We believe it is desirable to standardise the terms used here as much as possible with other groups. Since the International Code does not deal with names of higher rank than superfamily, guidance must be sought elsewhere. Blackwelder (1967: 435–6) suggests a basic heirarchy of taxa which impresses us as a successful distillation of past and current usage, while pointing out that there is no theoretical limit to the number of levels within the higher-category name. His order of categories is, in relevant part:

Suborder [e.g. Quatuordecempedes]
Infraorder [e.g., Flabellifera]
Superfamily [e.g., Cirolanoidea]
Family [e.g., Sphaeromatidae]

We are not aware of 'infraorder' having been used in this section of the Crustacea before. However, it has a definite self-evident place in the hierarchy of higher categories, and is commonly used in work on the Mammalia as a level below suborder (Blackwelder 1967: 220), whereas the term "section", although often used in the Crustacea, has not been given a universally accepted ranking. The International Code refers to "section" only in passing in an article (42d) on subdivision of genera. The only other reference we have found is in Mayr *et al.* (1953:36): "Terms like *section, series* and *division* are sometimes used for groups of higher categories. Their use is, however, not standardised, and they are sometimes used above and sometimes below the family, the order, the class. They are essentially still neutral terms, corresponding to the term *group*."

'Section' is more euphonious, and for that reason and its previous use in Crustacea is more acceptable to us than 'infraorder', but we feel there is much more to be gained from uniformity than from euphony and nostalgia. At the next level, the superfamily, the present endings can be retained without violence. "Names of superfamilies are not directly regulated as to the form of ending. For many years entomologists have standardised this ending as *-oidea* and have urged adoption of this form in the Code. In the 1961 Code there is no ruling, but it is recommended that *-oidea* be adopted for superfamily endings" (Blackwelder 1967:223). Most of the isopod groupings formerly accepted as subtribes and here designated superfamilies already end with *-oidea*.

INFRAORDER FLABELLIFERA

Pereon of seven somites; pleon of six, including pleotelson, which bears uropods. Five pairs of pleopods, seven pairs of pereopods. Mouthparts normal. Mandibles have well-developed molar processes, lacinia mobilis (left) setae row, and 3-segmented palp. Maxilla 1 has three plates, maxilla 2 has two. Maxilliped has epipod and palp with five segments. Eyes dorsal when present. Uropods lateral, flattened, not folding under pleon to cover pleopods.

Exceptions: no uropods in *Anuropus*; molar process absent in *Limnoria*; maxillae plates reduced or absent and number of maxilliped palp segments reduced in Cymothoidae. Sphaeromatidae have less than six free pleonites. Serolidae have less than 7 pereonites, but retain 7 pereopods and 5 pleopods. Uropods not flattened in *Limnoria* and many Sphaeromatidae.

(Derived from Menzies 1962a: 103–5)

KEY TO SUPERFAMILIES OF FLABELLIFERA

Pereon first somite fused medially to cephalon; 7th somite, when present, not reaching lateral contour of body; pleopods 1–3 smaller than 4 and 5, which are operculiform ..... SEROLOIDEA

Pereon has seven distinct separated somites, the first not fused with cephalon; pleopods generally similar, no one pair especially operculiform ..... CIROLANOIDEA

SUPERFAMILY CIROLANOIDEA

Menzies, 1962a: 112.

This group includes the more-or-less typical marine isopods. Pereon has seven distinctly separated somites, the first not fused with head. Pleopods generally similar; except occasionally for first pair, none are operculiform or larger than preceding pairs. Body somites individually wider than long. Uropods, when present, not arching over pleotelson.

