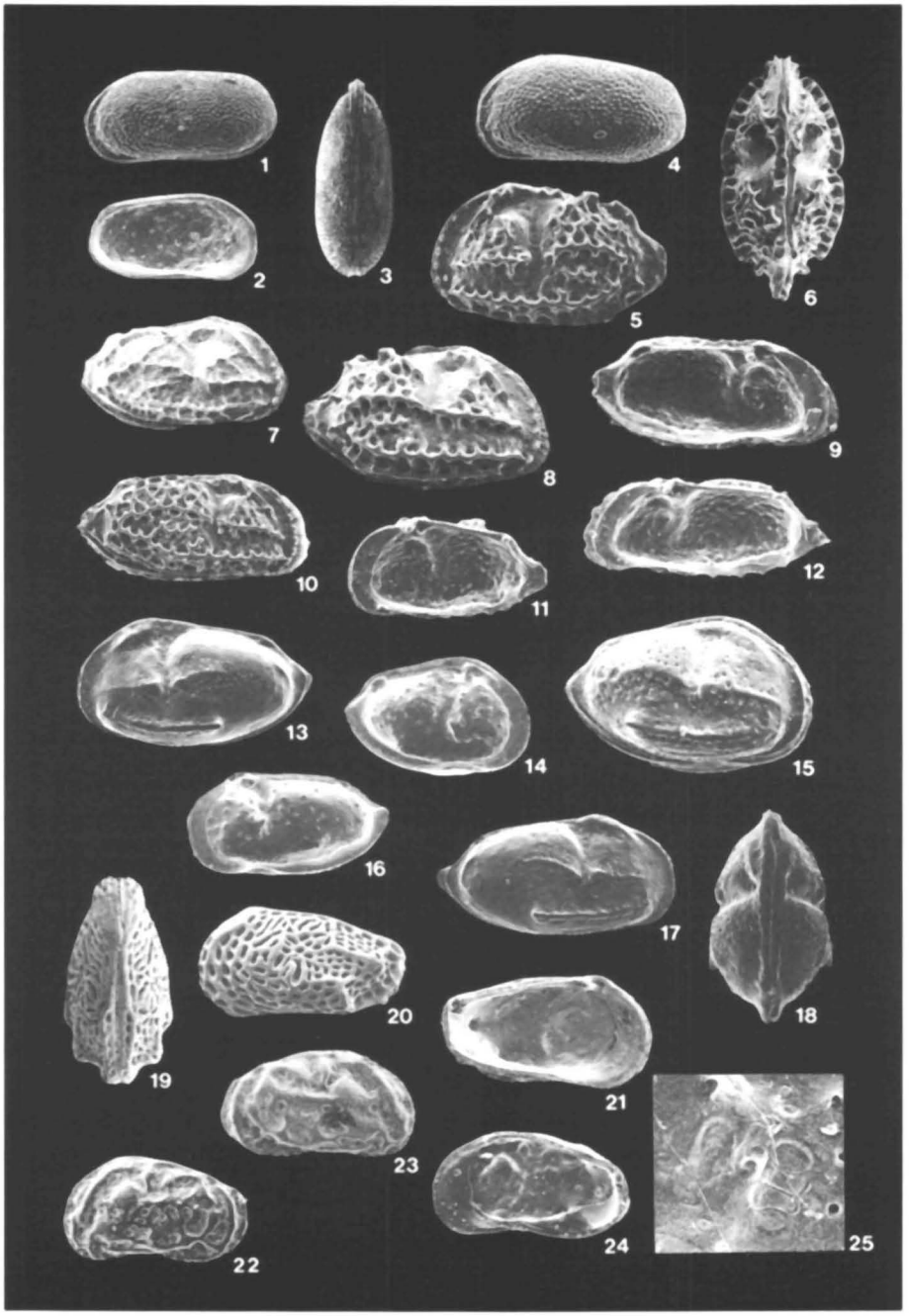
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PLATE 4

Leptocythere culpata sp. nov.
fig. 1. internal view of right male valve, Joal, 75×;
fig. 2. internal view female right valve, Joal, 75×;
fig. 3. left view of female carapace, Joal, 72×;
fig. 4. muscle scar arrangement, male right valve, Joal, 348×;
fig. 5. left view of male carapace, Joal, 72×;
fig. 6. female right valve, Joal, 62×;
fig. 7. male left valve, Joal, 75×;
fig. 8. left view female carapace, Joal, 72×;
fig. 9. right view of female carapace, 75×.

Keijia demissa (Brady, 1868)
fig. 10. left view of carapace, Fajara, 72×;
fig. 11. right view of carapace, Joal, 73×;
fig. 12. internal view of left valve, Joal, 62×.

Tanella gracilis Kingma, 1946
fig. 13. right valve, Bakau, 66×;
fig. 14. internal view of left valve, Bakau, 66×;
fig. 15. left view of carapace, Joal, 70×.

Cyprideis nigeriensis Omatsola, 1972
fig. 16. dorsal view female carapace, Joal, 41×;
fig. 17. male left valve, Joal, 34×;
fig. 18. dorsal view of male carapace, Joal, 41×;
fig. 19. male right valve, Joal, 34×;
fig. 20. right valve of juvenile specimen, St. Louis, 44×;
fig. 21. interior view of female right valve, showing muscle scars and hinge, St. Louis, 70×;
fig. 22. female left valve, St. Louis, 39×;
fig. 23. internal view of female left valve, St. Louis, 34×.

