

TAXONOMIC FEATURES AND IDENTIFICATION OF
OXYCEPHALIDAE
(Platysceloidea, Physocephalata, Hyperiiidea, Amphipoda)

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INTRODUCTION

Oxycephalidae is a group of curious holoplanktonic crustaceans. They are common in the plankton of the offshore waters of the tropical and subtropical regions. Carcinologists have taken to this group only recently inspite of their abundance, probably because of the high variability of morphological features which make specific identification difficult.

Stebbing (1888) made the first attempt on a detailed study of this group. Subsequently Bovallius (1890) made a more detailed effort. Fage (1960), Pillai (1966a), Semanova (in Vinogradov *et al.*, 1982) and Nair and Jayalakshmy (1992) have made further contributions by adding to our knowledge on their biology, taxonomy and distribution.

This contribution endeavours to elucidate and combine available information together with detailed illustrations for easy identification of the species. Taxonomy of the family is discussed with notes on inter- and intra-specific variations. Geographical distribution, ecophenotypic variations and biology of the species involved are mentioned. A detailed bibliographic account on the family is also provided.

Terminology
(Pl.1-Fig.1a-1e)

In the description of the species, different authors have used slightly different terminology. In order to avoid confusion, an explanation of the terminology adopted in the present work is given below :

For the different divisions of the body Bowman and Gruner (1973) have employed the term, head, pereon, pleon and urosome. Here, the term cephalon instead of head and pleon is used for the post pereonic part of the body

(pleon+urosome of Bowman and Gruner). Bowman and Gruner have introduced the term double urosomite to designate the segment formed by the fusion of the fifth and sixth pleon segments. Author has adopted this term with the difference that this composite segment is called double pleon segment. Instead of pereonite, pleonite and urosomite, the terms pereon segment, pleon segment and urosome are used respectively. It has to be admitted that the terms suggested by Bowman and Gruner have the merit of brevity.

In the description of the appendages, the margin of the appendage which faces the cephalon is described as the outer-side and the opposite the inner. However, this applies only to the two pairs of antennae and the first two pairs of pereopods which are generally directed forwards. In the remaining three pairs of pereopods which are normally directed backwards, the side facing the cephalon is designated as inner and the opposite the outer. Bowman and Gruner have named the various segments of a pereopod as coxa, basis, ischium, merus, carpus, propus and dactyl. Instead of coxa the author has given coxal plate, propodus instead of propus and dactylus for dactyl, eventhough these are longer words.

The first two pereopods which correspond to the gnathopods of gammarideans, are generally converted into prehensile organs of different types. The terms introduced by Bowman and Gruner, namely chelate, sub-chelate and weakly chelate are appropriate and useful and are hence used in this present work also.

Instead of the term gills, here is used the term branchiae and for oostegites the term brood lamellae.

Sub order-Hyperiiidea Milne-Edwards, 1830

(Pl.1-Fig.1a&1b)

Body short and tumid, or very slender, with thin and pellucid integument. Cephalon and pereon generally tumid, pereon with 7 segments and rounded in cross-section or somewhat flattened dorsoventrally. Coxal plates (which are fixed to the lateral surface of the pereon segments) are small or wanting. Branchiae (gills) on pereon segments 2-6 or on 5-6. Median to the branchiae on mature females are the brood lamellae (oostegites), commonly on pereon segments 2-5. They are thin plates which overlap to form a pouch beneath the pereon where the eggs and young ones are brood. The compound eyes enormously developed or small as in Physosomata. Pleon powerfully developed, contains 3 segments. Urosome is 2 segmented where the last segment is formed with the fusion of urosome segments 2 and 3 and is termed the double pleon segment. Telson is never divided or incised distally. First antenna without a secondary flagellum.

Both antennae are reduced in females, especially antenna 2, which may be rudimentary or absent. Mouth parts are much reduced. Mandibles may or may not have 3 segmented palp. Maxilla 1 has an inner lobe in the Physosomata, but not in the Physocephalata. Maxilla 1 and 2 may be rudimentary or absent.

Infra order—Physocephalata Bowman & Gruner, 1973

Cephalon large, longer than first pleon segment, eyes large or moderately large, occupying most of cephalon surface (excluding rostrum in oxycephalidae). Maxilla 1 without inner lobe. Maxilliped with inner lobes completely fused. Pereopods 1 and 2 usually chelate or subchelate, legs commonly simple.

Super family—Platysceloidea Bate, 1862

(Pl.1 – Fig. 1c)

Antenna 1 inserted on the ventral surface of the cephalon, flagellum of male with large curved 1st segment and a few small distal segments inserted terminally or more commonly subterminally, on first segment; flagellum of female usually curved, composed of few segments. Antenna 2 inserted on ventral surface of cephalon; in male usually composed of 5 long segments (3 peduncular 2 flagellar) that fold on one another in zigzag fashion; in female short, composed of a few segments, or absent. Pereopod 5 never with large sub chela. Pereopod 7 reduced in size and sometimes in number of segments.

Family—Oxycephalidae Dana, 1852

Oxycephalids are holoplanktonic crustaceans of the order Amphipoda and are almost exclusively confined to the offshore waters.

The history of the family oxycephalidae began with the creation of the genus *Oxycephalus* by Milne-Edwards (1830) to describe *Oxycephalus piscatoris*. He placed this genus under "Hyperines anormales". Cocco in 1832 created the second genus *Orio* to describe *Orio ornithoramphus*. A facsimile of Cocco's illustration of *O. ornithoramphus*, the first of an oxycephalid ever published was reproduced by Stebbing (1888). Later *Orio* was made a synonym of *Oxycephalus* (Stebbing, 1888). In 1840, Milne-Edwards described *Oxycephalus piscator* by changing the name of *O. piscatorius* created by him. In the same year he described a new species *Oxycephalus armatus* which later turned to be the first species of the genus *Rhabdosoma* of Adams and White (1848).

Dana in 1853 proposed a new classification of Crustacea and he placed Oxycephalidae as the third sub family of family Typhidae and named it as Oxycephalinae. Bate (1862) raised sub family Oxycephalinae to family status and included it as fifth family of "Hyperina". On the other hand, Claus (1887)

included Oxycephalidae along with some others under "Platysceliden". According to him this family included only two genera namely *Oxycephalus* Milne-Edwards and *Rhabdosoma* Adams & White.

Creation of additional genera followed fairly in quick succession. Streets created *Leptocotis* in 1877 and *Calamorhynchus* in 1878. Bovallius (1887) created two more genera *Glossocephalus* and *Tullbergella*. Without assigning any apparently valid argument, Bovallius substituted the name *Rhabdonectes* for *Rhabdosoma* Adams & White. Stebbing (1888) created *Simorhynchotus* by modifying *Simorhynchus* as earlier suggested by Claus (1871). In 1879 Claus transferred the genus *Simorhynchus* to the family Lycacidae. Stebbing (1888) created yet another genus *Streetsia*. It should be pointed out that Stebbing placed *Simorhynchotus* in the family Tryphanidae and it was Bovallius (1890) who brought it to Oxycephalidae where it remains.

Stebbing's Challenger report, no doubt, is a land mark in the study of Oxycephalidae, but the monographic study by Bovallius (1890) should be given the pride of place. Bovallius (1890) created three new genera, *Stebbingella*, *Dorycephalus* and *Cranoccephalus*. He discarded the genus *Rhabdonectes* proposed by himself and raised it to a distinct family Xiphocephalidae. But subsequent work, especially by Stephensen (1925) established that *Stebbingella* Bovallius and *Dorycephalus* Bovallius are synonyms of the genera *Leptocotis* Streets and *Cranoccephalus* Bovallius respectively. He also affirmed that family Xiphocephalidae is in no way different from Oxycephalidae. Stephensen upheld the validity of the genus *Rhabdosoma* and placed it in the family Oxycephalidae.

Spandl (1927) included under Oxycephalidae 10 genera. He rightly omitted *Dorycephalus* and *Stebbingella* but made no mention of *Rhabdosoma* and *Metalycaea*.

Altogether 20 species are described under 10 genera in Oxycephalidae including the one and only report of *Oxycephalus longipes* of Spandl (1927) and the report of a second species *Cranoccephalus thai* under the genus *Cranoccephalus* by Sudara (1975).

In recent years the family was treated extensively by Fage (1960) working on the Dana collections. Pillai (1966a) gave fully illustrated descriptions of 15 species belonging to 9 genera collected exclusively off the west coast of India. Bowman and Gruner (1973) have published a concise key on the families and genera of Hyperiidea. This includes a revised classification of the sub-order which as the authors themselves stated is largely based on the work of Pirlot (1929) with additions made by Stephensen and Pirlot (1931).

The most recent work on Hyperiidea is that of Vinogradov, *et al.* (1982). Under Oxycephalidae, Semenova in Vinogradov, *et al.* (1982) have recognised as valid *Oxycephalus* with 4 species, *Streetsia* with 4 species, *Leptocotis* with 1 species, *Calamorhynchus* with 1 species, *Tullbergella* with 1 species, *Glossocephalus* with 1

species, *Cranocephalus* with 1 species and *Rhabdosoma* with 4 species. They have removed *Simorhynchotus* from Oxycephalidae to Lycaeidae.

Bowman and Gruner (1973) have recognised the following 9 genera. *Rhabdosoma*, *Calamorrhynchus*, *Leptocotis*, *Glossocephalus*, *Simorhynchotus*, *Cranocephalus*, *Streetsia*, *Tullbergella* and *Oxycephalus*. They did not include *Metalycaea* Stephensen as an oxycephalid because of several contradictions in the published descriptions of this species. The original description by Stephensen (1925) was based on three females. This description clearly applied to *Lycaea serrata* Claus, (1879) and hence Bowman and Gruner stated "We believe that *M. globosa* is the female of *Lycaea serrata* Claus", whose description was based on a male. Stephensen had five males of *L. serrata* but he did not associate them with *M. globosa*, obviously because the two collections were made separately. Shoemaker (1945) had both males and females of *L. serrata* obtained in different tows of the net and gave what he thought to be the first description of the male of *L. serrata*. Unfortunately the illustrations by Stephensen and Shoemaker were based on different sexes or of different growth stages. Hence the question of the validity of *M. globosa* was kept somewhat open.

The International Indian Ocean Expedition (IIOE) collections contain females and males of *M. globosa* Stephensen, taken together from widely separated localities in the Indian Ocean. Detailed study of this material shows that the present specimens clearly answer the description provided by Stephensen and differ from that of *L. serrata* Claus. Hence, author has included *Metalycaea* as a valid genus under Oxycephalidae (Nair, 1993).

Together with *Metalycaea*, family Oxycephalidae contains 10 genera and 20 species. The validity of *Cranocephalus thai* is yet to be confirmed owing to the fact that the genus *Cranocephalus* is known to exhibit vast morphological variations.

Taxonomic features: General shape of the body variable, usually elongated as in *Streetsia* and *Leptocotis*, extremely elongated and slender as in *Rhabdosoma* or rather short and plump as in *Metalycaea* and *Simorhynchotus*. Cephalon generally swollen and anteriorly produced into a short rostrum as in *Tullbergella* or a very long rostrum as in *Rhabdosoma*, nearly absent in *Metalycaea* and *Simorhynchotus*. A neck usually present, occasionally produced as in *Leptocotis* or nearly absent as in *Streetsia*. Eyes large, covering the cephalon except rostrum, neck and narrow dorsomedian area, never demarcated into dorsal and ventral group of ocelli. Pereon segments gradually increasing in length backwards, generally of the same depth, except in *Glossocephalus*. Coxal plates separate from or fused with the pereon segments. First three pleon segments well developed, always longer than the last pereon segment, last two segments fused together. Telson triangular and dorsoventrally flattened, distal border not incised, fused with the

"double urosome" segment (Pl.1. Fig.1e). Antenna 1 and 2 modified in male, second antenna absent in female. First antenna in male generally with large hirsute basal flagellar segment, rest of the flagellum attached sub-terminally. Second antenna in male with elongated segments, foldable like a carpenter's rule. Mandible with a palp in male, without palp in female. Maxillae 1 & 2 generally absent. Maxilliped with 2 segmented stem and a pair of distal lateral lobes and a median lobe. Pereopods 1 & 2 chelate or sub chelate, occasionally simple as in *Metalycaea*. Pereopods 3 & 4 slender; 5 to 7 with the basis usually flattened and enlarged except in *Metalycaea* and *Glossocephalus*, 7th pereopod with segments 3 to 7 reduced in size and number. Pleopods well developed, biramous and natatory, with powerful muscles. Uropods flattened, rami free or the endopods of the second and third fused with the protopod and the exopod often reduced in size. Branchial lamellae present on pereon segments 2 to 6, occasionally rudimentary or reduced as in *Rhabdosoma*. Brood lamellae present on pereon segments 2 to 5 or 3 to 5, rudimentary or absent in *Rhabdosoma*.

The following key serves to distinguish the genera.

1. Cephalon with a distinct rostrum 2
 Cephalon without a distinct rostrum 9
2. Rostrum much longer than cephalon proper, coxal plates absent
 *Rhabdosoma*.
 Rostrum not longer than cephalon proper, coxal plates present 3
3. Rostrum proximally expanded or winged *Calamorhynchus*
 Rostrum proximally not expanded or winged 4
4. Coxal plates of pereopods 5 and 6 not flattened, rest of
 the segments flattened *Glossocephalus*
 Coxal plates of pereopods 5 and 6 flattened, rest of
 the segments not flattened 5
5. Pereopods 1 and 2 two chelate *Oxycephalus*
 Pereopods 1 and 2 two subchelate 6
6. Basis of pereopod 6 produced into an inner
 distal process *Tullbergella*
 Basis of pereopod 6 not produced into a process 7
7. Cephalon with a posterior constriction *Leptocotis*
 Cephalon without a posterior constriction 8
8. Coxal plates small and clearly demarcated *Streetsia*
 Coxal plates large rounded lobes, not clearly
 demarcated *Cranocephalus*
9. Endopod of 2nd uropod not fused with protopod *Metalycaea*
 Endopod of 2nd uropod fused with protopod *Simorhynchotus*

Genus - *Metalycaea* Stephensen

Metalycaea Stephensen, 1925, p.183; – Fage, 1960, p.6; – Nair, 1993, p.1171.