KEY TO NEW ZEALAND FAMILIES OF SUPERFAMILY CIROLANOIDEA

1. Body flat and thin, oval and disc-like; peduncle articles of both antennae expanded into flattened plates to form, with coxal plates and uropod rami, a continuous ring of outer plates around body ..... PLAKARTHRIIDAE

   Body and antennae not as above 2

2. Pleon of five segments, uropods absent. Brackish or fresh water ..... Genus PARAVIREIA (*see* p. 26)

   Pleon usually of two or six segments, uropods present 3

3. Pleon of two segments ..... SPHAEROMATIDAE

   Pleon usually of six segments, including pleotelson 4

4. Uropod outer ramus rudimentary, more-or-less claw-like. Boring in wood or algae ..... LIMNORIIDAE

   Uropod with both rami well developed, usually flattened, fan-like 5

5. Maxilliped palp free, margins of last two segments more-or-less setose, never armed with hooks. ..... CIROLANIDAE

   Maxilliped palp embracing the cone formed by the mouthparts; apex armed with hooks, never setose 6

6. Body symmetrical; both antennae with well-defined peduncles and flagellae, pleopods setose; uropod rami large, more-or-less leaf-like ..... AEGIDAE

   Body often distorted; both antennae reduced, without clear distinction between peduncle and flagellum; pleopods not setose; uropod rami long or short but always narrow ..... CYMOTHOIDAE

FAMILY SPHAEROMATIDAE

Sphaeromidae Hansen, 1905: 69–135, pl. 7. Menzies, 1962a: 128–9.

TYPE-GENUS: *Sphaeroma* Latreille, 1802.

DIAGNOSIS

Cirolanoidea with pleon of two distinct free somites including telson; pleonite 1 has suture lines indicating fusion of other somites. Molar process well developed, lacinia mobilis present. Maxilliped palp of five segments. Uropod peduncle united firmly to inner ramus; outer ramus present or absent. Young of most species incubated in invaginated pouches of ventral body wall of female.

(After Menzies 1962a: 128)

REMARKS

The family Sphaeromidae [*sic*] as discussed by Hansen (1905) comprised the subfamilies Plakarthriinae, Limnoriinae, and Sphaerominae, which have since been raised to family rank (Hurley 1961: 269). The classification used in the present work is based on that established for the subfamily Sphaerominae by Hansen, who grouped the genera on the basis of the different forms and combinations of the rami of pleopods 4 and 5 into the Groups Platybranchiatae, Hemibranchiatae, and Eubranchiatae. Since the subfamily Sphaerominae and the family Sphaeromatidae are now identical through removal of the other subfamilies, there is no reason why the "Groups" should not be treated as subfamilies.

While Hansen's criteria–the pleating or otherwise of pleopods 4 and 5–basically separate most genera into one or other of the subfamilies, there are some borderline instances where the character of the pleopods is not clear-cut. Probably to assist in separation of such genera, Hale (1929) introduced into his key a subsidiary character, the presence or absence of segmentation of pleopods 4 and 5. In this he was followed by Hurley (1961). The Hemibranchiatae and Eubranchiatae with "the outer branch of at least the fifth pleopods two-jointed" were distinguished from the Platybranchiatae with "the outer branch of both pairs unjointed".

Because we found discrepancies between our generic and subfamily diagnoses in the segmentation of these pleopods, we have investigated more thoroughly the degree of segmentation in pleopods 3, 4, and 5 in the New Zealand species of Sphaeromatidae available to us (Table 1).

It is clear from this table that, for the New Zealand species, the situation is not quite as Hale's key suggests, but that there are possibilities for other guidelines; these we have incorporated in our key as a secondary element. Nevertheless there are exceptions, and it is clear that these characters cannot be relied on in isolation.

TABLE 1—Segmentation of the outer ramus of pleopods 3–5 in New Zealand Sphaeromatidae (S, segmented; P, partially segmented; U, unsegmented; ?, status unknown)