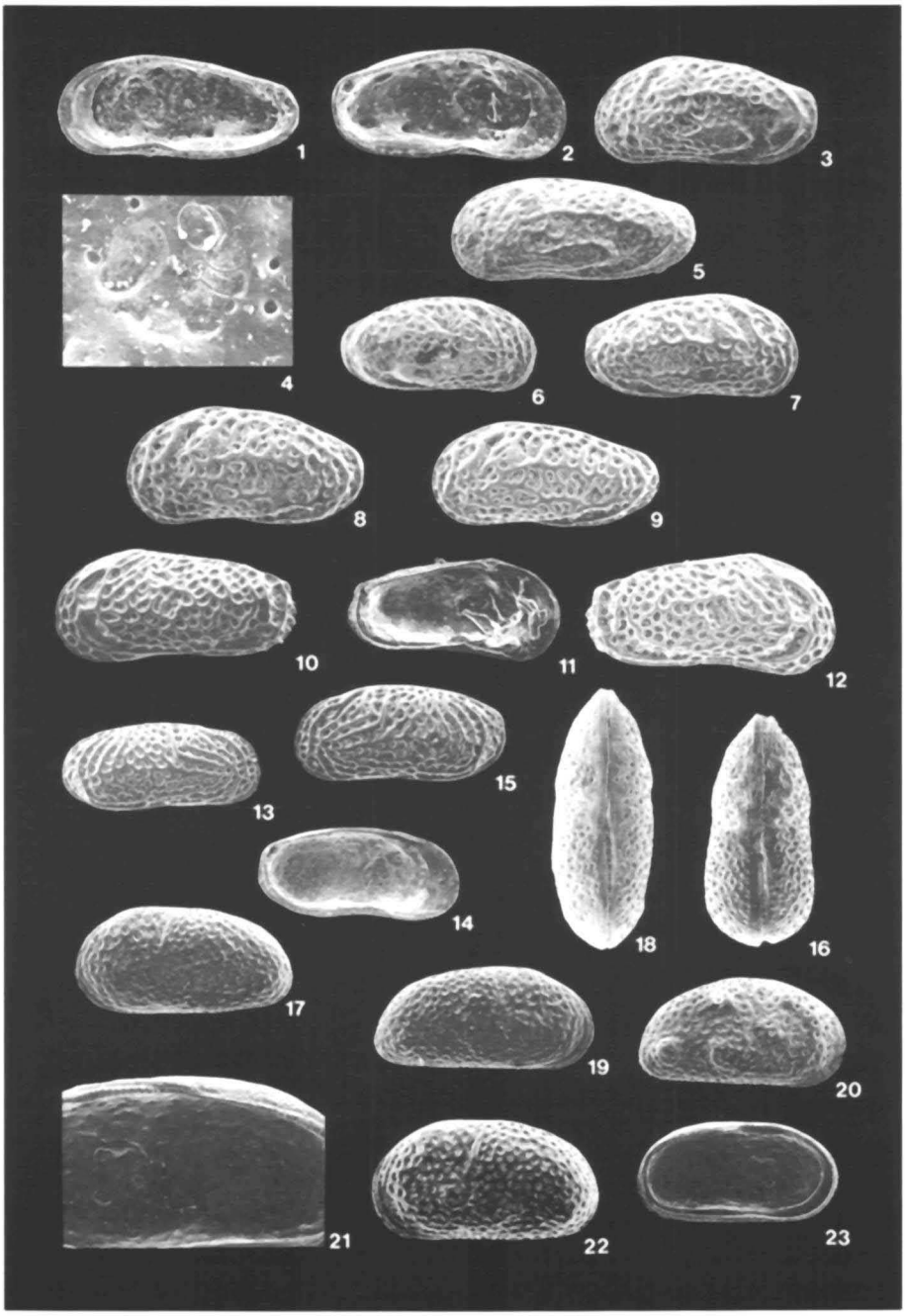
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PLATE 5

Cyprideis torosa Jones, 1850
fig. 1. internal view of female left valve, Joal, 35×;
fig. 2. male right valve, Joal, 35×;
fig. 3. internal view of male right valve, Joal, 34×;
fig. 4. dorsal view of female left valve, Joal, 34×;
fig. 5. dorsal view of male right valve, Joal, 34×;
fig. 6. female right valve, Joal, 36×.

Miocypideis leybarensis Carbonnel, 1986
fig. 7. dorsal view of female carapace, St. Louis, 43×;
fig. 8. dorsal view male carapace, St. Louis, 43×;
fig. 9. male left valve, St. Louis, 41×;
fig. 10. dorsal view of male right valve, St. Louis, 42×;
fig. 11. left view of female carapace, St. Louis, 35×;
fig. 12. internal view of female left valve, St. Louis, 35×;
fig. 13. muscle scar arrangement, female left valve, St. Louis, 185×;
fig. 14. right view male carapace, St. Louis, 37×;
fig. 15. internal view of female right valve, St. Louis, 35×.

Copytus fusiformis (Yassini, 1979)
fig. 16. oblique right view of carapace, Bakau, 33×;
fig. 17. left view of carapace, Bakau, 33×;
fig. 18. dorsal view of carapace, Bakau, 32×;
fig. 19. internal view of left valve, Bakau, 33×.

Pontocythere sp. A.
fig. 20. internal view of female left valve, Bakau, 44×;
fig. 21. internal view male right valve, Bakau, 40×;
fig. 22. male left valve, Bakau, 42×;
fig. 23. dorsal view female carapace, Bakau, 45×;
fig. 24. right view female carapace, Bakau, 47×;
fig. 25. detail of hinge structure, female right valve, Bakau, 135×.

?*Cletocythereis* sp. aff. *C. bradyi* Holden, 1967
fig. 26. left valve, Joal, 43×;
fig. 27. interior of left valve, Joal, 44×.

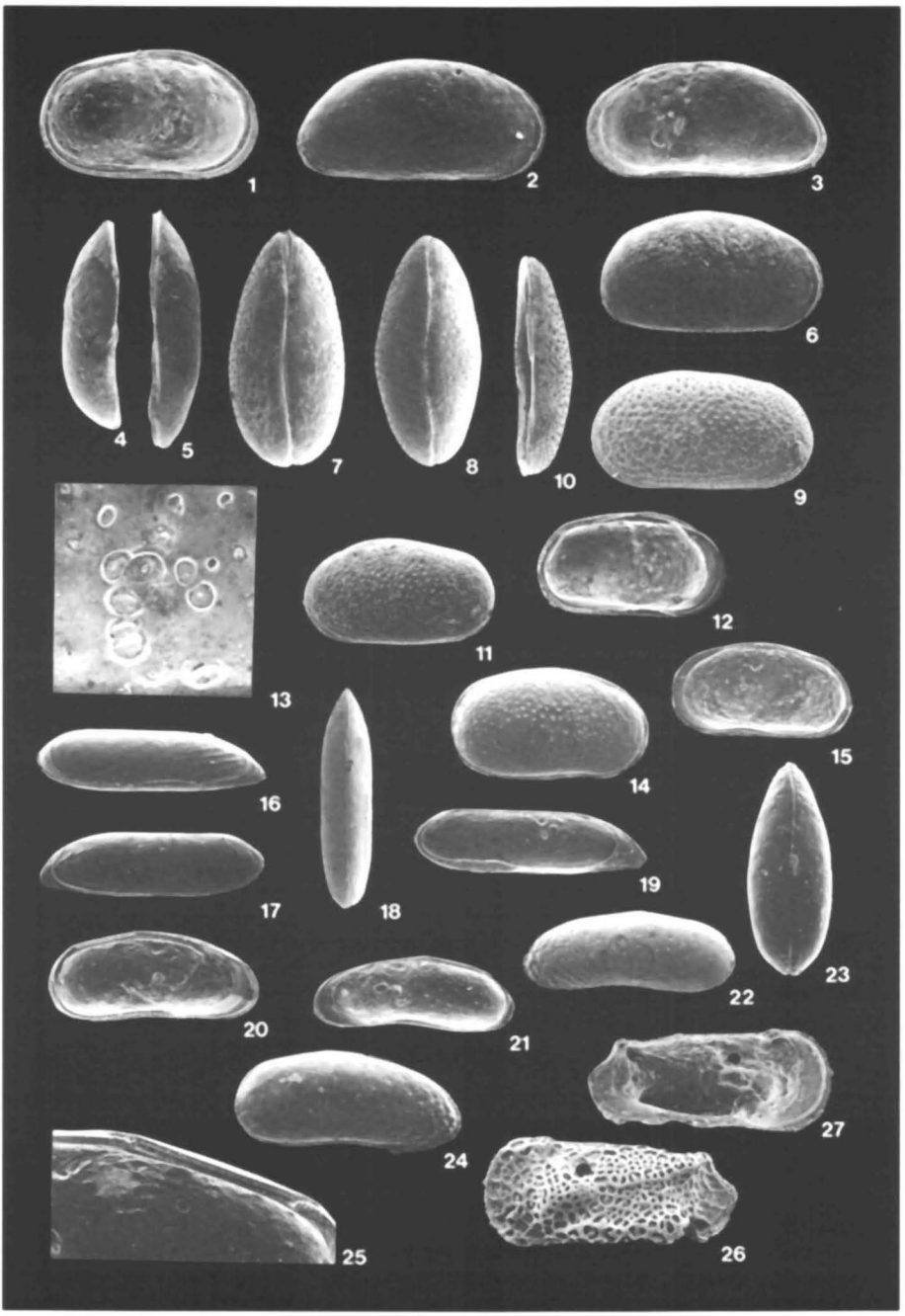
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PLATE 6