Lycaea Bowman & Gruner, 1973, p.8; – Vinogradov, *et al.*, 1982, p.381.

Diagnosis: Body rather plump, not elongated. Cephalon relatively large, without rostrum. Eyes large, covering the entire surface of the cephalon. Pereon segments successively becoming less deep backwards; coxal plates distinct. Pleon as long as pereon, composite pleon segment as long as telson, latter apically rounded. First and 2nd antennae of the male typically oxycephalid. Pereopods 1 & 2 simple, with slight expansion of carpus. Pereopod 5 clearly longer than pereopod 6, basis not expanded. Pereopod 7 reduced in size, basis rather elongated, followed by 5 segments. Ramai of uropods 1 & 2 free, those of 3rd partially free.

Type species: *Metalycaea globosa* Stephensen

The genus *Metalycaea* includes only one species *Metalycaea globosa* Stephensen.

Metalycaea globosa Stephensen

(Pl.1a–Figs.A1 & A2; Pl.5a & 5b)

Metalycaea globosa Stephensen, 1925, p.183, fig.71; – Fage, 1960, p.6; – Nair, 1993, p.1171.

Lycaea serrata Bowman & Gruner, 1973, p.8; – Vinogradov *et al.*, 1982, p.385, figs.208 (part).

Diagnosis: First antenna in male apparently with a short, indistinctly 3 segmented peduncle; flagellum 4 segmented. Second antenna well developed and 5 segmented. Outer margin of all the segments spinulose. Mandible moderately developed, palp 3 segmented. Maxillae 1 & 2 presumably absent. Maxilliped with 2 lateral lobes narrowing distalwards and a median low distally bilobed lamina. Carpus of pereopods 1 & 2 enlarged and produced into a low triangular projection or process making the limb neither simple nor subchelate (weakly subchelate).

In female, first antenna simple 4 - 5 segmented. Second antenna absent. Cephalon showing a distinct oral projection. Mandible simple, cutting edge rudimentary, palp absent. Marginal serrations on uropods extremely weak in juvenile females but clear in males. Telson reaching the middle of the endopod of the first uropod, over reaching in the male.

Remarks: Since its creation, *Metalycaea globosa* Stephensen (1925) has never been recorded by any other worker and hence its validity was considered to be doubtful. The present record of this species from the Indian Ocean shows that it is a valid species. The presence of males, females and juveniles in the IIOE collections helped to make this assertion.

Distribution: Originally recorded from the Mediterranean waters and the present records from the Arabian Sea, southwest and southeast Indian Ocean form the second world record. Its range of geographical distribution appears to extend from 40°N (Mediterranean) to 17°S (Indian Ocean). Available data indicate that *M. globosa* is a surface/subsurface species, but the record of a female from 1000 m by Stephensen (1925) remains unexplained.

Genus - *Simorhynchotus* Stebbing

Simorhynchotus Stebbing, 1888, p.1572; - Bovallius, 1890, p.47; - Spandl, 1927, p.211; - Pillai, 1966, p.171; - Bowman & Gruner, 1973, p.53; - Vinogradov *et al.*, 1982, p.390.

Simorhynchus Claus, 1871, p.156; - Claus, 1879b, p.43; - Claus, 1887, p.65; - - Bovallius, 1887, p.34.

Diagnosis: Body short, thick and somewhat compact, generally resembling *Metalycaea* in overall shape. Cephalon relatively small, produced anteriorly into an obtusely rounded snout, no distinct rostrum. Eyes moderately large and lateral. Pereon segments short, regularly becoming longer backwards, coxal plates small, clearly set off by septa. Pleon slightly deeper than pereon, double pleon segment slightly shorter than wide, fused with telson. Telson triangular nearly as long as broad, with blunt apex. Antenna 1 in male modified, in female simple. Antenna 2 in male elongated, typically oxycephalid; absent in female. Mouth parts as in the family. Pereopod 1 simple; Pereopod 2 sub-chelate. Pereopod 5 longer than pereopod 6. Pereopod 7 with third segment onwards reduced in size. Endopod of uropod 2 and 3 fused with protopod, exopod reduced in size.

Type species: *Simorhynchotus antennarius* (Claus, 1871).

The genus *Simorhynchotus* includes only one species, *Simorhynchotus antennarius* (Claus).

Simorhynchotus antennarius (Claus)

(Pl.1a-Fig.B & Pl.6)

Simorhynchotus antennarius Stebbing, 1888, p.1572, pl.200; - Bovallius, 1890, p.49; - Stephensen, 1925, p.185, fig.72; - Spandl, 1927, p.211, fig.32; - Barnard, 1930, p.433; - 1931, p.120; - 1937, p.191; - Pirlot, 1929, p.161; - 1938, p.366; - Reid, 1955, p.28; - Fage, 1960, p.11, figs.1-3; - Pillai, 1957, p.64; - 1966a, p.171, figs.1 & 2; - Jossi, 1972, p.125; - Bowman & Gruner, 1973, p.53, fig.71; - Tranter, 1977, p.651; - Vinogradov *et al.*, 1982, p.391, fig.211.

Simorhynchus antennarius Claus, 1871, p.156; - 1887, p.65; - 1879b, p.43.

Simorhynchotus lilljeborgi Bovallius, 1890, p.52, pl.1, figs.1-7; - Chevreux, 1900, p.160; - Spandl, 1927, p.212, fig.33.

Simorhynchotus stebbingi Bovallius, 1890, p.50.

Diagnosis: The anteriorly produced snout from the cephalon is more prominent in the male than in the female. Telson broadly triangular, in female it is broader than in the male.

First antenna in male with indistinctly 3 segmented peduncle, flagellum 4 segmented. Second antenna 5 segmented and typically oxycephalid. In female the 1st antenna simple and 5 segmented, 2nd antenna absent.

Seventh pereopod reduced in size but with all segments, tip of the propodus with two spiniform elements much longer than the dactylus. In females, the apical elements and the dactylus of the 7th pereopod are slightly different than in males. Endopod of the 3rd uropod fully fused with protopod, endopod very broad and long, considerably overreaching the tip of the telson and characteristically curving outwards, its borders serrated.

Remarks: *S. antennarius* exhibits wide range of variations with respect to size and sex.

Distribution: *S. antennarius* appears to be primarily an inhabitant of the surface layers but may have a vertical range which extends down into the mesopelagic zone (Thurston, 1976).

This is a circum tropical species known from the warm water regions of the Atlantic, Pacific and Indian Ocean and also from Mediterranean. The northern most geographical limit of this species was found to be 41°39.5'N (Chevreux, 1900) and southern limit upto the periphery of New Zealand (Barnard, 1930).

Genus – *Oxycephalus* Milne-Edwards

Oxycephalus Milne-Edwards, 1830, p.396; – 1840, p.99; – Bate, 1862, p.342; – Claus, 1879, p.190; – 1887, p.68; – Bovallius, 1887, p.35; – Stebbing, 1888, p.1576; – Bowman & Gruner, 1973, p.49; – Vinogradov, *et al.*, 1982, p.404.

Orio Cocco, 1832, p.205.

Ornithoramphus Natale, 1850, p.12.

Natalius Costa, 1864, p.88.

Diagnosis: Body stout, fairly deep and moderately elongated, cephalon produced into a distinct rostrum, always shorter than the cephalon proper, hind part of the cephalon constricted forming a neck. Eyes large; pereon segments successively increasing in length. First 3 pleon segments postero-laterally drawnout into spine-like processes, double pleon segment longer than wide and fused with telson. Telson elongate-triangular and apically acute. First antenna in male modified, in female simple. Second antenna in male long, typically oxycephalid, absent in female. Pereopods 1 & 2 perfectly chelate; chela well armed; pereopods 3 & 4 slender, 5 & 6 with broad basis. Seventh pereopod reduced in size, dactylus with a nail. Uropods not over-reaching the tip of telson, endopod of 2nd & 3rd uropods fused with protopod.

Type Species: *Oxycephalus piscatoris* Milne-Edwards, 1830.

Under the genus *Oxycephalus* Fage (1960) recognised only 3 species, namely *O. Clausi* Bovallius, *O. piscator* Milne-Edwards and *O. latirostris* Claus. On the

other hand the most recent publication by Semenova in Vinogradov, *et al.* (1982) lists 4 species namely *O. clausi* Bovallius, *O. piscator* Milne-Edwards, *O. latirostris* Claus and *O. longipes* Spandl. In the present key, an adult female of *O. longipes* is illustrated for the first time.

Since its inception, the difference of opinion was with regard to *O. longipes* because the original description was based on one and only record of juvenile female from Atlantic. Spandl's illustration of the 7th pereopod of *O. longipes* shows a long spiniform propodus which obviously gave rise to its name. The record of adult females from Indian Ocean by Nair (1995), establishes the validity of *O. longipes*.

They differ thus—

1. Body rather elongated, rostrum relatively short 2
 Rostrum prominent 3
 Body moderately deep and elongated. Cephalon parallel sided for more than two-thirds of its length and as long as pereon, rostrum short.
 First antenna in female six segmented with elongated peduncle, third peduncular segment with ten stiff setae.
 Carpus of pereopod 1 broad and internally produced, cutting edges of carpus and propodus with a sharp row of spines; carpus of pereopod 2 much longer than the rest of the limb, thumb like process clearly shorter than the segment proper, cutting edges of carpus and propodus with sharp denticulate spines.
 Third and 4th pereopods sub-similar.
 Pereopod 5, basis enlarged, inner border convex and smooth.
 Pereopod 6, basis nearly conical.
 Pereopod 7, broadest at one-third distance from the base and further on steadily narrows, propodus extremely elongated and ends in a long dactylus.
 Uropods flattened; outer borders of protopod of the first uropod unarmed; endopod of first uropod does not reach the tip of telson.
 Telson roughly triangular and narrows towards the tip, the distal one-third of the borders serrated *O. longipes*.
2. Telson regularly narrowing towards the tip.
 First antenna 5 segmented; peduncle 3 segmented with 5 groups of hairs or setules.
 Carpus of pereopods 1 & 2 regularly widening distalwards and internally produced into a straight thumb, as long as the segment proper, its inner edges with a close row of spines, propodus internally armed like the thumb. Pereopods 3 - 5, inner border

sparsely spinate, basis of pereopod 5 moderately enlarged, basis of pereopod 6 nearly conical.

Basis of pereopod 7 proximally enlarged, propodus slightly elongated.

First uropod almost reaching the tip of the telson; postero-lateral corners of pleon segments 1 & 2 rounded, of 3rd slightly produced *O. latirostris*.

- 3. Carpus of pereopods 1 & 2 with outer distal tooth, cutting edge of the chela of pereopod 2 with high blunt teeth on the thumb and low cusps on the movable finger.

Basis of pereopod 5 enlarged, clearly longer than broad, basis of 6th pereopod as long as broad and nearly circular. Pereopod 7 with elongate ovate basis.

First 3 pleon segments regularly decreasing in depth backwards, each segment postero-laterally produced into a pair of sharp processes with the border between the processes deeply concave.

Telson narrow *O. clausi*.

- 4. First 3 pleon segments subequal in length, but becoming successively deep, postero-lateral angles drawn out into spines becoming more and more prominent backwards.

Telson relatively wider and apically acute. Uropod 1 reaches beyond the tip of the telson. The outer border of the carpus of pereopod 1 & 2 lacks a distal spine or tooth. Carpus and propodus with very few stiff setae. Basis of 5th & 6th pereopods broadly ovate.

Basis of pereopod 7 broadest at the base and steadily narrowing distally *O. piscator*

Oxycephalus longipes Spandl

(Pl.1c; Pls.6a & 6b)

Oxycephalus longipes Spandl, 1927, p.181; – Vinogradov, 1982, p.411; – Nair, 1995.

Remarks: Since its inception by Spandl, it has never been recorded from anywhere else. But Semanova in Vinogradov, *et al.* (1982) has treated this species as valid. On the other hand from the illustrations of Spandl, the figure of the cephalon shows signs of immaturity. However, the spindle shaped propodus of the seventh pereopod marks it distinct from other species of the genus except in the case of *O. latirostris*. The record of adult females from the Bay of Bengal and the southeast Indian Ocean (Nair, 1995) confirms its validity.

Distribution: Originally recorded from the tropical part of Atlantic. Adult females are recorded for the first time from Indian Ocean.

Oxycephalus latirostris Claus

(Pl.1b – Fig.E; Pl.9)

Oxycephalus latirostris Claus, 1879a, p.193; – 1887, p.71, pl.24, Fig.1; – Bovallius, 1890, p.66, pl.2, figs.7-12; – Pirlot, 1938, p.367; – Barnard, 1940, p.485; – Fage, 1960, p.26; – Pillai, 1966a, p.178, fig.5; – Vinogradov *et al.*, 1982, p.409, fig.220.

Oxycephalus pectinatus Bovallius, 1887, p.36; – 1890, p.64, pl.II, figs.4-6.

Oxycephalus notabilis Spandl, 1924a, p.32, figs.7a-f; – 1927, p.182, figs.15-16.