Species	Pleopod		
	3	4	5
EUBRANCHIATINAE			
Amphoroidea falcifer	U	U	P(¼)
Amphoroidea longipes	U	U	P(½)
Amphoroidea media	U	U	P(½)
Cymodocella capra	U	U	S
Cymodocella egregia	U	U	P(¼)[1]
Cymodocella tubicauda[2]	U	U	P(½)
Dynamenella condita	U	U	S
Dynamenella cordiforaminalis	U	U	S
Dynamenella hirsuta	U	U	S
Dynamenella huttoni	U	U	S
Dynamenella insulsa	U	U	S
Dynamenella mortenseni	U	P(¼)	S
Dynamenoides decima	U	U	U
Dynamenoides vulcanata	U	U	P(¼)
Dynamenopsis varicolor	S	U	P(½)
Scutuloidea maculata	S	U	S
Cassidinopsis admirabilis[3]	U	S	U
Cassidinopsis emarginata	S	S	P(¼)[1]
HEMIBRANCHIATINAE			
Cymodocini			
Cilicaea angustispinata	S	S	S
Cilicaea caniculata	S	S	S
Cilicaea dolorosa	S	S	S
Cilicaea tasmanensis	S	S	S
Cymodoce allegra	S	S	S
Cymodoce australis	S	S	S
Cymodoce convexa	?	?	?
Cymodoce granulata	?	?	?
Cymodoce hodgsoni	S	S	S
Cymodoce iocosa	S	S	S
Cymodoce penserosa	S	S	S
Cymodoce perversa	S	S	S
Cymodopsis impudica	S	S	S
Cymodopsis montis	S	S	S
Cymodopsis sphyracephalata[4]	S	S	P(¼)
Cymodopsis torminosa	S	S	S
Sphaeromini			
Exosphaeroma chilensis[5]	S	S	P(½)
Exosphaeroma echinensis	S	S	S
Exosphaeroma falcatum	?	?	?
Exosphaeroma gigas	S	S	S
Exosphaeroma obtusum	S	S	S
Exosphaeroma planulum	S	S	S
Isocladus armatus	S	S	S
Isocladus calcareus	S	S	S
Isocladus dulciculus	S	S	S
Isocladus inaccuratus	S	S	S
Isocladus reconditus	S	S	S
Isocladus spiculatus	S	S	S
Pseudosphaeroma callidum[6]	S	P(¼)	S
Pseudosphaeroma campbellensis[7]	S	S	S
Sphaeroma laurensi	U	S	S
Sphaeroma quoyanum	U	S	S
PLATYBRANCHIATINAE			
Cassidina typa[8]	U	U	P(2 × ¼)

NOTES TO TABLE 1

[1]It is difficult to distinguish pleating from segmentation—this is a best guess. Although *Cassidinopsis emarginata* is not a New Zealand species, material has been examined; it is included in this table because of its nonconformity.

[2]The only eubranchiatine species in which both rami of pleopods 4 and 5 are not undeniably pleated. The rami are distinctly thickened, but the pleating is obscure.

[3]This is an anomalous combination, but has been double-checked.

[4]The segmentation of pleopod 4 is faint, that of pleopod 5 extends only ¼ across.

[5]The segmentation is almost complete, but disappears near the thickened knobs.

[6]There is pleating on the inner ramus, whereas the outer is scarcely pleated but distinctly thickened.

[7]There is a slight pleating on the outer ramus as well as the inner in both pleopods 4 and 5.

[8]There is a slight segmentation beginning from each margin (not from one only, as in most instances of partial segmentation), but this still leaves about ¼ unsegmented.

The outer ramus of pleopod 3 is two-segmented in the New Zealand Hemibranchiatinae (except *Sphaeroma laurensi** and *S. quoyanum**), but unsegmented in *Cassidina typa*, the only platybranchiatine, and generally unsegmented in the Eubranchiatinae.

Pleopod 4 outer ramus is segmented in New Zealand Hemibranchiatae (except *Pseudosphaeroma campbellensis*, in which it is partially segmented), but completely unsegmented in Eubranchiatinae (except *Cassidinopsis admirabilis*) and Platybranchiatinae.

Pleopod 5, however, varies from partially to completely segmented in all three subfamilies, to a degree which makes it useless for separation except possibly for Platybranchiatinae, in which its partial segmentation on *both* margins may be significant.