Neocaudites lindersae sp. nov.
fig. 1. dorsal view of carapace, Joal, 50×;
fig. 2. left valve, Bakau, 50×;
fig. 3. right view of carapace, Joal, 50×;
fig. 4. right valve, Bakau, 50×;
fig. 5. internal view of left valve, Bakau, 50×;
fig. 6. oblique ventral view of carapace, Joal, 72×;
fig. 7. left view of carapace, Joal, 50×.

Chrysocythere foveostriata (Brady, 1870)
fig. 8. female left valve, Bakau, 49×;
fig. 9. dorsal view of female carapace, Bakau, 46×;
fig. 10. female right valve, Bakau, 49×;
fig. 11. male right valve, Bakau, 46×;
fig. 12. internal view of female right valve, Bakau, 44×.

Neocaudites atlantica Cronin, 1979
fig. 13. female right valve, Joal, 52×;
fig. 14. female left valve, Bakau, 52×;
fig. 15. right view of male carapace, Joal, 52×;
fig. 16. internal view of female right valve, Joal, 52×.

Campylocythereis sp. A.
fig. 17. internal view of male? right valve, Bakau, 52×;
fig. 18. right view of female? carapace, Bakau, 46×;
fig. 19. male? right valve, Bakau, 52×;
fig. 20. dorsal view of female? carapace, Bakau, 46×;
fig. 21. male? left valve, Bakau, 52×.

Falsocythere terryi Holden, 1967
fig. 22. left view of female carapace, Bakau, 47×;
fig. 23. left view of female carapace, Fajara, 47×;
fig. 24. dorsal view of female carapace, Bakau, 47×;
fig. 25. right view of male carapace, Bakau, 57×;
fig. 26. left view of male carapace, Bakau, 57×.

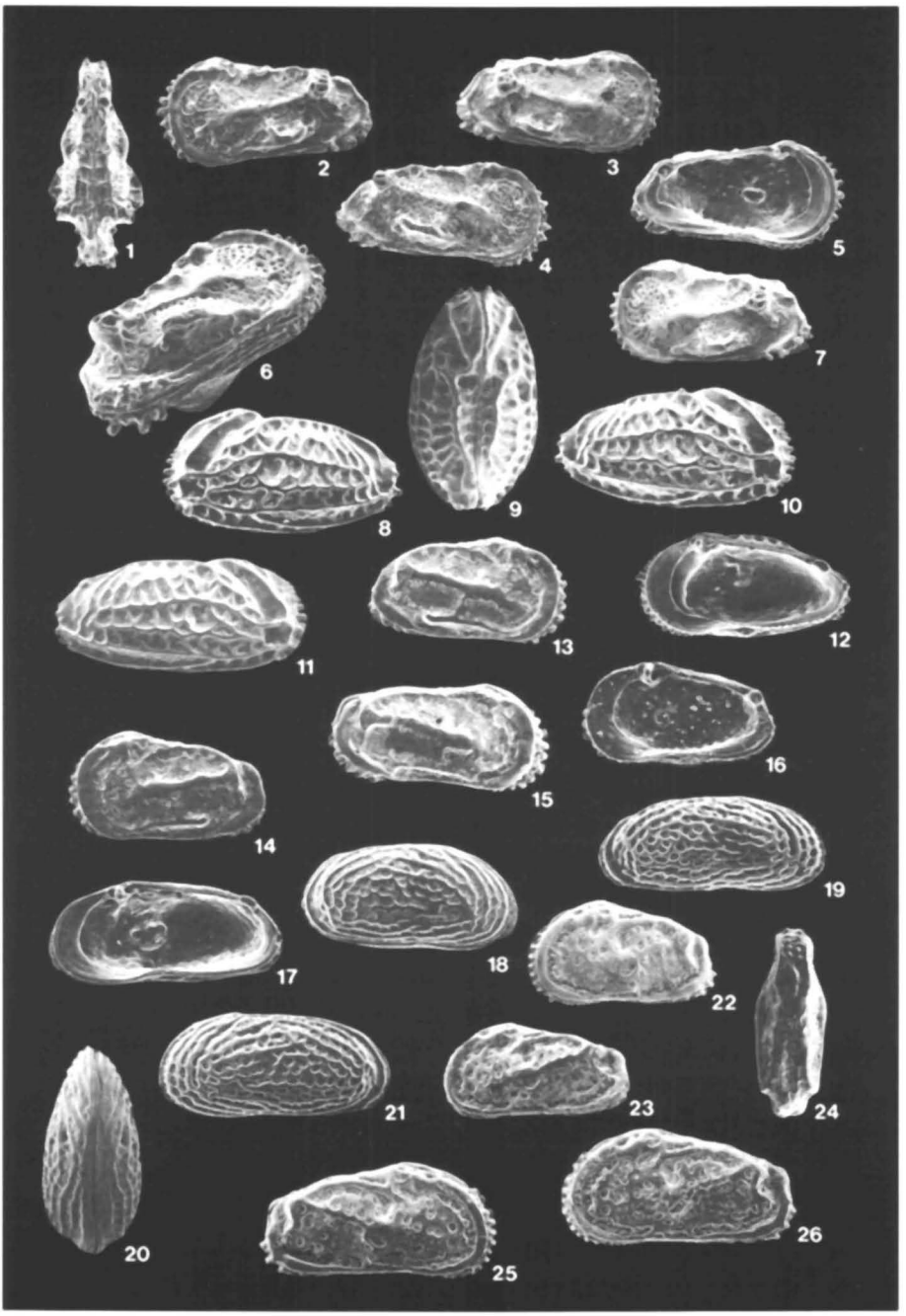
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PLATE 7

Falsocythere simplex (Omatsola, 1972)
fig. 1. right view of carapace, Bakau, 57×;
fig. 2. left view of carapace, Fajara, 54×.