Remarks: *O. latirostris* can be easily distinguished from *O. clausi* and *O. piscator* by the shape of the postero-lateral parts of the first three pleon segments. The armature of the first and second pereopods is also very characteristic in both *O. clausi* and *O. piscator*.

As Fage (1960) has observed *O. pectinatus* Bovallius 1887 and *O. notabilis* Spandl, 1924 are synonymous with *O. latirostris* Claus.

Fage (1960) from his extensive studies concluded that females of *O. latirostris* do not show dimorphism unlike *O. clausi* and *O. piscator*. But studies on IIOE material (Nair, 1992) show that female of *O. latirostris* also may exhibit dimorphism.

Distribution: *O. latirostris* was found to be unevenly distributed in the tropical waters of Atlantic, Pacific and Indian Ocean.

This species is not known to extend beyond 10°N and 4°S from the tropics whereas the southernmost extension in the Indian Ocean appeared to be 38°S (Fage, 1960).

Oxycephalus clausi Bovallius

(Pl.1b – Figs.D1-D4 & Pl.7)

Oxycephalus clausi Bovallius, 1887a, p.35; – 1890, p.60, pl.1, figs.19-24; – Stebbing, 1888, p.1573; – 1923, p.11; – Chevreux, 1900, p.161; – 1935, p.200; – Walker, 1909b, p.55; – Chilton, 1912, p.516; – Stephensen, 1925, p.188; – Spandl, 1927, p.180; – Barnard, 1930, p.433; – 1931, p.130; – 1932, p.294; – 1937, p.192; – 1940, p.485; – Pirlot, 1929, p.163; – 1938, p.193; – Shoemaker, 1945a, p.251; – Reid, 1955, p.29; – Pillai, 1957, p.65; – 1966a, p.124, fig. 3; – Fage, 1960, p.20, figs.11-14; – Jossi, 1972, p.125; – Tranter, 1977, p.651; – Vinogradov *et al.*, 1982, p.408, fig.219.

Oxycephalus tuberculatus Bate, 1862, p.343, pl.54, fig. 5; – Streets, 1878, p.276, pl.2, fig.1.

Oxycephalus piscator Claus, 1879b, p.190; – 1887, p.69, pl.22, figs.1-9 & pl.23, figs.1-8.

Oxycephalus erythraeus Cecchini, 1929, p.6.

Oxycephalus mancinni Cecchini, 1929, p.7.

Remarks: The most diagnostic character of *O. clausi* is the presence of two spines separated by a deep concavity at the postero-lateral corner of pleon segments one to three. Equally characteristic is the presence of a blunt projection (male) or a strong spine (female) on the outer distal part of the carpus of

pereopods one and two, particularly the latter and the strongly dentate cutting edge of the chela of the second pereopod of the females.

Distribution: A very widely distributed species, commonly seen in the world oceans including the Mediterranean and the Red Sea. Its geographical limits varied between 43°N and 41°47'S.

Oxycephalus piscator Milne-Edwards

(Pl.1a – Figs.C1-C2 & Pl.8)

Oxycephalus piscator Milne-Edwards, 1840, p.100, pl.30, fig.10; – Bate, 1862, p.342, pl.54, fig.3; – Bovallius, 1890, p.56, pl.1, figs.8-16; – 1887, p.35; – Chevreux, 1900, p.160; – Stephensen, 1925, p.186; – Spandl, 1927, p.180, figs.3a & b; – Pirlot, 1929, p.163; – Bernard, 1930, p.433; – Shoemaker, 1945a, p.246; – Reid, 1955, p.29; – Fage, 1960, p.14, figs.5-10; – Evans, 1961, p.201; – Pillai, 1966a, p.176; – Jossi, 1972, p.125; – Vinogradov *et al.*, 1982, p.405, fig.218.

Oxycephalus piscatoris Milne-Edwards, 1830, p.396.

Orio ornithoramphus Cocco, 1832, p.205

Orio ornithoramphus cocci Natale, 1850, p.12.

Natalius candidissimus Costa, 1864, p.88.

Oxycephalus oceanicus Guérin, 1836, p.10, pl.18, fig.2.

Oxycephalus bulbosus Streets, 1878, p.280, pl.2, fig.2.

Oxycephalus edwardsi Thomson, 1883, p.238.

Oxycephalus similis Claus, 1879b, p.193; – 1887, p.71, pl.33, fig.9.

Remarks: *O. piscator* can be readily distinguished from *O. clausi* by the absence of a second spine-like process at the posterolateral portion of the first three pleon segments. Another salient character of *O. piscator* is that the cutting edge of the chela of the second pereopod of the female is feebly serrated or crenulate.

Distribution: This circum tropical species was found in Atlantic, Pacific and Indian Ocean as well as in the Mediterranean. The form *O. bulbosus* was more specific to areas of high temperature (Nair, 1992). The northern and southern limit of this species appeared to be 41°24'N & 41°47'S.

Genus – *Tullbergella* Bovallius

Tullbergella Bovallius, 1887, p.38; – 1890, p.68; – Bowman & Gruner, 1973, p.53; – Vinogradov *et al.*, 1982, p.425.

Diagnosis: Body rather stout, compact and dorsoventrally flattened, cephalon small, globular and prolonged into a short sharp rostrum. First two pereon segments shallow, producing a neck. Coxal plates distinct. First three pleon segments postero-laterally produced. Double pleon segment clearly longer than telson. Pereopods 1 & 2 subchelate. Pereopod 6 with basis distally produced backwards. Seventh pereopod with only 4 free segments. Rami of uropods 1 & 2 free, endopod of uropod 3 fused with protopod, not reaching tip of telson.

Type species: *Tullbergella cuspidata* Bovallius, 1887

This genus created nearly a century back, even now contains only the type species, originally collected from the Indian Ocean.

Tullbergella cuspidata Bovallius.

(Pl.2a – Figs.F1-F4 & Pl.10)

Tullbergella cuspidata Bovallius, 1887, p.38; – Bovallius, 1890, p.69, pl.2, fig.13; – Colosi, 1918, p.212; – Spandl, 1927, p.191, fig.22; – Fage, 1960, p.30; – Pillai, 1966a, p.179, Fig.6; – Jossi, 1972, p.125; – Vinogradov *et al.*, 1982, p.425, fig.228; – Zeidler, 1984, p.298.

Diagnosis: Eyes large, very dark covering almost the entire cephalon except the rostrum. Telson nearly as long as broad, regularly narrowing to an acute apex.

First antenna in female stout and 5 segmented, in male the 1st and 2nd antenna typical as in Oxycephalidae. Mandible, an irregular rectangular plate broader than long and with serrated cutting plate. Maxilliped ending in two large lateral lobes bordered with a row of setae and fairly large feebly bilobed median lobe carrying a small median distal projection.

Carpus of pereopods 1 & 2 enlarged, broader than long and armed with several stiff setae, its inner distal corner drawn out into a short strong process, distal border of the carpus and the outer border of the carpal process closely serrate. Third and 4th pereopods similar, but short. Pereopod 5 longest with expanded basis. Basis of 6th pereopod roughly rectangular, outer distal part of the basis somewhat enlarged and drawn out into an apically acute process directed backwards – characteristic to the species, which is less prominent in male. Basis of 7th pereopod flattened and sub-ovate, followed by only 3 other segments.

Uropods short but stout, 1st uropod not reaching the tip of the telson; peduncle of 3rd uropod short and fused with the endopod.

Remarks: This is one of the rare species of Oxycephalidae and it obviously exhibits ecophenotypic variation.

Distribution: It was originally recorded from the Gulf of Siam near Batavia and from the south-west Pacific (to the east of the Low Islands), Trinity opening and Cook's Strait, N. Queen land.

Genus – *Leptocotis* Streets

Leptocotis Streets, 1877, p.136; – 1878, p.283; – Stebbing, 1888, p.1593; – Bovallius, 1890, p.110 – Stephenson, 1925, p.191; – Spandl, 1927, p.204; – Pirlot, 1929, p.168; – Barnard, 1930, p.434; – Bowman & Gruner, 1973, p.52; – Vinogradov *et al.*, 1982, p.421.

Diagnosis: Body slender and enlarged, compactly built. Cephalon longer than pereon, regularly narrowing to the tip of the rostrum, posterodorsal part

of the cephalon suddenly constricted, producing a well marked cephalon. Pereon segments regularly increasing in length and depth backwards, coxae not fused with pereon segments. Pleon segments 1 to 3 subequal in length but gradually decreasing in depth, posterolateral corners of 1st and 2nd rounded, of 3rd drawn out. Fourth pleon segment short; double pleon segment extremely elongated; telson only slightly longer than 4th pleon segment.

Pereopods 1 and 2 chelate, pereopod 7 with full complement of segments. Protopod of uropod 1 overreaching that of 2nd, rami free, endopod reduced to a small spine. Endopod of uropod 2 fused with protopod in female, free in male; exopod smaller than endopod. Uropod 3 with spiniform exopod, endopod fused with protopod.

Type species: Leptocotis spinifera Streets, 1877.

Leptocotis tenuirostris (Claus)

(Pl.2b – Figs.H1-H5 & Pl.11)

Leptocotis tenuirostris Claus, 1887, p.36; – Bovallius, 1890, p.117, pl.V, figs.10-14; – Walker, 1909, p.55; – Stephensen, 1925, p.191, fig.74; – Spandl, 1927, p.206, fig.30; – Barnard, 1930, p.435; – 1931, p.132; – 1932, p.296; – 1937, p.194; – Chevreux, 1935, p.163; – Pirlot, 1929, p.168; – 1938, p.372; – Shoemaker, 1945, p.253; – Reid, 1955, p.28; – Hurley, 1960, p.282; – Iric, 1959, p.32; – Fage, 1960, p.37, figs.21-24; – Pillai, 1966a, p.181, fig.7; – Jossi, 1972, p.128, fig.18; – Tranter, 1977, p.651; – Vinogradov *et al.*, 1982, p.421, fig.226.

Oxycephalus tenuirostris Claus, 1871, p.155.

Leptocotis spinifera Streets, 1877, p.137; – 1878, p.283.

Leptocotis lindstromi Bovallius, 1887, p.38.

Leptocotis ambobus Stebbing 1888, p.1594, fig. 204; – Tsuruta, 1963, p.160.

Dorycephalus lindstromi Bovallius, 1890, p.76; – Stewart, 1913, p.264; – Colosi, 1918, p.212.

Dorycephalus ambobus Colosi, 1918, p.218; – Spandl, 1927, p.203, fig.28.

Leptocotis similis Spandl, 1927, p.204, fig.29.

Diagnosis: Cephalon globular in female, appreciably elongated in male and nearly fully covered by the eyes. Telson about two-thirds as long as the double pleon segment, steadily narrowing to an acute apex.

First antenna slender and 7 segmented in female and in male typical as in the family.

Carpus of pereopod 1 nearly equal in length and width, its inner distal part produced into a broad-based triangular process armed with stiff setae. Carpus of 2nd pereopod slightly longer than broad, carpal process longer and narrower than in the first, carpal process and propodus finely serrate. Pereopods 2 & 3 slender; 5th pereopod longer than 6th; basis of 7th pereopod ovate with all the following segments.

Remarks: As *L. tenuirostris* shows wide variation in morphology depending on sex and stage of growth, it has been described under several names. Fage (1960) studied a very rich collection from all over the tropical waters and concluded that *Leptocotis* is monotypic. The adult male and female show pronounced sexual dimorphism.

Distribution: Reported from the north and south Atlantic, the Pacific, East Indies and the Indian Ocean. Most often found in the Indo-west Pacific. It was not recorded from the west coast of Africa, Mediterranean and the Red Sea. Its northern and southern geographical limit appears to be 46°N and 36°S.

Genus – *Calamorhynchus* Streets

Calamorhynchus Streets, 1878, p.285; – Stebbing, 1888, p.1599; – Bovallius, 1890, p.72; – Spandl, 1927, p.197; – Bowman & Gruner, 1973, p.50; – Vinogradov *et al.*, 1982, p.423.

Diagnosis: Body extremely elongated and slender, somewhat dorsoventrally flattened. Cephalon clearly longer than pereon, with conspicuous neck, produced into a long rostrum laterally expanded into large horizontal wings with serrated borders. Eyes lateral. Pereon segments successively increasing in length backwards; coxal plates fused with pereon segments but discernible. Pleon nearly as long as cephalon, first three segments becoming successively increasing in size. Fourth pleon segment about a third of the length of the double segment. Telson indistinctly separated, steadily narrowing to an acute apex, lateral borders serrated. Pereopods 1 and 2 chelate. Pereopod 7 with the full complement of segments. Uropod 3 not reaching tip of telson, endopod fused with protopod.

Type species: *Calamorhynchus pellucidus* Streets

Calamorhynchus pellucidus Streets

(Pl.2a – Figs.G1-G2 & Pl.12)

Calamorhynchus pellucidus Streets, 1878, p.285; – Bovallius 1890, p.73, pl.2, figs.14-15; – Spandl, 1927, p.198, figs.25-26; – Barnard, 1930, p.434; – Chevreux, 1935, p.202; – Pirlot, 1938, p.371; – Shoemaker, 1945, p.251; – Fage, 1960, p.31, figs.19-20; – Pillai, 1966a, p.182, fig.8; – Brusca, 1967, p.387; – Jossi, 1972, p.125; – Tranter, 1977, p.652; – Bowman & Gruner, 1973, p.50; – Vinogradov *et al.*, 1982, p.423, fig.227.