Key to subfamilies of Sphaeromatidae (with special reference to New Zealand species)

1. Pleopods 4 and 5, one or both rami of each with deep transverse pleats or wrinkles; pleopods 3 and 4, outer rami may be two-segmented; pleopod 5, outer rami invariably partially or completely two-segmented 2

   Pleopods 4 and 5, both rami of each without transverse pleats or wrinkles; pleopods 3 and 4, outer rami unsegmented; pleopod 5, outer rami with only rudimentary segmentation ..... Platybranchiatinae

2. Pleopods 4 and 5, inner ramus of each has transverse pleats or wrinkles, outer ramus of each is thin and membranous; pleopods 3–5, outer rami segmented, with few exceptions ..... Hemibranchiatinae

   Pleopods 4 and 5, both rami with transverse pleats or wrinkles (except *Cymodocella tubicauda*); pleopods 3 and 4, outer rami usually unsegmented; pleopod 5, outer rami usually partly or completely segmented ..... Eubranchiatinae

A number of genera (Monod 1931a: 67 *et seq.*) do not fit precisely into the groups established by Hansen (1905). *Pseudosphaeroma* Chilton, the only New Zealand genus in this category, has the outer rami of pleopods 4 and 5 transversely folded, but the whole inner part of the inner ramus of pleopod 4 and the proximal part of the inner part of pleopod 5, though thicker and fleshier than the remainder, are not folded. Originally placed in the Eubranchiatae by Chilton (1909: 653–4), *Pseudosphaeroma* was transferred to the Hemibranchiatae by Monod (1931a: 74), the arrangement followed here.

Paravireia Chilton (1925) has hitherto been regarded as belonging to the Sphaeromatidae. The type species of the genus, *Paravireia typica* Chilton, has been found only in a freshwater stream in the Chatham Islands. Morphologically it resembles terrestrial rather than free-living marine forms, particularly in the maxillipeds. More recently a second species, *P. pistus*, has been described from shallow water in Deep Bay, Stewart Island (Jansen 1973). Since the Sphaeromatidae are properly diagnosed by the characteristic pleon with only two free, separate segments, *Paravireia* cannot be included, and is omitted from this memoir. The apparent absence of uropods in *Paravireia* supports this separation. Limnoriidae and Plakarthriidae, at one time subfamilies of the Sphaeromatidae (Hansen 1905, Richardson 1913) have already been excluded (Hurley 1961).

Because in this work we break down a number of the commoner "species" or species complexes into several species (e.g., *Isocladus*), we have preferred not to integrate into the synonymy all of the references in Morton & Miller (1968). In a great deal of valuable ecological information, which we have freely drawn on, Morton & Miller (1968) list four species which do not appear in our material and should be looked for: *Cymodopsis* sp. (their fig. 71.8), *Cymodoce bidentata* (fig. 71.9), *Cilicaea curtispina* (fig. 71.6), and *Chitonopsis* sp. (fig. 149).

The figure illustrating *Cymodopsis* sp. in Morton & Miller appears to be taken from a drawing of *Cymodopsis crassa* Baker given in Hale (1929, fig. 279), and may not relate to the particular species found in Auckland. Our own material includes only one intertidal *Cymodopsis*, *C. montis* n.sp., which is not sufficiently like *C. crassa* to have been confused with it.

The figure given for *Cymodoce bidentata* may also be re-drawn from Hale (1929, fig. 283). *Cilicaea curtispina* of Morton & Miller may be based on Hale's figure (1929, fig. 280), although the proportions of the median spine are slightly different. These three illustrations appear to have been chosen to illustrate types of isopods found in New Zealand, not necessarily the actual species in hand, and we think the names are best omitted from the New Zealand fauna until specimens can be seen.

Chitonopsis sp., however, as figured by Morton & Miller (1968, fig. 149), is certainly distinct from the Australian species illustrated by Hale (1929, fig. 306), and deserves further attention when material comes to hand. (We understand the original material is no longer available). The authors appear to be quite correct in regarding as new to science this species which they describe so delightfully as "creeping about with its short walking legs like a minute clockwork mouse".

Subfamily Eubranchiatinae

Group Sphaerominae eubranchiatae Hansen, 1905: 101, 105–9.

Diagnosis

Pleopods 4 and 5, both rami subsimilar with deep, essentially transverse folds, often fleshy, without plumose marginal setae; pleopod 5, outer ramus generally distinctly or partially 2-segmented, subapical squamiferous protuberance very high; pleopod 3, both rami closely set with long, plumose setae, at least on distal margin; pleopod 1, inner ramus at least rather broad, scarcely ever half as long again as broad. (Pleotelson at least emarginate, generally with notch or slit terminating in foramen.)