Keijella sp. aff. *Ruggieria indoiranica* Jain, 1981
fig. 3. internal view of female? left valve, Joal, 53×;
fig. 4. male? right valve, Joal, 54×;
fig. 5. female? left valve, Joal, 55×.

Ruggieria sp. A.
fig. 6. left view of carapace, Joal, 39×.

Basslerites elongatus Omatsola, 1972
fig. 7. left view of carapace, Joal, 61×.

Reymentia microdictyota Omatsola, 1970
fig. 8. internal view of right valve, Bakau, 64×;
fig. 9. right view of carapace, Bakau, 73×;
fig. 10. dorsal view of carapace, Bakau, 73×;
fig. 11. left view of carapace, Bakau, 88×.

Mutilus falcatus sp. nov.
fig. 12. right valve, Joal, 47×;
fig. 13. internal view of left valve, Joal, 47×;
fig. 14. left valve, Joal, 47×;
fig. 15. right view of carapace, Joal, 47×;
fig. 16. internal view of right valve, Joal, 47×.

Grinioneis sp. aff. *Hermanites foveolatus* Omatsola, 1972
fig. 17. dorsal view of left valve, Joal, 43×;
fig. 18. right valve, Joal, 40×;
fig. 19. internal view of right valve, Joal, 40×.

Caudites africanus Omatsola, 1972
fig. 20. right view of carapace, Fajara, 51×;
fig. 21. left view of carapace, Fajara, 51×;
fig. 22. dorsal view of carapce, Fajara, 54×.

Aurila voraginosa sp. nov.
fig. 23. internal view of left valve, Bakau, 47×;
fig. 24. internal view of right valve, Bakau, 47×;
fig. 25. right valve, Bakau, 47×;
fig. 26. left valve, Bakau, 47×.

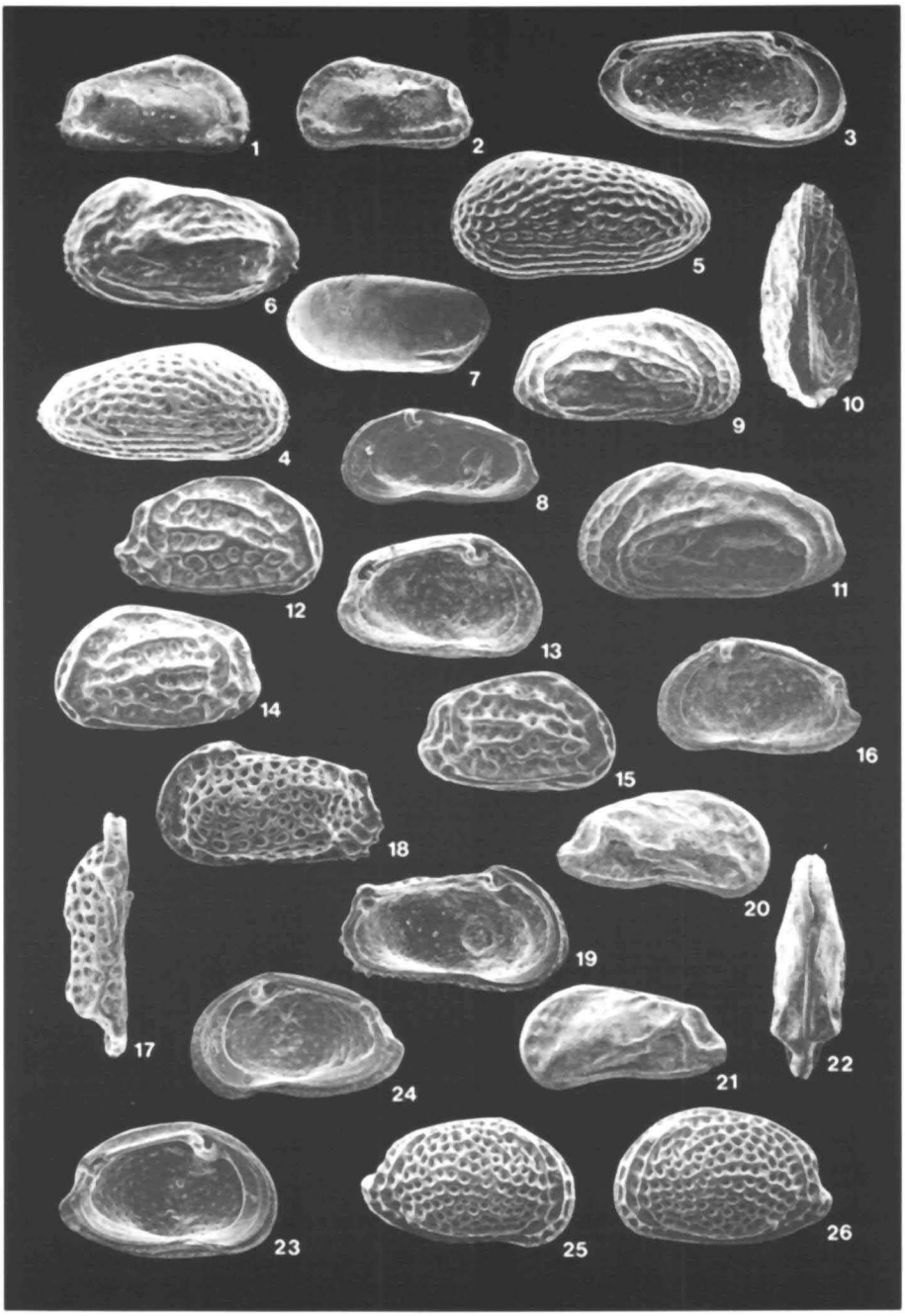
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PLATE 8

Loculicytheretta morkhoveni Witte, 1986
fig. 1. ventral view of female carapace, Bakau, 40×;
fig. 2. right view of female carapace, Bakau, 46×;
fig. 3. male left valve, Bakau, 50×;
fig. 4. internal view of male right valve, Bakau, 50×.

Loxoconcha lacunensis Omatsola, 1970
fig. 5. right view of carapace, Bakau, 80×;
fig. 6. left view of carapace, Bakau, 77×;
fig. 7. internal view of right valve, Bakau, 80×;
fig. 8. dorsal view of carapace, Bakau, 80×.

Loxoconcha sp. aff. *L. tumida* Brady, 1869
fig. 9. left view of carapace, Bakau, 56×;
fig. 10. internal view of left valve, Bakau, 56×.

Loxocorniculum visendum sp. nov.
fig. 11. male left valve, Fajara, 49×;
fig. 12. female left valve, Bakau, 52×;
fig. 13. internal view of male right valve, Bakau, 47×;
fig. 14. male right valve, Bakau, 47×;
fig. 15. internal view of female left valve, Bakau, 52×.

Paracytheridea sp. B.
fig. 16. right valve, Joal, 47×.