Calamorhynchus rigidus Stebbing, 1888, p.1600, pl.206; – Bovallius, 1890, p.74; – Stephensen, 1925, p.189, fig.73; – Spandl, 1927, p. 2000, fig. 17; – Pirlot, 1929, p. 164.

Diagnosis: Main part of the cephalon housing the eyes oblong, laterally situated and separated by a wide dorso-median gap. Lateral borders of the telson dentate, particularly towards the tip.

Carpus of 1st pereopods widening distalwards and expanded at the inner distal part into a rounded lobe; carpus of pereopod 2 more elongated than in the 1st pereopod. Carpus of both 1st & 2nd pereopods armed with stiff setae,

distal borders of both serrated and with median spine, more prominent in 2nd pereopod. Pereopods 3 & 4 subsimilar. Pereopod 5 & 6 with elongate-oblong basis with widely spaced marginal spinules. Basis of 7th pereopod narrowing distalwards with all the usual segments present.

Uropod 1 reaching the tip of uropod 3, uropod 3 stopping far short of the tip of telson.

Remarks: The rostrum with broad lateral wings and the clearly separate lateral eyes distinguish this genus from all the rest. However the post, cephalic region of the body including the appendage show close similarity to *Leptocotis*.

Distribution: This circumtropical species was found to occur in the north and south Atlantic, the north Pacific, East Indies, Tasman Sea and the Indian Ocean. Its distribution scarcely extends beyond 38°N and 41°S latitudes.

Genus *Cranocephalus* Bovallius

Cranocephalus Bovallius, 1890, p.94; – Bowman & Gruner, 1973, p.51; – Vinogradov *et al.*, 1982, p.429.

Diagnosis: Body elongated but fairly deep, not at all streamlined as in the other genera of the family. Cephalon proper, perfectly globular, separated by deep sinuses from the 1st pereon segment, a true neck absent. Rostrum elongated and fairly deep, longer than the cephalon proper. Eyes large, pereon longer than cephalon, 2nd to 7th segments with deep well marked transverse groove reaching laterally the line of fusion of the coxal plates. Coxae fully fused with the pereon segments. Pleon segments 1 to 3 subsimilar, much shallower than the pereon, 4th short, double segment one and a half times as long as 4th, telson strongly narrowing. Pereopods 1 & 2 subchelate. Basis of 5th, 6th and 7th expanded, irregular in shape, 7th pereopod with all segments; rami of all the uropods free.

Type species: *Cranocephalus goesi* Bovallius, 1890

Cranocephalus scleroticus (Streets)

(Pl.3b – Figs.M1-M5 & Pl.13)

Cranocephalus scleroticus Shoemaker, 1945, p.251, fig.44; – Reid, 1955, p.30; – Hurley, 1960, p.282; – Fage, 1960, p.72, figs.44-53; – Pillai, 1966a, p.184, fig.9; – Tranter, 1977, p.652; – Vinogradov *et al.*, 1982, p.429, fig.230.

Oxycephalus scleroticus Streets, 1878, p.281, pl.2, fig.3.

Oxycephalus typhoides Claus, 1879, p.195; – 1887, p.72, pl.24, figs.11-14; – Chun, 1889, p.527.

Cranocephalus goesi Bovallius, 1890, p.95, pl.4, figs.7-9.

Stebbingella sclerotica Bovallius, 1890, p.98, pl.4, figs.13-16.

Stebbingella theeli Bovallius, 1890, p.101, pl.5, figs.1-4.

Stebbingella typhoides Bovallius, 1890, p.100, pl.4, figs.10-12; – Walker, 1909, p.55; – Chevreux, 1935, p.202; – Stephensen, 1925, p.199, fig.76; – Spandl, 1927, p.193, fig.23; – Pirlot, 1929, p.167.

Cranocephalus typhoides Pirlot, 1938, p.370; – 1939, p.80.

Diagnosis: Cephalon regularly narrowing to the tip of the rostrum, latter apically acute. Coxal plates fused with the pereon, the line of fusion indicated by a prominent incision and a forwardly directed large rounded lobe.

First antenna in female long and slender, 7 to 8 segmented; in male, the lower distal part of the first flagellar segment produced into a blunt lobe.

Maxilliped distally with three lobes, two lateral and one median.

Carpus of the 1st and 2nd pereopod regularly widening distalwards, inner distal part expanded inwards ending in a strong spine in the case of 1st pereopod, in the case of second pereopod the spine is weak.

Telson strongly narrowing to the tip in the case of the female, but blunt in male. First uropod just stopping short of the tip of the telson.

Remarks: The wide variation in size and also external morphology exhibited by this species prompted the early workers to describe this species under different names. This species was named *O. scleroticus* by Streets because the original specimen had a coriaceous exoskeleton.

Distribution: Even though this species was found distributed mainly along the tropical areas of the world oceans in the northern hemisphere, it extends to 38°58'N in the Atlantic and 35°59'N in the Pacific and in the southern hemisphere it was seen down to 36°09'S in the Atlantic, 33°30'S in the Pacific and 40°06'S in the south Indian Ocean. It was recorded from the Mediterranean waters but not in the Caribbean Sea, the Red Sea, the Persian Gulf and the northern Arabian Sea.

Genus *Glossocephalus* Bovallius

Glossocephalus Bovallius, 1887, p.35; - 1890, p.105; - Stebbing, 1888, p.1576; - Steuer, 1911, p.682; - Colosi, 1918, p.221; - Stephensen, 1925, p.202; - Chevreux and Fage, 1925, p.432; - Spandl, 1927, p.196; - Cecchini, 1929, p.91; - Barnard, 1931, p.131; - 1937, p.193; - Bowman & Gruner, 1973, p.51; - Vinogradov *et al.*, 1982, p.426.

Elisia Giles, 1888, p.250.

Diagnosis: Body somewhat dorso-ventrally flattened. Cephalon very short, dorso-ventrally flattened almost fully covered by the eyes; rostrum short and blunt. Pereon segments regularly increasing in length and depth backwards, coxal plates 1 to 6 free, 6th fused with the pereon segment. Pereon as long as the body behind. Pleon segments 1 to 3 antero-laterally rounded, postero-laterally angular but not acute. Double pleon segment fused with telson, longer than the latter, telson apically broadly rounded, roughly semicircular. Pereopods 1 & 2 small, chelate; 3 and 4 long and slender; 5 & 6 flattened paddles; 7th typically oxycephalid but very small, with all segments. All the 3 uropods with free rami, protopods with serrate border.

Type species: *Glossocephalus milneedwardsi* Bovallius, 1887

Glossocephalus milneedwardsi Bovallius

(Pl.3b – Figs.N1-N2 & Pl.14)

Glossocephalus milneedwardsi Bovallius, 1887, p.35; – 1890, p.106, pl.5, figs.5-9; – Colosi, 1918, p.221; – Chevreux, 1913, p.11, figs.4-5; – 1935, p.200; – Stephensen, 1925, p.202; – Chevreux and Fage, 1925, p.432, fig.421; – Spandl, 1927, p.196, fig.24; – Cecchini, 1929, p.9, pl.4; – Barnard, 1931, p.131; – 1937, p.193; – 1940, p.485; – Pirlot, 1938, p.371; – 1939, p.79; – Shoemaker, 1945, p.253, fig.45; – Fage, 1960, p.83, fig.56; – Pillai, 1966a, p.186, fig.10; – Vinogradov *et al.*, 1982, p.427, fig.229.

Glossocephalus spiniger Bovallius, 1887, p.35; – 1890, p.108, pl.5.

Elisia indica Giles 1888, p.250, pl.6, figs.2-4; – Walker, 1904, p.237, pl.1.

Glossocephalus adriaticus Steuer, 1911b, p.682, pl.III.

Diagnosis: Cephalon in female produced into a short apically broadly rounded rostral lobe on snout; whereas in male it is proportionately longer. Pereon segments 1 to 3 are relatively short and shallow producing a distinct neck. First antenna in female 6 segmented, in male the 1st flagellar segment not curved as is the case in many species of oxycephalids.

The carpus of 1st & 2nd pereopods widening distalwards and their inner distal part prolonged into a conical thumb armed apically with a few spine like setae. The basis of the 7th pereopod highly flattened in females and more elongated in males.

Uropod 1 clearly overreaches the tip of the telson. Peduncle of 3rd uropod short, nearly equal in length and width.

Remarks: *G. milneedwardsi* has several unique characters such as the short blunt snout, long slender third and fourth legs, flattened paddle like fifth leg, uropods with the endopods of the first and second clearly smaller than the exopods, the reverse of what is found in the other genera. The fusing of the seventh coxal plate alone with the pereon segment is very characteristic. The shape of the cephalon often varies depending on sex and stage of development.

Distribution: This circumtropical species was found to have an extended distribution up to 30°N and 35°49'S latitudes. In the north Pacific it appeared to be rare and seldom crossed the 21°40'N latitude, and found up to 120°E. In the south Pacific, it never crossed the Tropic of Capricorn. In the Atlantic, it extended up to 30°N and towards south it was present within 19°S.

Genus *Streetsia* Stebbing

Streetsia Stebbing, 1888, p.1603; – Bovallius, 1890, p.80; – Chevreux, 1900, p.161; – Senna, 1902, p.19; – Colosi, 1918, p.218; – Stephensen, 1925, p.192; – Spandl, 1927, p.184; – Barnard, 1930, p.435; – Pirlot, 1938, p.368; – Fage, 1960, p.70; – Pillai, 1966a, p.187; – Bowman & Gruner, 1973, p.53; – Vinogradov *et al.*, 1982, p.412.

Diagnosis: Cephalon varying in length, as long as, shorter than or longer than pereon, drawn out into an apically acute rostrum; eyes dorso-medially

separated by a very narrow gap. Pereon segments compact with distinct coxal plates. Pleon as long as pereon, but deeper. Double pleon segment varying in length, upto two and a half times as long as broad. Telson fused with double pleon segment, shorter than the latter and narrowing to the acute apex. Pereopods 1 & 2 subchelate, or the latter chelate. Basis of pereopod 5 & 6 enlarged; pereopod 7 small, all segments present. Rami of all the uropods free, 3rd uropod not reaching the tip of the telson.

Type Species : *Streetsia challengerii* Stebbing, 1888.

The genus *Streetsia* contains 4 species - *S. challengerii* Stebbing 1888; *S. steenstrupi* (Bovallius, 1887); *S. porcella* (Claus, 1879) and *S. mindanaonis* (Stebbing, 1888). Under *S. porcella*, 3 adult males were found to show considerable intra-specific variation which is described in detail by the author for the first time and here it is treated as a variety.

- Body compactly built; cephalon elongated, ventral border with widely spaced spinules, rostrum short 1
- Body compactly built and stout, cephalon relatively short, produced into a short downwardly directed rostrum which is half the length of the cephalon 4
- Body elongated and narrow, perfectly stream lined; cephalon highly elongated in male, oblong in female (except rostrum); pleon segments with a pair of lateral glands on the ventral half 2
- Body elongated, cephalon regularly narrowing towards the tip of the rostrum, rostrum long with well spaced spinules 3
1. Pleon segment successively decreasing in depth backwards. Double segment one and a half times as long as broad. Telson slightly shorter than double pleon segment. Carpus of the 1st pereopod as long as broad, its distal border nearly transverse and inner distal part produced into a triangular apically sharp process, inner and distal borders finely serrate, surface, except near the outer margin covered with several stiff setules. Carpus of 2nd pereopod nearly equal in length and width but its inner distal part prolonged into a long process, nearly as long as the segment, borders of the process weakly serrate, its surface with stiff setules.
- Pereopods 3 & 4 simple; basis of 5th and 6th expanded; basis of 7th oblong. First uropod reaches beyond the tip of the 3rd *Streetsia steenstrupi*
2. Double pleon segment highly elongated, one and a half times longer than the telson. Pereopod 1 weakly chelate, carpus slightly longer than broad, internally armed with stiff setae. Carpus of the 2nd pereopod slightly swollen and internally produced into a stout

conical lobe reaching the tip of the propodus, borders with fine spinules. Basis of 5th pereopod expanded on outer side; basis of 6th pereopod elongate ovate, basis of 7th pereopod steadily narrowing distalwards *S. mindanaonis*

- 3. First three pleon segments successively becoming shallower backwards, their postero-lateral parts angular but not produced. Double pleon segment as long as telson.

Carpus of pereopod 1 long as broad, widening distalwards, its distal border nearly transverse, inner distal part expanded with feebly serrate borders and setose surface. Carpus of 2nd pereopod broader than long, its inner and distal borders serrate, inner distal part drawn out into a triangular thumb terminating in a spine.

Pereopods 3 & 4 moderately flattened. Basis of 5th pereopod with straight inner border and convex outer border; basis of 6th pereopod with convex side narrowing distalwards, its lower distal part prolonged into a prominent conical process *S. challengeri*

- 4. Pleon segment 1-3 are rather deep with postero-lateral prolongations acute.

Carpus of pereopod 1 is produced into a more or less rounded lobe armed with about 10 unequal teeth, inner border finely serrate, inner surface of the segment carries large number of stiff spinate setae. Carpus of the 2nd pereopod, inner distal angle drawn out into a long spine, distal border is irregularly serrate. Basis of pereopod 5 with a straight upper border; basis of 6th pereopod distal border serrated, the remaining segments armed with well spaced spinules; basis of 7th pereopod ovate. Inner ramus of the 3rd uropod much flattened

. *S. porcella* (typical)

Cephalon elongate triangular, pleon segment 1-3 very deep, deeper than the pereon plus the coxal plates, postero laterally angular, not produced. Carpus of pereopod 1 broader than long and widening distalwards, distal border transverse, inner distal part covered with stiff spines, borders not serrated, propodus very narrow (unlike in typical form).