*Monod (1931a: 16) found that pleopod 3 in a number of species of *Sphaeroma* was unsegmented, and concluded that in *Exosphaeroma* segmentation was complete to the extent of marginal indentations on both margins, whereas *Sphaeroma* "never possess complete articulation attaining and modifying the inner margin".

REMARKS

The New Zealand genera fall into two groups, those with pleopod 3 outer ramus unsegmented (*Amphoroidea, Cymodocella, Dynamenella,* and *Dynamenoides*), and those with the outer ramus of two segments (*Dynamenopsis* and *Scutuloidea*). *Cassidinopsis* is slightly anomalous: the type species is segmented but the New Zealand species appear to lack segmentation. Both species are, however, alike in being the only ones of all those examined in which pleopod 4 outer ramus was clearly 2-segmented.

KEY TO NEW ZEALAND AND SUBANTARCTIC GENERA OF SUBFAMILY EUBRANCHIATINAE

1. Antenna I, segment 1 expanded, protruding in front of head as large, free plate ..... AMPHOROIDEA

   Antenna I, segment 1 normal, not expanded in front of head as large, free plate 2

2. Uropod a large, single, broad, oval plate ..... SCUTULOIDEA

   Uropod not a large, single, broad plate 3

3. Uropod rami equally developed 4

   Uropod rami not equally developed 5

4. Pleotelson sides folded down and around to form nearly closed tube; pereonite 6 coxal plate produced posteriorly, overlapping pereonite 7 ..... DYNAMENOPSIS

   Pleotelson sides not forming tube, pleotelson has apical notch or foramen instead; pereonite 6 coxal plate not produced posteriorly to overlap pereonite 7 ..... DYNAMENELLA

5. Pleotelson sides bent downwards and inwards to form tube; pleopod 3 unsegmented ..... CYMODOCELLA

   Pleotelson sides not bent to form tube 6

6. Pleotelson has transverse foramen connected with posterior margin by narrow slit; pleopods 3 and 4 unsegmented ..... DYNAMENOIDES

   Pleotelson feebly emarginate, no slit; pleopod 3 may be segmented, pleopod 4 definitely segmented ..... CASSIDINOPSIS

Amphoroidea Milne Edwards, 1840

Amphoroidea Milne Edwards, 1840: 222–3. Hansen, 1905: 108, 126. Menzies, 1962a: 140.

TYPE-SPECIES: *Amphoroidea typa* Milne Edwards, 1840.

DIAGNOSIS

Eubranchiate Sphaeromatidae with pleopod 3 outer ramus unsegmented. Pleopods 4 and 5, rami unsegmented. Antenna I expanded into exceedingly large, horizontal plate in front of head. Body smooth, flattened, without processes. Mature males with well developed appendix masculina on pleopod 2 inner ramus. Female mouthparts not metamorphosed. Broodplates overlapping in midline. Males and females similar.

KEY TO NEW ZEALAND AND SUBANTARCTIC SPECIES OF AMPHOROIDEA

1. Antenna I, anterior margin of first segment parallel to transverse axis of body; uropod rami subequal in length ..... FALCIFER

   Antenna I, anterior margin of first segment slanted posterolaterally; uropod outer ramus longer than inner 2

2. Antenna I, expanded segment has rounded angles, length and basal width subequal; uropod outer ramus about twice as long as inner ..... LONGIPES

   Antenna I, expanded segment has sharp angles, not as long as basal width; uropod outer ramus about half as long again as inner ..... MEDIA

Amphoroidea falcifer Thomson, 1879 (Fig. 16A–C)

Amphoroidea falcifer Thomson, 1879: 233–4, pl. 10, fig. A5. Filhol, 1885: 456. pl. 50, fig. 7. Thomson & Chilton, 1886: 153. Hurley, 1961: 271.
Amphoroidea falcifera. Nierstrasz, 1931: 214.

DIAGNOSIS

Amphoroidea with anterior margin of expanded first segment of antenna I parallel to transverse axis of body. Uropod rami of equal length, not produced past end of pleotelson. Pleotelson apex slightly produced with shallow, semicircular notch. Prominent longitudinal ridge formed where pereon tergites and coxal plates fuse. Coxal plates vertical.