Paracytheridea sp. A.
fig. 17. left valve, Joal, 47×.

Paracytheridea tschoppi van den Bold, 1946
fig. 18. left valve, Bakau, 62×;
fig. 19. right valve, Bakau, 48×.

Pseudoconcha bucculenta gen. et sp. nov.
fig. 20. dorsal view of carapace, Joal, 54×;
fig. 21. right view of carapace, Joal, 67×;
fig. 22. left view of carapace, Joal, 67×;
fig. 23. internal view of left valve, Joal, 67×;
fig. 24. detail of ornamentation, Joal, 690×;
fig. 25. internal view of right valve, Joal, 67×;
fig. 26. central muscle scars, right valve, Joal, 344×.

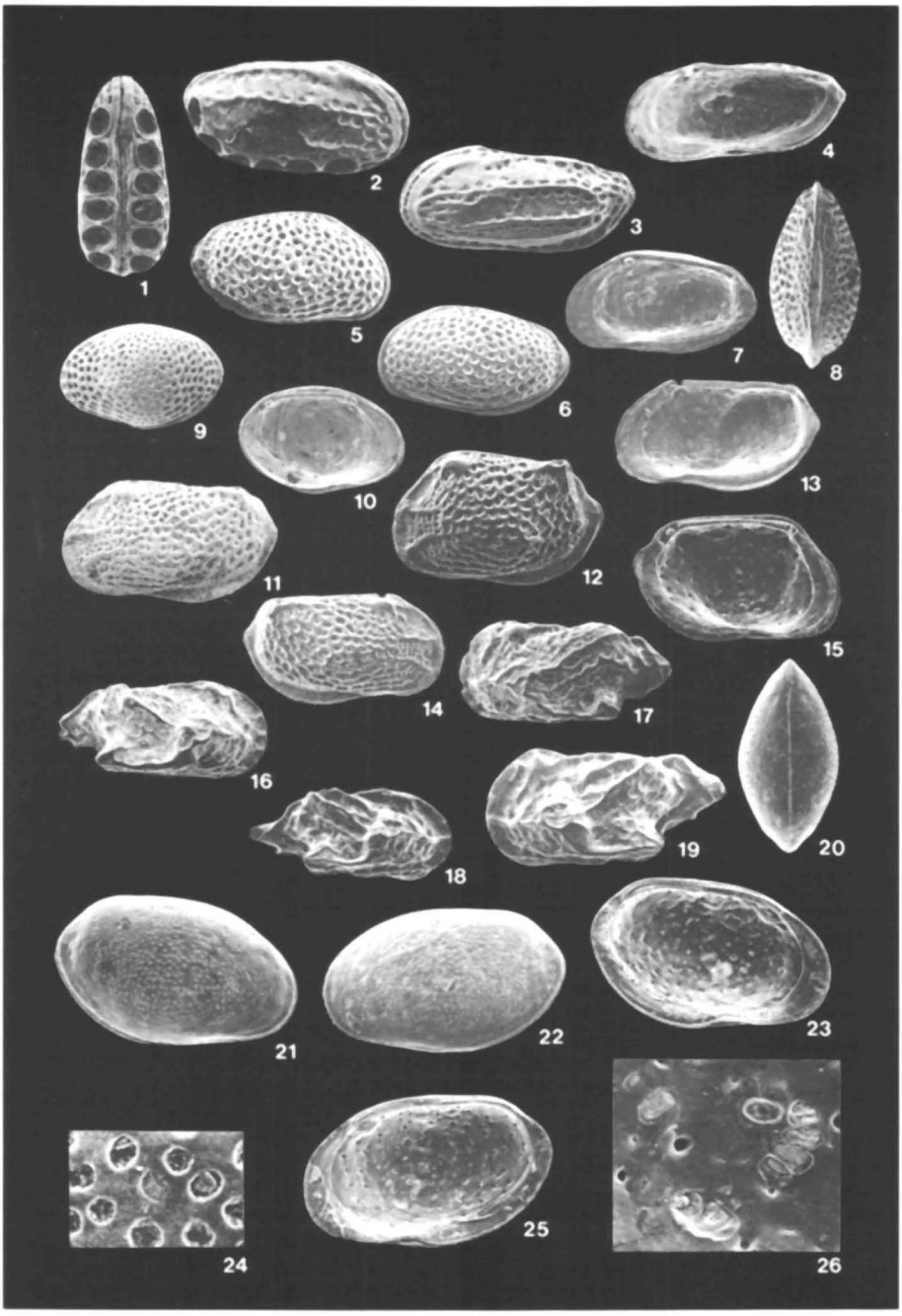
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PLATE 9

Pseudoconcha omatsolai gen. et sp. nov.
fig. 1. dorsal view of carapace, Joal, 65×;
fig. 2. internal view of male left valve, Joal, 65×;
fig. 3. right view of male carapace, Joal, 70×;
fig. 4. muscle scar arrangement, male right valve, Joal, 344×;
fig. 5. left view of male carapace, Joal, 65×;
fig. 6. internal view of female right valve, Joal, 65×;
fig. 7. internal view of male right valve, Joal, 65×.

Semicytherura duracina sp. nov.
fig. 8. detail of hinge, right valve of young female?, Bakau, 152×;
fig. 9. dorsal view, male? carapace, 88×;
fig. 10. right view, same carapace, Bakau, 74×;
fig. 11. left view, young female? carapace, 88×;
fig. 12. dorsal view of same carapace, Bakau, 88×;
fig. 13. internal view left valve, young female?, Bakau, 74×;
fig. 14. internal view male? right valve, Bakau, 74×;
fig. 15. dorsal view, young male? carapace, 88×;
fig. 16. left view of same carapace, Bakau, 88×;
fig. 17. dorsal view, young female? carapace, Bakau, 88×;
fig. 18. right view, same carapace, Bakau, 74×;
fig. 19. detail anterior margin, showing 'marginal notches', young female? right valve, Bakau, 280×;
fig. 20. detail anterior margin, showing 'marginal notches', male? left valve, Bakau, 280×.

Semicytherura sp. A.
fig. 21. dorsal view of male carapace, 88×;
fig. 22. right view of same carapace, Bakau, 73×;
fig. 23. right view of female carapace, 73×;
fig. 24. dorsal view of same carapace, Bakau, 88×.

Kangarina abyssicola G.W. Müller, 1894
fig. 25. dorsal view, Fajara, 81×;
fig. 26. left view of carapace, Fajara, 81×.