Carpus of 2nd pereopod much broader than long, inner distal part less densely spiny than in first leg, distal borders with about 6 spines successively increasing in length, inner distal spine very long, propodus slender and with subparallel sides. Pereopods 3 & 4 not very slender. Basis of 5th pereopod enlarged, nearly twice as long as broad; basis of 6th longer than that of 5th, twice as long as broad; 7th pereopod relatively small

. *S. porcella* (variety).

Streetsia steenstrupi (Bovallius)

(Pl.2b – Figs.II-13 & Pl.15)

Streetsia steenstrupi Bovallius, 1890, p.89, pl.3; – Pirlot, 1938, p.363; – Bernard, 1932, p.296; – Pillai, 1966a, p.191, fig.13; – Fage, 1960, p.42, figs.25-27; – Jossi, 1972, p.128; – Tranter, 1977, p.652; – Vinogradov *et al.*, 1982, p.415, fig.223.

Oxycephalus longiceps Claus. 1879, p.48; – 1887, p.72; – Stebbing, 1888, p.1591, pl.204B.

Oxycephalus steenstrupi Bovallius, 1887a, p.37.

Remarks: The detailed illustrations of this species published by Stebbing (1888) and Pillai (1966a) clearly apply to author's specimens. However, there is some difference in the armature of the uropods (pl. 15, Fig. G) compared to the descriptions by Fage (1960) and Bovallius (1890).

Distribution: This tropical and sub-tropical species was found in the southern areas of the Atlantic, the Pacific and the Indian Ocean in addition to the central Atlantic. So far, it has not been collected from the north Atlantic, north Pacific, Mediterranean, Red Sea, Persian Gulf, north Arabian Sea and the south-central Indian Ocean. Its northern geographical limit appeared to be 36°42'N and its southern limit as 41°47'S.

Streetsia mindanaonis (Stebbing)

(Pl.3a – Figs.J1-J2 & Pl.16)

Streetsia mindanaonis Bovallius, 1890, p.93; – Fage, 1960, p.45, figs.28-32; – Pillai, 1966a, p.192, fig.14; – Jossi, 1972, p.128; – Vinogradov *et al.*, 1982, p.419, fig.225.

Leptocotis mindanaonis Stebbing, 1888, p.1598, pl.204.

Remarks: As in *Simorhynchotus antennarius* the exopod of uropod 3 is curved outwards in *S. mindanaonis* though not to the same extent and its distal margin is dentate (pl. 16, Fig. H). Except for this, the descriptions provided by Stebbing (1888), Fage (1960) and Pillai (1966a) clearly apply to author's specimens.

S. mindanaonis is closely related to *S. steenstrupi* than to the other two species. But it can be distinguished by the prominent constriction on the dorsal side of the Cephalon, the presence of luminescent organs on the first three pleon segments and considerably elongated double pleon segment. Both have the same type of body and pereopods 1 and 2.

Distribution: *S. mindanaonis* was collected from all the three major oceans between 30°N and 30°S latitudes.

Streetsia challengerii Stebbing
(Pl.3a – Figs.K1-K2 & Pl.17)

Streetsia challengerii Stebbing, 1888, p.1603, pl.207; – Bovallius, 1890, p.82; – Senna, 1908, p.153; – Walker, 1909, p.55; – Chevreux, 1913, p.24; – 1935, p.203; – Stephensen, 1925, p.194, fig.75; – Spandl, 1927, p.186, figs.18-19; – Pirlot, 1929, p.164; – 1938, p.369; – Barnard, 1930, p.435; – 1932, p.295; – 1937, p.192; – 1940, p.486; – Shoemaker, 1945, p.255; – Hurley, 1956, p.19; – Fage, 1960, p.51, fig.37; – Brusca, 1967, p.387; – Pillai, 1966a, p.189, fig.12; – Jossi, 1972, p.128, fig.21; – Tranter, 1977, p.652; – Vinogradov *et al.*, 1982, p.413, fig.222.

Oxycephalus pronoides Bovallius, 1887, p.36.

Streetsia pronoides Bovallius, 1890, p.84, pl. III, figs.7-12; – Pirlot, 1938, p.369.

Streetsia carinata Bovallius, 1890, p.87, pl.III.

Streetsia stebbingi Chevreux, 1900, p.161, pl. 18, fig.4.

Streetsia washingtoni Senna, 1903, p.15, pl.2; – Stewart, 1913, p.263.

Streetsia sabauda, Colosi, 1918, pl.2, figs. 5-8, p.218.

Streetsia qausi Spandl, 1927, p.184, fig.17.

Remarks: This species can be distinguished from its congeners by the conical prolongation of the inner distal part of the basis of the second pereopod and the extremely elongated telson which is clearly longer than the double pleon segment. But it should be pointed out that judging from IIOE collection these two characters are subject to some variation. Author's specimens from Bay of Bengal show a higher degree of armature on the carpus of pereopod one and two than those from other parts of the Indian Ocean.

Distribution: This species common in Mediterranean was found distributed in the warm waters of all the oceans, more widely than *S. steenstrupi* and *S. mindanaonis* between 40°N and 45°S.

Streetsia porcella (Claus)
(Pl.3a – Figs.L1-L2; Pls.18a & 18b)

Streetsia porcella Senna, 1903, p.10; – Stephensen, 1925, p.192; – Pirlot, 1929, p.165; – 1938, p.370; – Barnard, 1930, p.435; – 1932, p.295; – 1937, p.192; – Ruffo, 1939, p.217; – Shoemaker, 1945, p.255; – Reid, 1955, p.29; – Hurley, 1960, p.282; – Fage, 1960, p.63; – Tsuruta, 1963, pp.160-161; – Pillai, 1966a, p.188, fig. 11; – Jossi, 1972, p.128; – Tranter, 1977, p.652; – Vinogradov *et al.*, 1982, p.412, fig.224.

Streetsia porcellus Bovallius, 1890, p.83, pl. IV, figs.4-6.

Oxycephalus Procellus Claus, 1879b, p.48; – 1887, p.71, pl.24, figs.7-9; – Bovallius, 1887a, p.36; – Stebbing, 1888, p.1587, pl.203 (= *Streetsia porcella*); – Irie, 1948, p.38; – 1957b, p.355; – 1958, p.144; – 1959, p.32.

Streetsia intermedia Spandl, 1927, p.188, figs.20-21.

Streetsia nyctiphanes, Fage, 1934, p.1631.

Remarks: *S. porcella* can be easily distinguished from its congeners by the subchelate second pereopod (chelate in all the other species) the relatively short

double pleon segment, the flattened rami of the second and third uropods, particularly the endopod of the third, and the size of the basis of the seventh pereopod in relation to the rest of the limb. In this species the basis of the seventh pereopod is shorter than the rest of the limb (equal in other species).

S. porcella shows a wide range of intra-specific variation and this is perhaps the reason for the species having been described under several names. But Fage (1960) after studying his rich material concluded that *S. intermedia* Spandl (1927) and *S. nyctiphanes* Fage (1934), as synonymous with *S. porcella*. This species has been illustrated in detail by Stebbing (1888), Spandl (1927) and Pillai (1966a). These illustrations clearly apply to the IIOE material (Pl. 18a)

The characters given for *S. porcella* (variety) are based on three males (Pl. 18b) collected from the southeast Indian Ocean between Java and Australia along the 110°E meridian. These specimens differ from typical material mainly in the shape and armature of the carpus of the first and second pereopods (Pl. 18a, Figs A-B). The author was inclined to refer these to a new species but as the species is subject to considerable inter-specific variation and the three specimens differ only in one character, he has described it in detail.

In author's collection there are adult males showing the proximal constriction of the cephalon (Pl. 3a, Fig. 2) as illustrated by Stebbing. But males without this constriction are also very common (Pl. 3a, Fig. L1). The length of the cephalon in relation to total length in males is slightly more than one-third and in females clearly less than that. The pereon and pleon are sub-equal in length.

Distribution: *S. porcella* was found in the warm waters of the Atlantic and the Pacific from 37°N to 38°S. In the Indian Ocean it extends from 19°N to 39°S. It was also recorded from the Mediterranean waters, the Sea of Japan and the New Zealand waters.

Genus – *Rhabdosoma* White

Rhabdosoma White, 1847, p.138; – Admas & White, 1848, p.63; – Dana, 1852, p.1009; – Spence Bate, 1862, p.344; – Streets, 1878, p.286; – Claus, 1879, pp.42,49; – 1884, p.455; – 1887, pp.68, 73; – Gerstaecker, 1886, p.487; – Giles, 1887, p.219; – Stebbing, 1895, p.366; – Spandl, 1927, p.207; – Cecchini, 1929, p.11; – Barnard, 1930, p.436; – 1931, p.132; – 1932, p.296; – 1937, p.193; – Pirlot, 1938, p.372; – Fage, 1960, p.87; – Pillai, 1966a, p.194; – Bowman & Gruner, 1973, p.52; – Vinogradov *et al.*, 1982, p.431.

Oxycephalus Milne-Edwards, 1840, p.101.

Macrocephalus Spence Bate, 1858, p.361.

Rhabdonectes Bovallius, 1887, p.39.

Xiphocephalus Bovallius, 1890, p.116.

Pseudanurus Garbowsky, 1895, p.199.

Diagnosis: Body slender and highly elongated. Cephalon much longer than pereon, proximally narrower to produce a long neck and distally drawn out into a very long slender rostrum; the swollen part of the cephalon elliptic, covered

by the eyes. Pereon segments short, completely fused with the coxal plates. Pleon segments 1-3 longer than percon segments, postero-laterally drawn out. Double pleon segment long, more than three times as long as broad. Telson free, very long and slender. Pereopods 1 & 2 small, chelate. Pereopods 3-6 slender; seventh very small, consisting of basis or 1 or 2 additional minute segments. Uropods slender and elongated, endopods of 2nd and 3rd fixed with protopod, exopods much reduced in size. Branchiae on pereon segments 2-6 or 5-6 in females, in males on 4-6 or 5-6. Brood lamellae on pereon segments 2-6, reduced in size.

Type species: Oxycephalus armatus Milne-Edwards, 1840.

Pirlot (1936) discussed the status of the species described till then and found only *R. armatum* (Milne-Edwards, 1840), *R. whitei* Bate, 1862 and *R. brevicaudatum* Stobbing, 1888 as valid. Since then Fage (1954) created *R. minor* and his later study (Fage, 1960) based on the rich collections of the Dana Expedition confirmed its validity. Genus *Rhabdosoma* thus includes four valid species, all of them are represented in the IIOE collections.

1. Rostrum more than twice as long as cephalon. Telson longer than double pleon segment 2
 Rostrum slightly longer than cephalon.
 Telson shorter than double pleon segment 3
2. Carpus of the 1st pereopod with a prominent sub-apical spine-like process. Basis of pereopod 6 with broad basis. Pereopod 7, a mere pyriform lobe carrying a small two-segmented appendix. Exopods of uropods, very small. Telson almost as long as 3rd uropod in male, in female much longer
 *Rhabdosoma armatum*
 Rostrum one third of the total length of the body. Posterolateral corners of the first 3 pleon segment produced into slender apically pointed process. Carpal process of pereopod 1 longer than the segment proper, edges serrated. Coxal plates of 7th pereopod posteriorly drawn out into conical process, basis a pear shaped lamina, rest of the segments absent. Exopods of uropods not very small. Third uropod reaching the distal third of the telson
 *R. whitei*
3. Basal ventral side of the cephalon with a prominent spine like process followed by a small one. Carpal process of the 1st pereopod as long as the segment proper, its inner and outer borders serrated, dactylus with an accessory spine at the middle of its inner side. Carpal process of pereopod 2 serrated only along the inner side, dactylus with accessory spine shifted towards the tip. Pereopod 7 triangular with 2 minute segments. The length of the uropods increase considerably from 1 to 3, endopods are minute except

in the case of uropod 1. Telson about one fourth the length of double urosome segment *R. brevicaudatum*.

Carpus of pereopod 1 broader than long and produced into a stout process, its borders finely serrate. Carpus of pereopod 2 relatively slender. Basis of pereopod 5 & 6 flattened. Pereopod 7 one segmented, clearly longer than broad. First uropod very long, over reaching the proptopod of 3rd uropod, exopod well developed, both rami free. Second uropod reaching or slightly over reaching the tip of the telson, exopod much reduced. Third uropod about four times as long as telson. Telson about half the length of the double pleon segment *R. minor*

Rhabdosoma armatum (Milne-Edwards)

(Pl.4 – Fig.O & Pl.19)

Rhabdosoma armatum Adams & White, 1848, p.63. pl.13, figs.7-8; – Streets, 1878, p.288, pl.2. fig.7; – Claus, 1887, p.74, pl.26. figs.1-4; – Spandl, 1927, p.210; – Barnard, 1930, p. 436; – 1931, p.132; – 1932. p.297; – Pirlot, 1938, p.374; – Nayar, 1959, p.48, pl.16, figs.6-11; – Fage, 1960, p.88, figs.60-63; – Tsuruta, 1963, p.160, fig.58; – Pillai, 1966a, p.196, fig.16; – Brusca, 1973, p.23; – Vinogradov *et al.*, 1982, p.432, fig.231.

Oxycephalus armatus Milne-Edwards, 1840, p.451.

Macrocephalus longirostris Bate, 1858, p.362.

Rhabdonectes armatus Bovallius, 1887, p.39.

Xiphocephalus armatus Bovallius, 1890, p.119, pl.6.

Rhabdosoma sanzoi Cecchini, 1929, p.12, pl.VI.