TYPE LOCALITY: Kaikoura Harbour and Stewart Island.

MATERIAL EXAMINED

Whangaroa Harbour: [45] 1 juv. (15 mm), 2♀♀ (17–18 mm), 2♂♂ (17–19 mm).
Cuvier Is: [137] spp.
Kaikoura: [87] 1 juv. (2 mm), 2♀♀ (10–20 mm); [85] 1 sp.
Solander I: [40] 1♂ (13 mm).
Snares Is: [63] 1 juv. (12 mm), 1♂ (16 mm).
Antipodes Is: [33] 1 juv. (13 mm).
Auckland Is: [51, 52, 54, 56, 57] 2 juvs (8–10 mm), 2♀♀ (18–19 mm), 4♂♂ (18–21 mm); [15] 1♀ (18 mm). *Also*: [15] 4 spp.; [4] 1 sp.
Chatham Is Exped: [CIE 12, 25, 47, 48] 16 juvs (6–14 mm), 1♀ (19 mm), 1♂ (15 mm).
OTHER RECORDS: Lyttelton, Taylor's Mistake, Quail I., Godley Head (Chilton Coll.); Otago, Longbeach, Oamaru; Auckland I. (coll. W. H. Dawbin, Cape Exped., 1943).
HABITAT: Under stones, in and among algal holdfasts.
DEPTH RANGE: Intertidal and shallow subtidal.
REMARKS: As remarked by Hansen (1905), this species is distinct from *A. typa* of Milne Edwards and *A. australiensis* of Dana.

Amphoroidea longipes n.sp. (Fig. 16G–I)

DIAGNOSIS

Amphoroidea with anterior margin of first segment of antenna I slanting posterolaterally, expanded segment with rounded angles, length and basal width subequal. Uropod outer ramus about twice as long as inner, produced past end of pleotelson. Pleotelson apex slightly produced, with shallow, semicircular notch. Coxal plates continuing curve of pereon tergites, not forming longitudinal ridge.

TYPE MATERIAL
Holotype: NZOI Type No. 146 [Z2304, ♂, 13 mm].
Paratypes: NZOI Type No. P203 [Z2034, 5 juvs, 2–8 mm; 4♀♀, 9–12 mm; 6♂♂, 10–13 mm].
TYPE LOCALITY: Kaikoura.
MATERIAL EXAMINED
Cape Maria van Diemen: [Cop. 3] spp.
Whangarei: [E953] 10 juvs (2–7 mm), 2♀♀ (9–10 mm), 2♂♂ (7–9 mm).
Auckland: [E956] 1 juv. (5 mm), 1♂ (8 mm).
Wellington: [Z2304] 5 juvs (2–8 mm), 4♀♀ (9–12 mm), 7♂♂ (10–13 mm); [31] spp.
Kaikoura: [98, 99] 2 juvs (8–14 mm), 24♀♀ (11–15 mm), 1♂ (10 mm).
Auckland Is: [54] 1 juv. (5 mm).
Chatham Is Exped: [CIE 12] 7 juvs (4–8 mm), 2♀♀ (11–12 mm), 2♂♂ (11–13 mm); [CIE 49] 1♂ (13 mm); [32] 1 sp.
OTHER RECORDS: None.
HABITAT: Algal fronds, exposed rocks.
DEPTH RANGE: Intertidal.

Amphoroidea media Hurley & Jansen, 1974 (Fig. 16D–F)

Amphoroidea media Hurley & Jansen, 1971: 473. Jansen, 1971: 268–9, 275.
[Not] *Amphoroidea falcifer* Thompson. Morton & Miller, 1968; 219, fig. 73.7. (?)Hicks, 1971: 52, 56.

DIAGNOSIS
Amphoroidea with anterior margin of first segment of antenna I slanting posterolaterally, expanded segment with sharp angles, not as long as basal width. Uropod outer ramus about half as long again as inner, produced past end of pleotelson. Pleotelson apex not produced, has shallow, semicircular notch. Coxal plates continue lateral curve of pereon tergites, do not form longitudinal ridge.