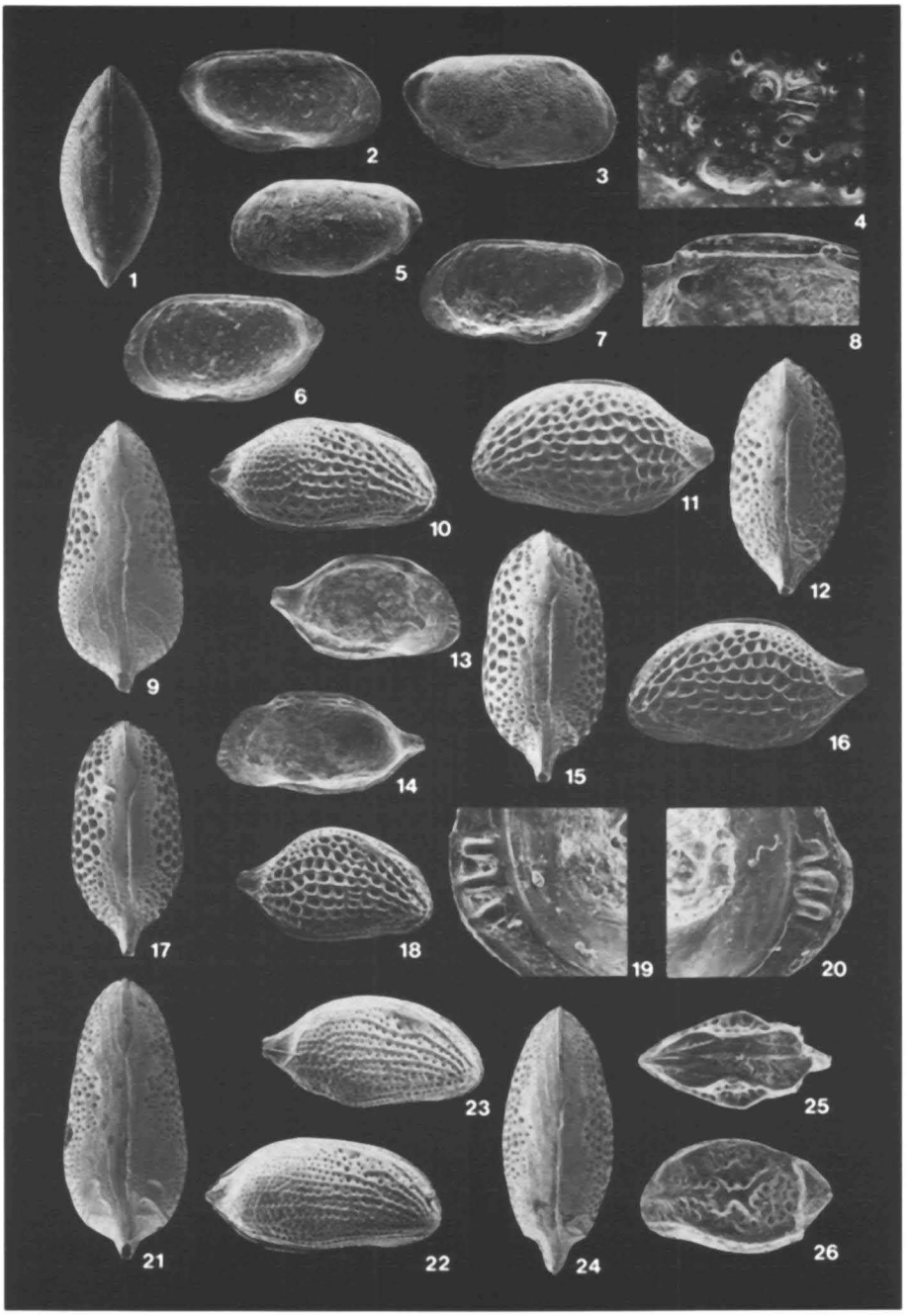
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PLATE 10

Hemicytherura cellulosa (Norman, 1865)
fig. 1. dorsal view of female carapace, Fajara, 96×;
fig. 2. right view of female carapace, Fajara, 99×;
fig. 3. left view of male carapace, Fajara, 96×.

Gibboborchella kuznetsovae (Omatsola, 1972)
fig. 4. internal view of female left valve, Bakau, 43×;
fig. 5. internal view of male right valve, Bakau, 43×;
fig. 6. right female valve, Bakau, 47×;
fig. 7. left male valve, Bakau, 46×;
fig. 8. dorsal view of male valve, Bakau, 47×;
fig. 9. dorsal view of female valve, Bakau, 47×.

Hemicytherura sp. A.
fig. 10. right view of carapace, Fajara, 96×.

Perissocytheridea (Kroemmelbeinella) perfidiosa sp. nov.
fig. 11. detail of hinge, female right valve, Bakau, 137×;
fig. 12. female right valve, Bakau, 70×;
fig. 13. detail of ornamentation, Bakau, 226×;
fig. 14. female left valve, Bakau, 46×;
fig. 15. male left valve, Bakau, 46×;
fig. 16. internal view of female left valve, Bakau; 70×;
fig. 17. internal view of male right valve, Bakau. 72×;
fig. 18. internal view of female right valve, Bakau, 70×;
fig. 19. male right valve, Bakau, 46×.

Perissocytheridea (Kroemmelbeinella) libidinosa (Witte, 1986)
fig. 20. female left valve, St. Louis, 36×;
fig. 21. internal view of female left valve, St. Louis, 48×;
fig. 22. male left valve, St. Louis, 36×.

Perissocytheridea (Kroemmelbeinella) ebutemettaense (Omatsola, 1970)
fig. 23. internal view of female left valve, Joal, 55×;
fig. 24. female left valve, Joal, 55×.