Remarks: *R. armatum* closely resembles *R. whitei* but can be distinguished by the presence of a prominent spine on the thumb-like process of the carpus of the first pereopod. This is a character not observed in any other species. Among other diagnostic characters can be mentioned the serrate lower border of the pleon segments, the clearly flattened and expanded merus of pereopods three to five, the differently shaped coxal plate of the seventh pereopod and the rudimentary exopods of uropods two and three.

Fage (1960) observed a small degree of sexual dimorphism in this species. According to him the neck and the rostrum in the female are longer than in male. The telson in the male is much shorter than in the female, almost equal to that of the trunk (mesosome+metasome) in females but about half the length of the trunk in the males. In the male the third uropod almost reaches the tip of the telson while in the female the telson reaches far beyond the tip of the third uropod. Cecchini (1929) created *R. sanzoi* with the help of a single male collected from the Red Sea. He was apparently misled by the sexual dimorphism, characteristic of *R. armatum*.

During development, the relative proportions of the telson and the uropods undergo changes. In subadult females the telson is clearly shorter than the third uropod but just prior to sexual maturity grows rapidly and over-reaches the uropod. Fage has observed this in *R. armatum* and *R. whitei*. The seventh pereopod which is normally a circular or pear-shaped lamina shows some variation. In an ovigerous female Fage (1960) has found the seventh pereopod on the right side three segmented and its counterpart with a reduced basis. But in embryos taken out of the marsupium the seventh leg always was three segmented.

Distribution: In the north Pacific it was found to cross the Tropic of Cancer – both on the eastern and western sides, whereas in the south Pacific it was distributed well within 20°S latitude. In the Atlantic it was not seen north of the equator and towards south it extended upto 20°S latitude. It was not recorded from the Mediterranean. In the Indian Ocean it was found to extend from 15°N to 10°S latitudes.

Rhabdosoma whitei Bate

(Pl.4 – Figs. P1-P2 & Pl.20)

Rhabdosoma whitei Bate, 1862, p.345, pl.54, fig.7; – Streets, 1878, p.287, fig.6; – Stephensen, 1925, p.207; – Spandl, 1927, p.208, figs.31a-f; – Cecchini, 1929, p.11, pl.V; – Pirlot, 1930, p.16; – 1938, p.373; – Barnard, 1930, p.436; – 1931, p.132; – 1932, p.296; – 1937, p.193; – 1940, p.486; – Rose, 1932, p.63; – Schellenberg, 1933, p.154, figs.1-4; – Chevreux, 1935, p.203; – Shoemaker, 1945a, p.255; – Hurley, 1960, p.282; – Reid, 1955, p.31; – Fage, 1960, p.97, fig.71; – Evans, 1961, p.203; – Pillai, 1966a, p.194, fig. 15; – Jossi, 1972, p.128; – Brusca, 1973, p.652; – Thurston, 1976, p.439; – Tranter, 1977, p.652; – Vinogradov *et al.*, 1982, p. 435, fig.232.

Rhabdosoma armatus Eydoux & Souleyet, 1841, 8, p.267, pl.4, figs.13-32.

Rhabdosoma armatum Claus, 1871, p.155; – 1879, p.51; – 1887, p.74, pl.25, figs.2-8, pl.26, fig.5; – Stebbing, 1888, p.1607.

Rhabdonectes whitei Bovallius, 1887, p.39.

Rhabdosoma investigatoris Giles, 1887, p.219, pl.IV.

Xiphocephalus whitei Bovallius 1890, p.125, pl. VII, figs.1-20; – Walker, 1909, p.55.

Xiphocephalus lillejeborgi Bovallius, 1890, p. 131, pl.VII, figs.21-24.

Remarks: *R. whitei* is much shorter than *R. armatum*. In addition to the size difference these two species can be distinguished by several other characters, some of which have been mentioned in the remarks under *R. armatum*. To recapitulate, they are: (1) The absence of an accessory spine on the carpal process of the first pereopod. (2) The slender nature of pereopods three to six (basis and merus flattened in *R. armatum*). (3) The prolongation of the posterior part of the coxal plate of the seventh pereopod and the reduction of the limb to a one-segmented lamina (there is a two segmented appendix in *R. armatum*). (4) Much reduced exopods of uropods two and three. (5) In *R. whitei* the first uropod is as long as the third or even longer (always shorter in *R. armatum*). (6) In males there are only two pairs of branchiae (there are three pairs in *R. armatum*).

Distribution: This most widely distributed species has been recorded from the tropical and sub-tropical areas of the Pacific, the Indian and the Atlantic Oceans within 40°N to 40°S latitudes including the Mediterranean and the Caribbean Sea.

Rhabdosoma brevicaudatum Stebbing

(Pl.4 – Fig.Q & Pl.21)

Rhabdosoma brevicaudatum Stebbing, 1888, p.1612, pl.208; – 1895, p.366; – Chevreux, 1900, p.163; – 1935, p.203; – Pesta, 1920, p.26, fig.1; – Spandl, 1924, p.271; – Stephensen, 1925, p. 205, figs.79-80; – Barnard, 1930, p.436; – Piriot, 1939, p.56; – Shoemaker, 1945, p.255; – Irie, 1959, p.32; – Fage, 1960, p.104, figs.77-78; – Tsuruta, 1963, pp.160-161; – Thurston, 1976, pp.438-439; – Vinogradov, *et al.*, 1982, p.435, fig.233.

Xiphocephalus brevicaudatus Bovallius, 1890, p.133.

Rhabdosoma brachyteles Stebbing, 1895, p.369, pl.55B.

Pseudanurus brevicaudatus Grabowsky, 1895, p. 199.

Remarks: As already indicated in the key to the species; *R. brevicaudatum* can be easily distinguished from *R. armatum* and *R. whitei* by the extremely short telson which is less than a quarter of the length of the double pleon segment. In this character *R. brevicaudatum* resembles *R. minor* but the latter has totally different seventh pereopod.

Distribution: It was interesting to note that in all the world oceans *R. brevicaudatum* was distributed more towards the landmasses rather than towards the open ocean.

Thus it was found in the north and the south-western areas of the Pacific, in the Atlantic from the equator to 38°N and also in the Mediterranean Sea. From the nearshore waters of the Indian Ocean they were found to extend from 8°N to 38°S along African coast, from 10°S to 32°S along the Australian coast.

Rhabdosoma minor Fage

(Pl.4 – Figs.R1-R2 & Pl.22)

Rhabdosoma minor Fage, 1954, p.661; – 1960, p. 107, fig.77; – Brusca, 1973, p.23; – Vinogradov *et al.*, 1982, p.437, fig.234.

Diagnosis: *R. minor* closely resembles *R. brevicaudatum* but can be distinguished by the relatively longer telson which is half the length of the double pleon segment and the totally differently shaped 7th pereopod. There are a few other minor differences, the most important being the stronger armature of the chela of *R. brevicaudatum*.

Distribution: This circumtropical species was found in the Atlantic upto the south-west of Iceland in the north and in the south upto 5°S latitude. In the Pacific, though it extended from 31°N to 5°S, it was more confined towards the western and eastern half of the Ocean. In the Indian Ocean it extended 15°N to 35°S latitudes.

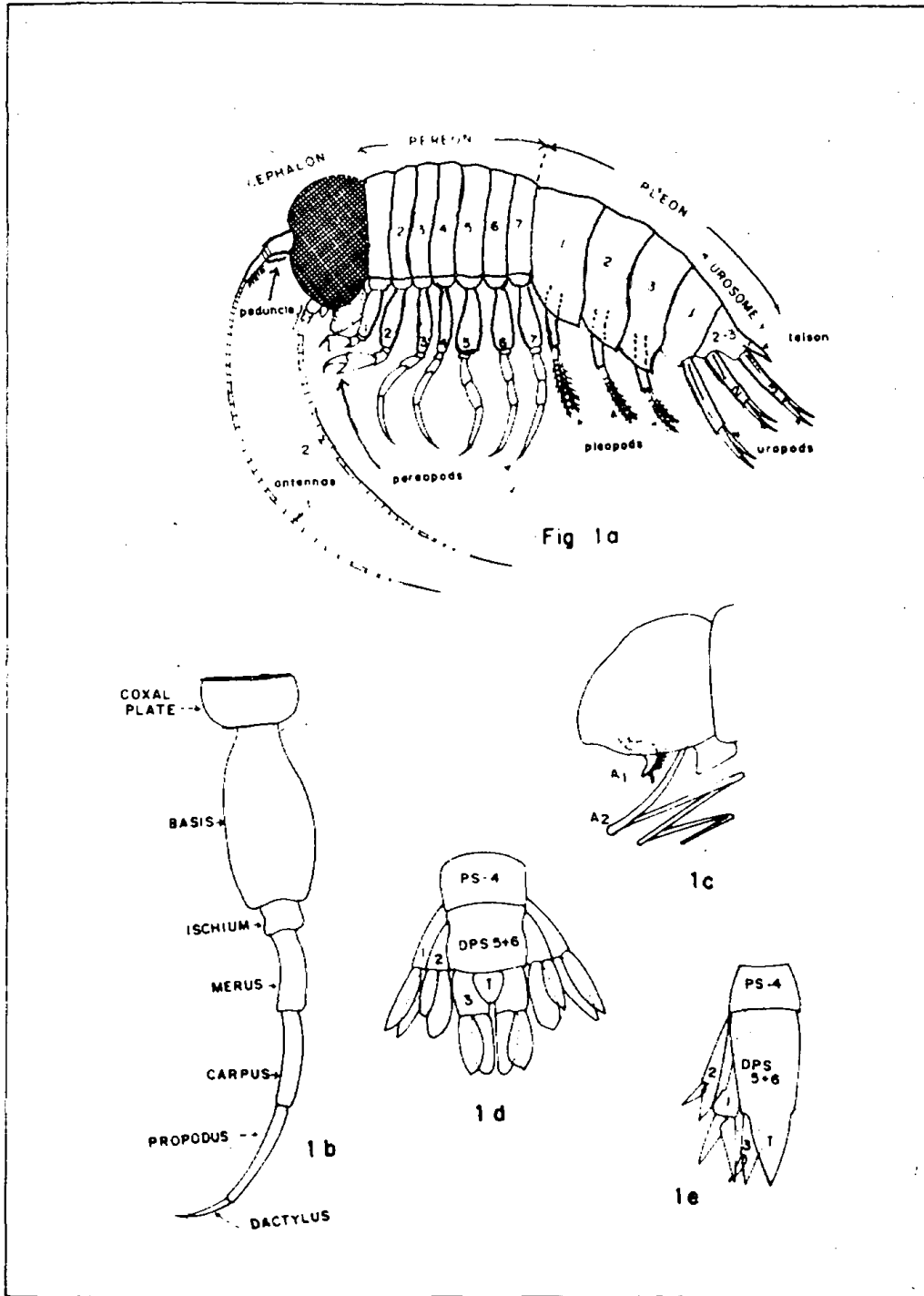


Plate 1. Fig.1a. Hyperiid amphipod, based on *Hyperia* male; Fig.1b. Amphipod pereopod; Fig.1c. Cephalon of platysceloidea, A1 - Antenna-1, A2 - Antenna-2; Fig.1d. Urosome (typical *pronoe capita*, telson not fused with double pleon segment (DPS), endopods not fused with protopods); Fig.1e. Urosome of *Oxyccephalus Piscator* (telson fused with double pleon segment (DPS), endopods of uropods 2 and 3 fused with protopods); Ps-4—Pleon segment-4=(US-1); DPS-5+6 -Double pleon segment=(US-2+3); T-Telson; 1, 2 & 3—Uropods. (Figs 1a-1e. Reproduced from Bowman and Gruner, 1973.)