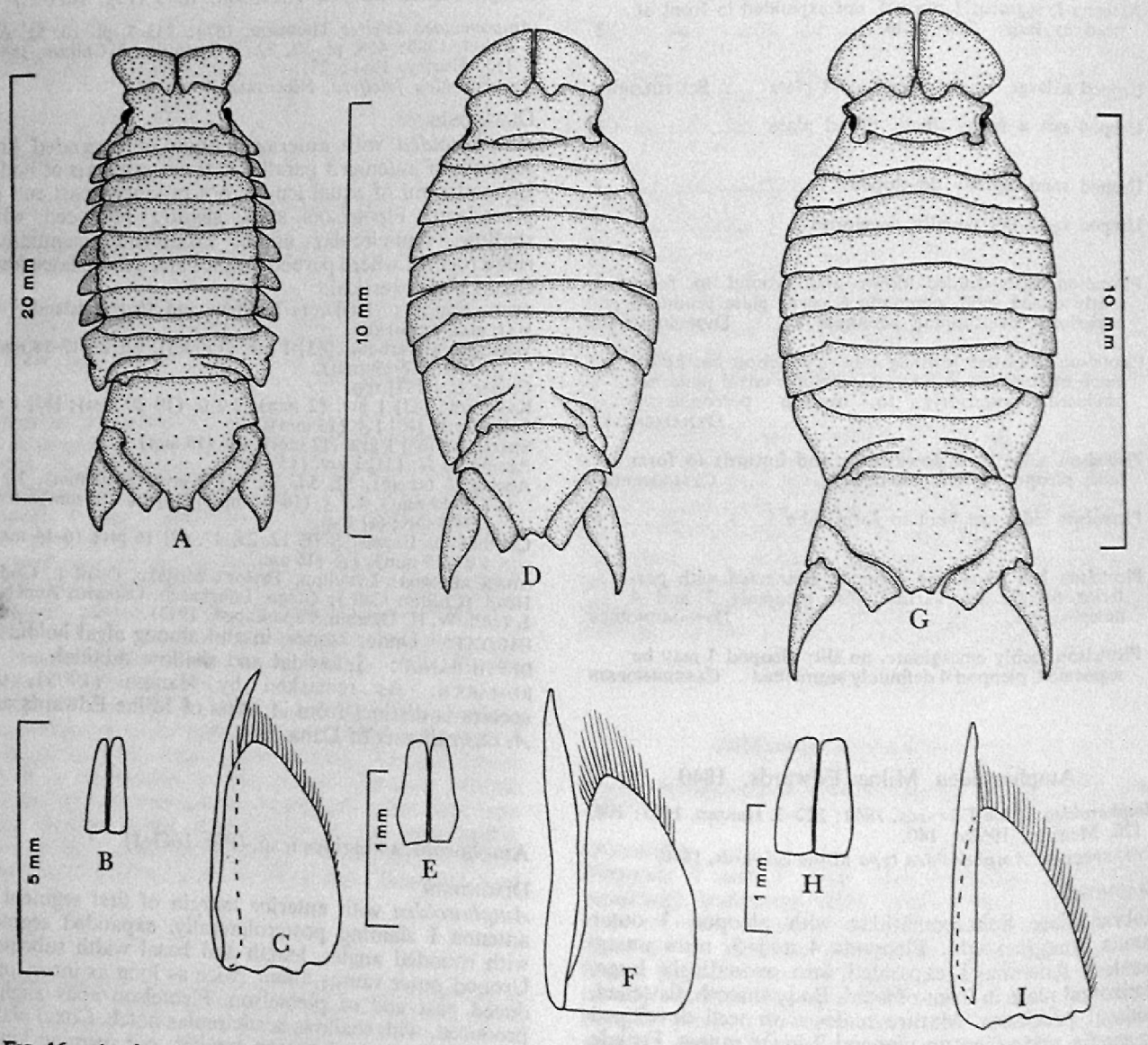

FIG. 16. *Amphoroidea* spp., mature ♂♂–whole animal, penes, and pleopod 2, inner ramus: A–C, *falcifer* Thomson; D–F, *media* Hurley & Jansen; G–I, *longipes* n.sp.