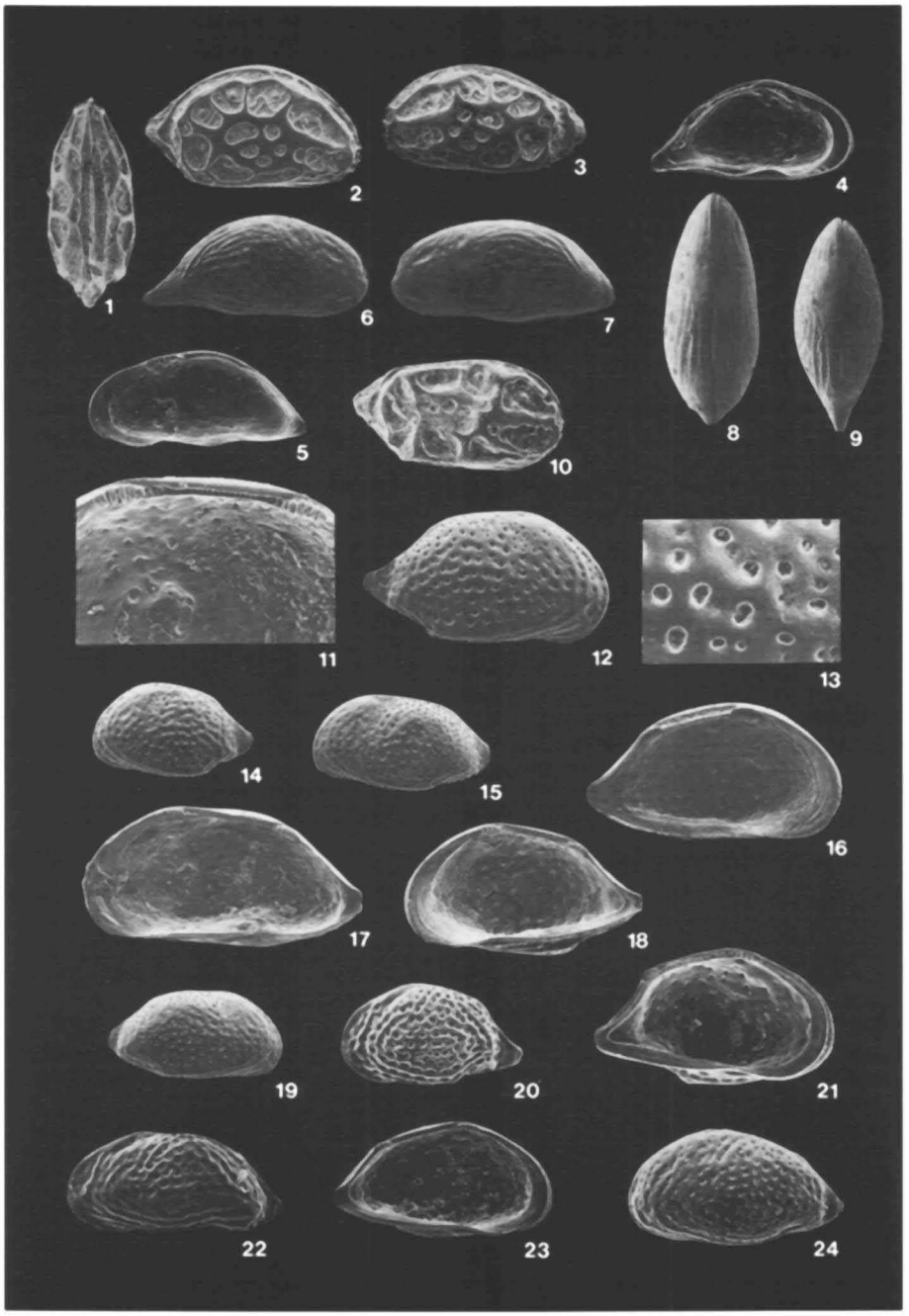
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PLATE 11

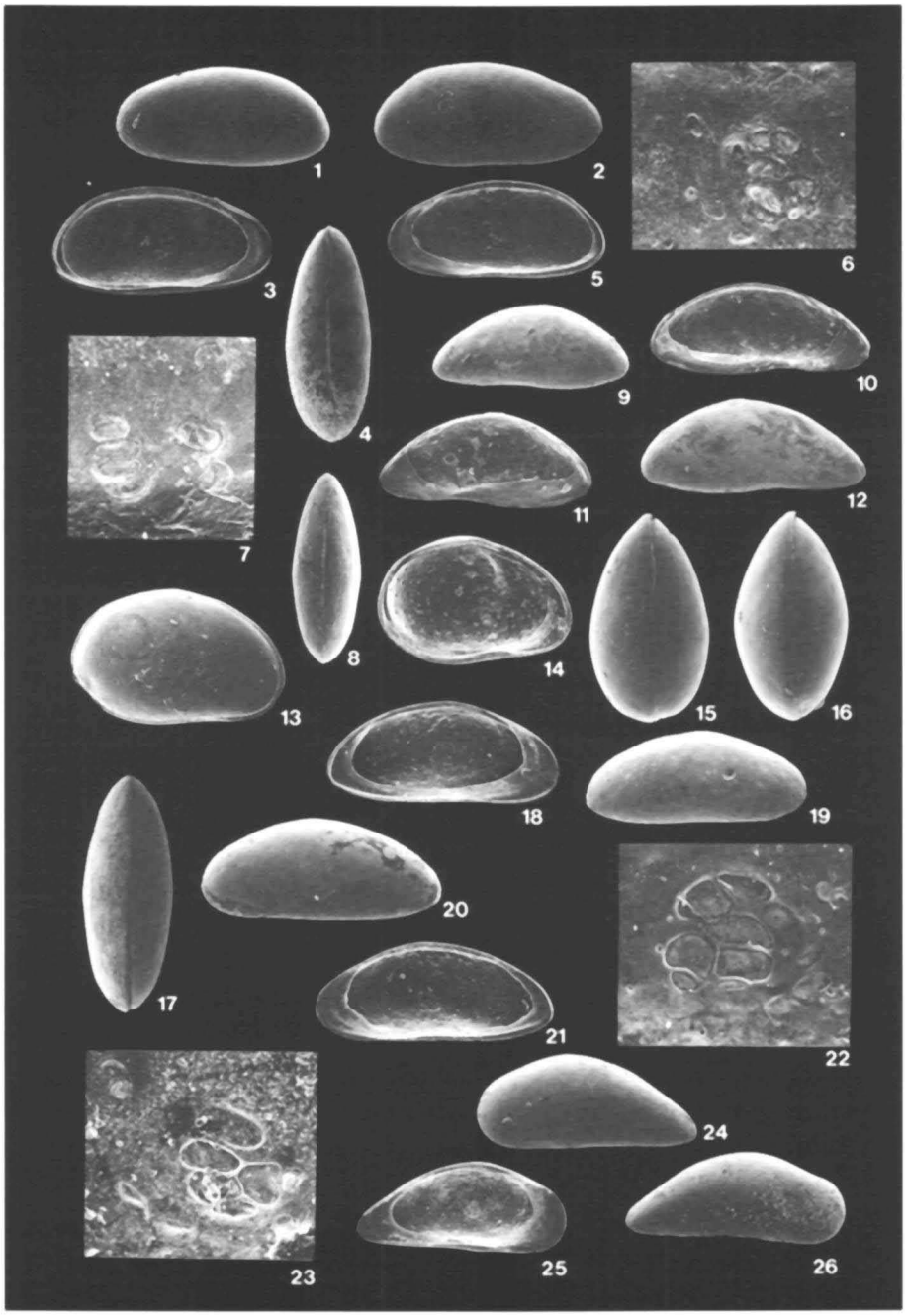
?*Aglaiocypris gambiensis* sp. nov.
fig. 1. left valve, Bakau, 30×;
fig. 2. right valve, Fajara, 30×;
fig. 3. internal view of left valve, Fajara, 30×;
fig. 4. dorsal view of carapace, Bakau, 30×;
fig. 5. internal view of right valve, Bakau, 30×;
fig. 6. muscle scars, right valve, Bakau, 196×.

Cytherois sp. A.
fig. 7. muscle scars, left valve, Joal, 222×;
fig. 8. dorsal view of carapace, Joal, 45×;
fig. 9. right view of carapace, Joal, 45×;
fig. 10. internal view of left valve, Joal, 45×;
fig. 11. internal view of right valve, Joal, 45×;
fig. 12. right valve, Joal, 47×.