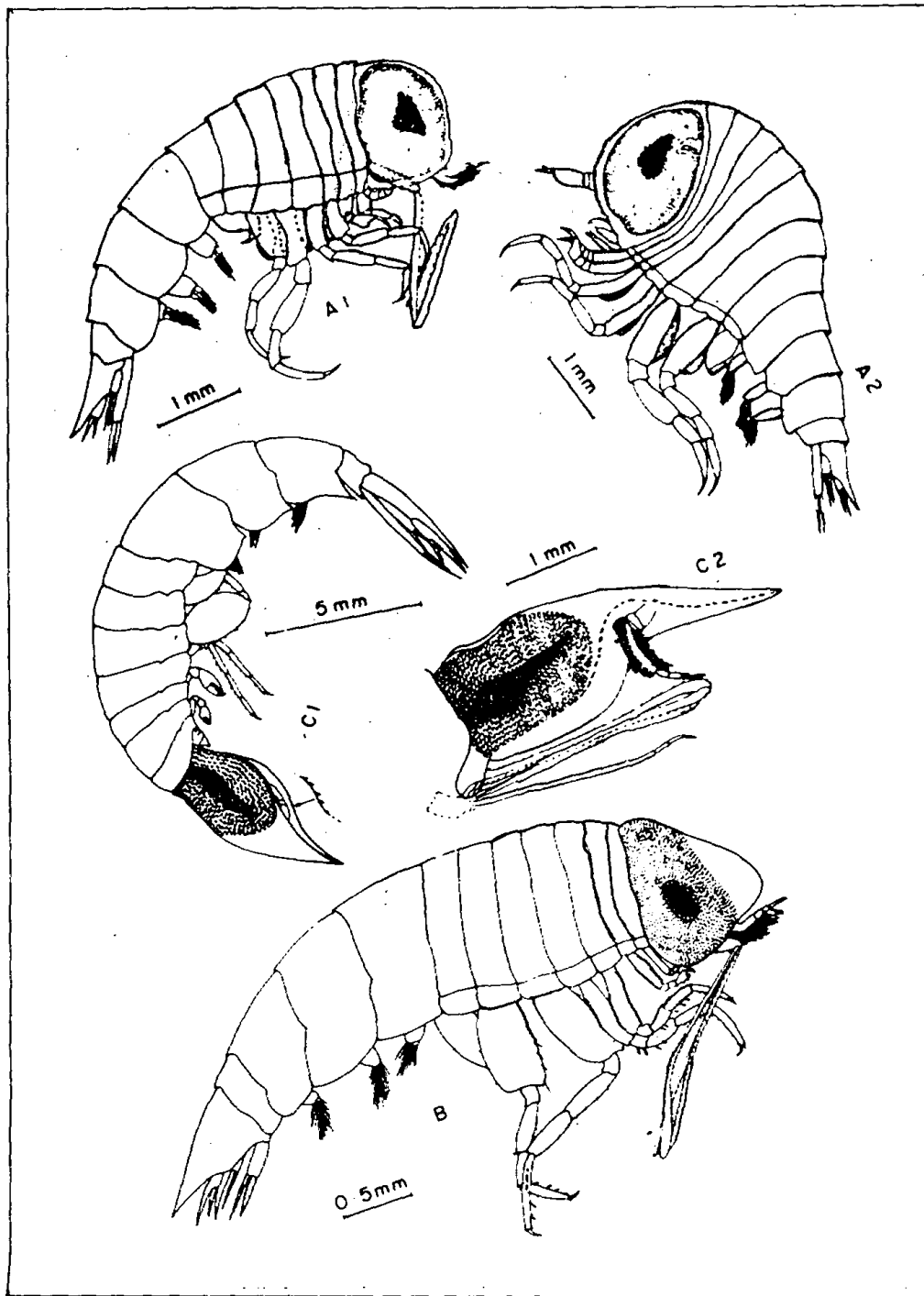


Plate 1a. Fig. A1. *Metalycaea globosa* (adult male), Fig. A2. *M. globosa* (juvenile male), Fig. B. *Simorhyncholus antennarius* (male), Fig. C1. *Oxycephalus piscator* (female), Fig. C2. *O. piscator* (Cephalon-male).

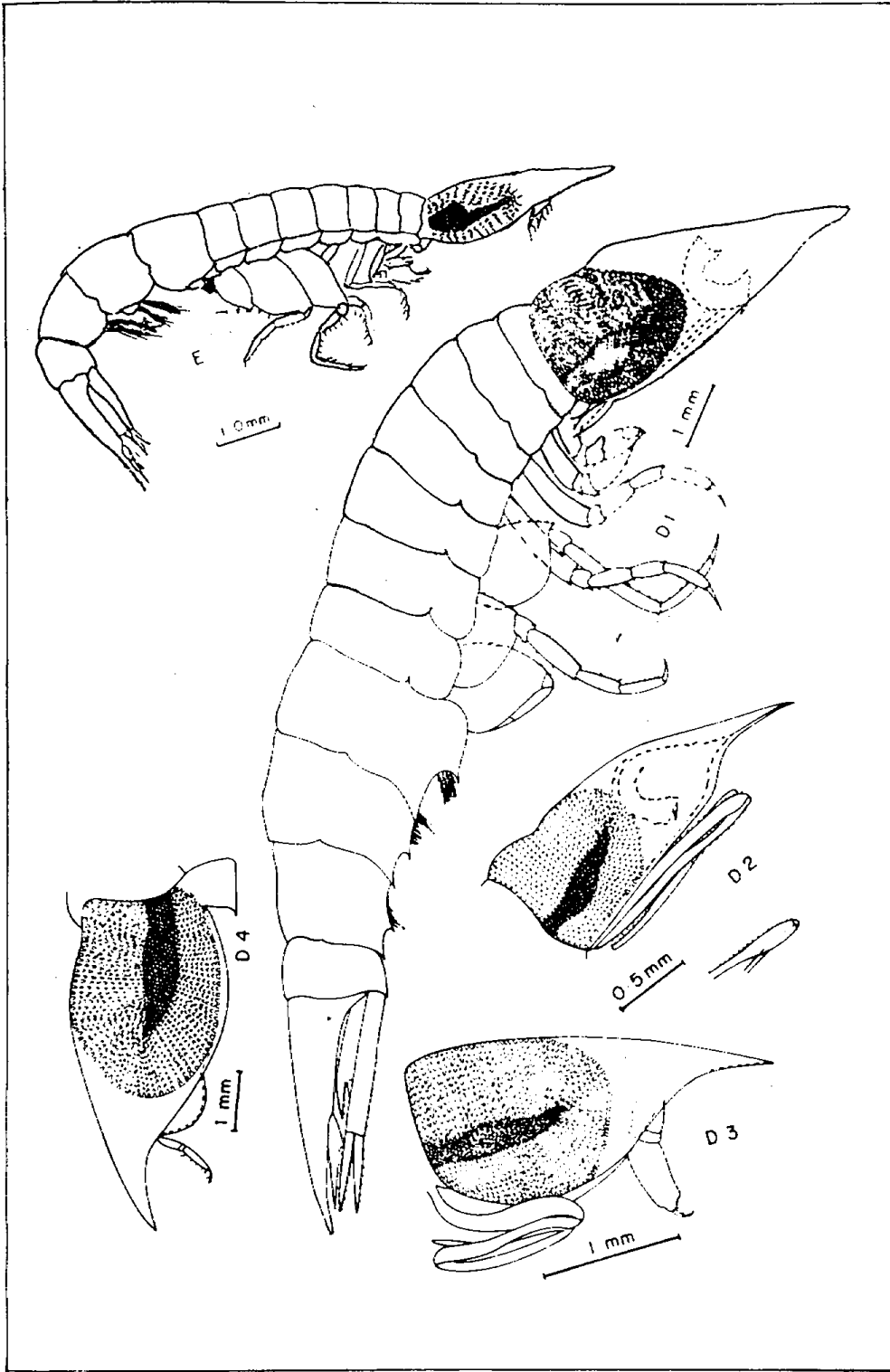


Plate 1b. Fig. D1. *Oxycephalus clausi* (Adult male), Fig. D2. *O. clausi* (Cephalon—adult male), Fig. D3. *O. clausi* (Cephalon—juvenile male), Fig. D4. *O. clausi* (Cephalon—adult female), Fig. E. *Oxycephalus latirostris* (Female).

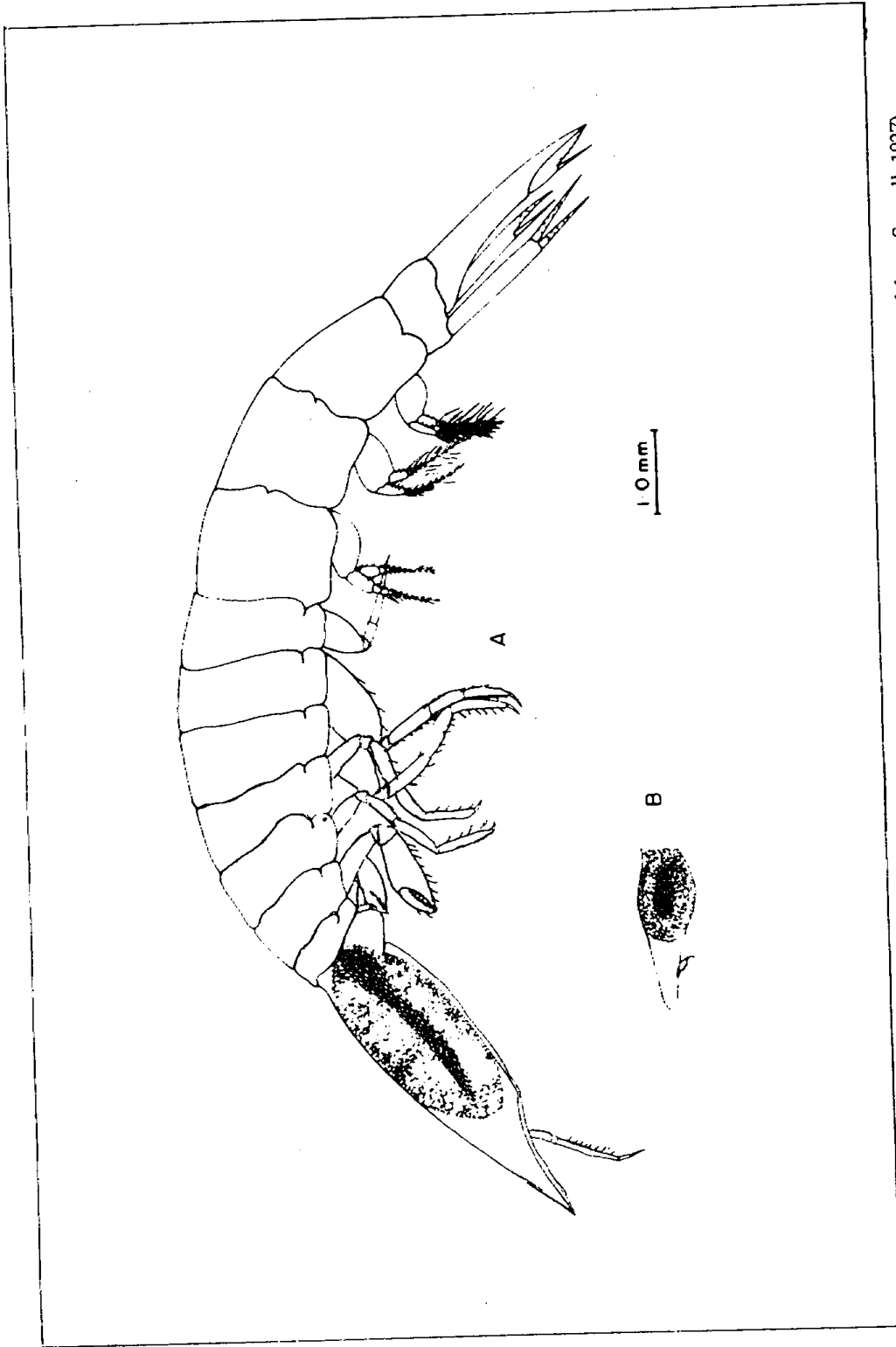


Plate 1c. Fig. A. *Oxycephalus longipes* (Adult female), Fig. B. *O. longipes* (Cephalon-Juvenile female): Reproduced from Spandl, 1927).

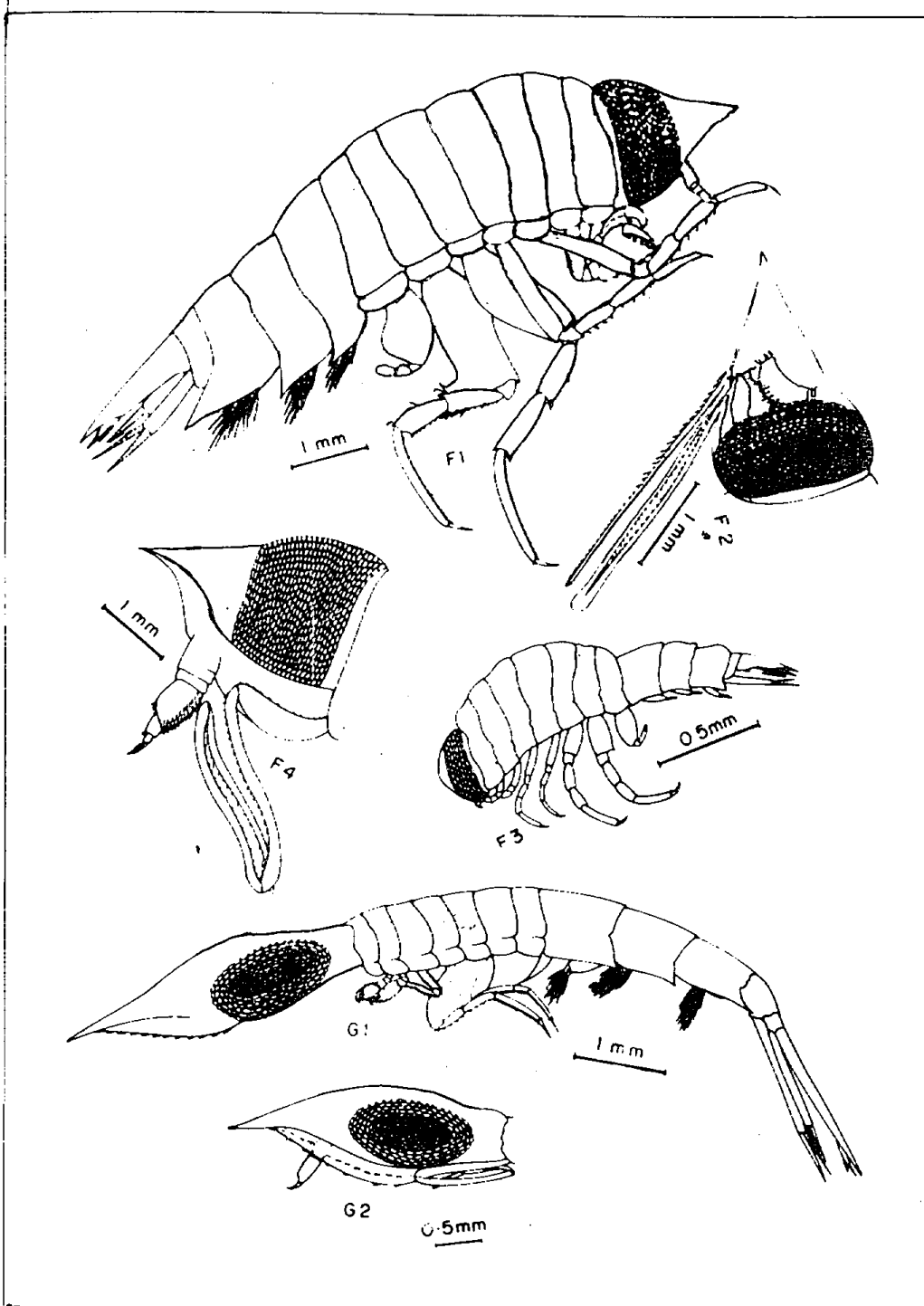


Plate 2a. Fig. F1. *Tullbergella cuspidata* (female), Fig. F2. *T. cuspidata* (Cephalon-male), Fig. F3. *T. cuspidata* (Juvenile from the brood pouch), Fig. F4. *T. cuspidata* (Cephalon-juvenile male), Fig. G1. *Calamorrhynchus pellucidus* (female), Fig. G2. *C. pellucidus* (Cephalon-juvenile male).