Xestoleberis cf. *communis* G.W. Müller, 1894.
fig. 13. right view of carapace, Joal, 54×;
fig. 14. internal view of left valve, Joal, 58×;
fig. 15. dorsal view of female crapace, Joal, 64×;
fig. 16. dorsal view of male carapace, Joal, 64×.

Aglaiella sanctamariae sp. nov.
fig. 17. dorsal view of carapace, Bakau, 41×;
fig. 18. internal view of right valve, Fajara, 39×;
fig. 19. right valve, Bakau, 39×;
fig. 20. left valve, Bakau, 39×;
fig. 21. internal view of right valve, Bakau, 40×;
fig. 22. central muscle scars, right valve, Fajara, 118×.

Paracypris sp. A.
fig. 23. central muscle scars, right valve, Joal, 96×;
fig. 24. left valve, Joal, 34×;
fig. 25. internal view of left valve, Joal, 33×;
fig. 26. right valve, Joal, 34×.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Appendix. Distribution of ostracod species over the sampling sites. The oblique stroke divides the number of carapaces (left) and valves retrieved from 200 grams wet sediment.

species	St.Louis	Joal	Bakau	Fajara	Cp.Skirring
Cytherella eburnea sp. nov.	-/-	-/7	69/160	21/51	5/6
Cytherella joalensis sp. nov.	-/-	6/10	-/3	-/1	-/-
Cytherella ponderosa sp. nov.	-/-	2/-	-/-	-/-	-/-
Paranesidea multiforma sp. nov.	-/-	-/7	4/7	-/2	-/3
Paranesidea sp. A	-/-	-/-	1/7	-/-	-/4
Paranesidea sp. B	-/-	1/1	-/5	-/1	-/-
Triebelina intermedia sp. nov.	-/-	15/28	-/3	-/1	-/-
Neomonoceratina ikoroduensis Omatsola, 1970	-/-	-/-	102/27	6/-	1/-
Neomonoceratina iddoensis Omatsola, 1970	1/7	1/7	-/-	-/1	-/-
Kotoracythere inconspicua (Brady, 1880)	-/-	4/-	1/-	-/2	-/-
Keijia demissa (Brady, 1868)	-/-	10/1	1/-	1/-	-/-
Leptocythere culpata sp. nov.	-/-	70/-	4/-	-/-	-/-
Callistocythere littoralis (G.W. Müller, 1894)	-/-	18/1	-/-	-/-	-/-
Tanella gracilis Kingma, 1948	-/-	2/-	4/-	-/-	-/-
Cyprideis torosa (Jones, 1850)	-/6	7/31	-/-	-/-	-/-
Cyprideis nigeriensis Omatsola, 1972	-/7	8/20	-/-	-/-	-/-
Miocyprideis leybarensis Carbonnel, 1986	5/16	3/5	-/-	-/-	-/-
Perissocytheridea (K.) perfidiosa sp. nov.	-/-	-/-	-/4	-/-	-/-
Perissocytheridea (K.) ebutemettaense (Omatsola, 1970)	-/-	3/3	4/11	-/-	-/-
Perissocytheridea (K.) libidinosa (Witte, 1986)	3/48	-/6	-/-	-/-	-/-
Pontocythere sp. A	-/-	-/-	3/-	-/-	-/-
Copytus fusiformis (Yassini, 1979)	-/-	-/-	2/7	-/4	-/-
?*Cletocythereis* sp. aff. *C. bradyi* Holden, 1967	-/-	-/1	-/-	-/-	-/-
Grinioneis sp. aff. *Hermanites foveolatus* Omatsola, 1972	-/-	-/4	-/-	-/-	-/-
Chrysocythere foveostriata (Brady, 1870)	-/-	-/-	10/61	3/22	-/2
Neocaudites atlantica Cronin, 1979	-/-	18/6	8/-	3/-	-/-
Neocaudites lindersae sp. nov.	-/-	1/-	1/3	-/-	-/-
Falsocythere terryi (Holden, 1967)	-/-	-/-	6/-	2/-	-/-
Falsocythere simplex (Omatsola, 1972)	-/-	-/-	2/-	3/-	-/-
Loculicytheretta morkhoveni Witte, 1986	-/-	-/-	2/20	-/7	1/-
Ruggieria sp. A	-/-	1/-	-/-	-/-	-/-
Keijella sp. aff. *Ruggieria indoiranica* Jain, 1981	-/-	-/10	1/2	-/2	-/-
Mutilus falcatus sp. nov.	-/-	1/2	-/-	-/-	-/-
Aurila voraginosa sp. nov.	-/-	6/14	11/11	2/2	-/1
Caudites africanus Omatsola, 1972	-/-	6/8	5/1	6/-	-/-
Campylocythereis sp. A	-/-	-/-	1/6	-/-	-/-
Reymentia microdictyota Omatsola, 1970	-/-	-/-	10/2	-/-	-/-
Basslerites elongatus Omatsola, 1972	-/-	1/-	-/-	-/-	-/-
Loxoconcha lacunensis Omatsola, 1970	-/-	-/-	33/-	3/-	-/-
Loxoconcha sp. aff. *L. tumida* Brady, 1869	-/-	-/-	1/-	-/-	-/-
Loxocorniculum visendum sp. nov.	-/-	-/-	-/5	-/1	-/-
Paracytheromorpha sp. A	-/-	1/1	-/-	-/-	-/-
Gambiella caelata Witte, 1985	-/-	-/-	3/6	-/-	-/-
Pseudoconcha bucculenta sp. nov.	1/13	17/21	-/-	-/-	-/-
Pseudoconcha omatsolai sp. nov.	-/-	8/2	-/-	-/-	-/-
Paracytheridea tschoppi van den Bold, 1946	-/-	-/-	-/11	-/-	-/-
Paracytheridea sp. A	-/-	-/2	-/-	-/1	-/-
Paracytheridea sp. B	-/-	-/1	-/-	-/-	-/-

Appendix. (Continued).

species	St.Louis	Joal	Bakau	Fajara	Cp.Skirring
Semicytherura duracina sp. nov.	-/-	3/-	9/-	2/-	-/-
Semicytherura sp. A	-/-	-/-	4/-	-/-	-/-
Gibboborchella kuznetsovae (Omatsola, 1969)	-/-	9/10	11/22	4/8	-/1
Kangarina abyssicola (G.W. Müller, 1894)	-/-	-/-	2/1	-/1	-/1
Hemicytherura cellulosa (Norman, 1865)	-/-	5/3	13/2	18/-	-/-
Hemicytherura sp. A	-/-	-/-	-/-	1/-	-/-
Xestoleberis cf. *communis* G.W. Müller, 1894	-/-	21/15	9/41	1/2	-/-
Cytherois sp. A	-/-	6/5	-/-	-/-	-/-
?*Aglaiocypris gambiensis* sp. nov.	-/-	3/13	3/151	1/145	-/7
Aglaiella sanctamariae sp. nov.	-/-	-/8	2/55	-/27	-/-
Paracypris sp. A	-/-	1/-	-/3	-/-	-/-

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