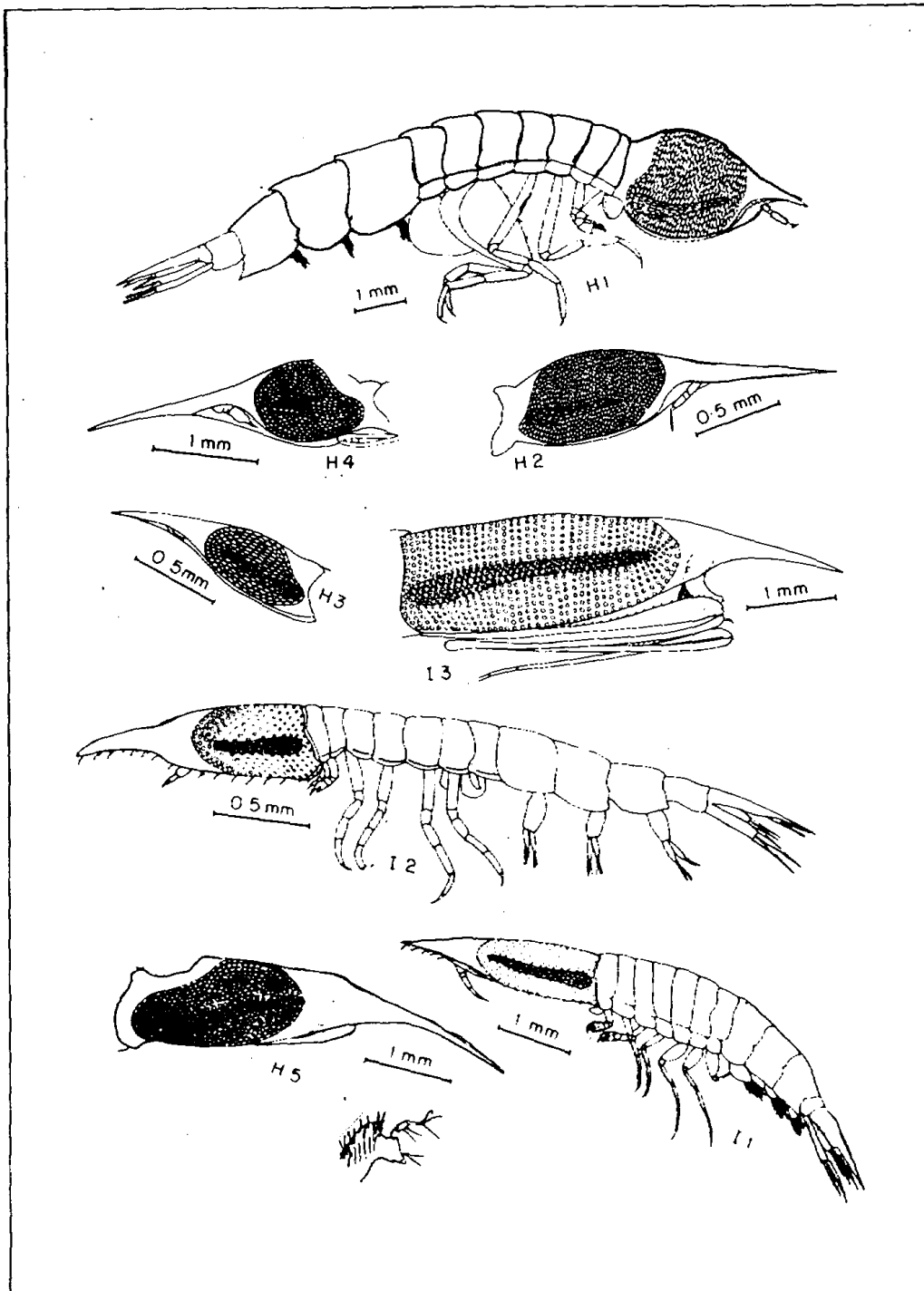


Plate 2b. Fig. I1. *Leptocotis tenuirostris* (adult female), Fig. H2. *L. tenuirostris* (Cephalon-female), Fig. H3. *L. tenuirostris* (Cephalon-juvenile female), Fig. H4. *L. tenuirostris* (Cephalon-juvenile male), Fig. H5. *L. tenuirostris* (Cephalon - adult male). Fig. I1. *Streetsia steenstrupi* (female), Fig. I2. *S. steenstrupi* (juvenile-female), Fig. I3. *S. steenstrupi* (Cephalon-adult male).

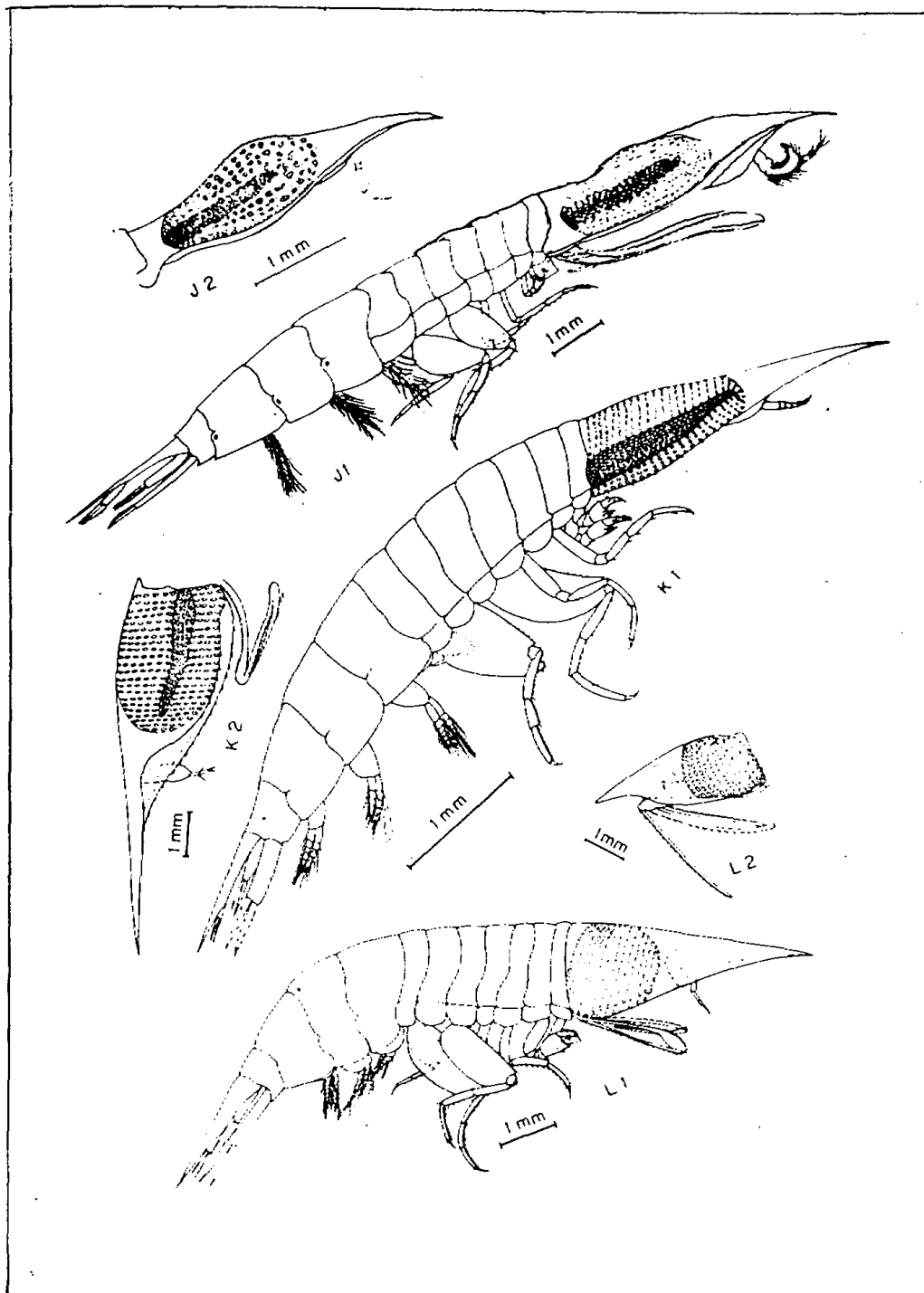


Plate 3a. Fig. J1. *Streetsia mindanaoins* (male), Fig. J2. *S. mindanaoins* (Cephalon-female), Fig. K1. *Streetsia challengerii* (female), Fig. K2. *S. challengerii* (Cephalon-juvenile male), Fig. L1. *Streetsia porcella* (male), Fig. L2. *S. porcella* (Cephalon-male).

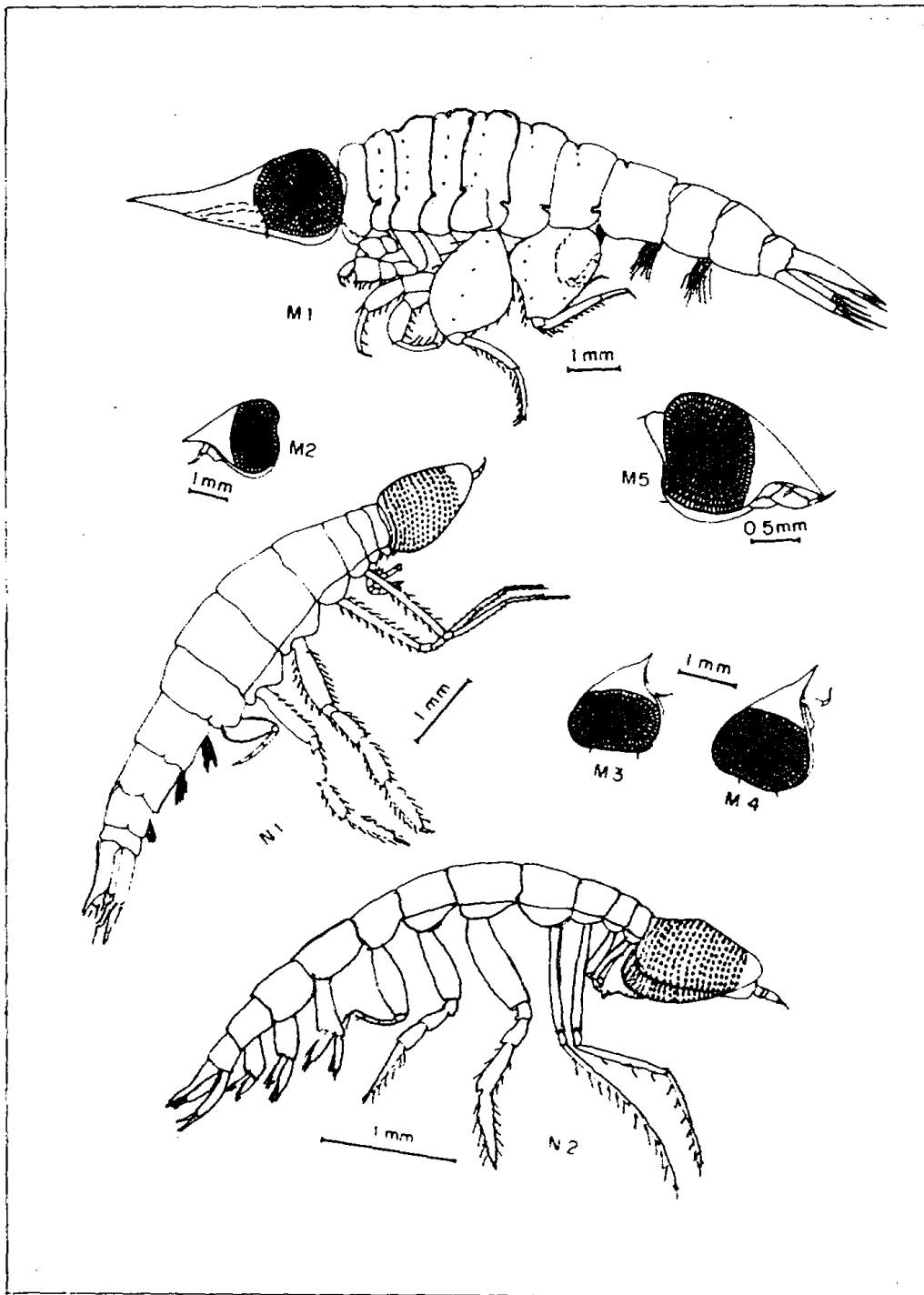


Plate 3b. Fig. M1. *Cranoecephalus scleroticus* (female), Fig. M2-M4. *C. scleroticus* (Cephalon-female), Fig. M5. *C. scleroticus* (Cephalon-juvenile male), Fig. N1. *Glossocephalus milneedwardsi* (female), Fig. N2. *G. milneedwardsi* (juvenile-female).

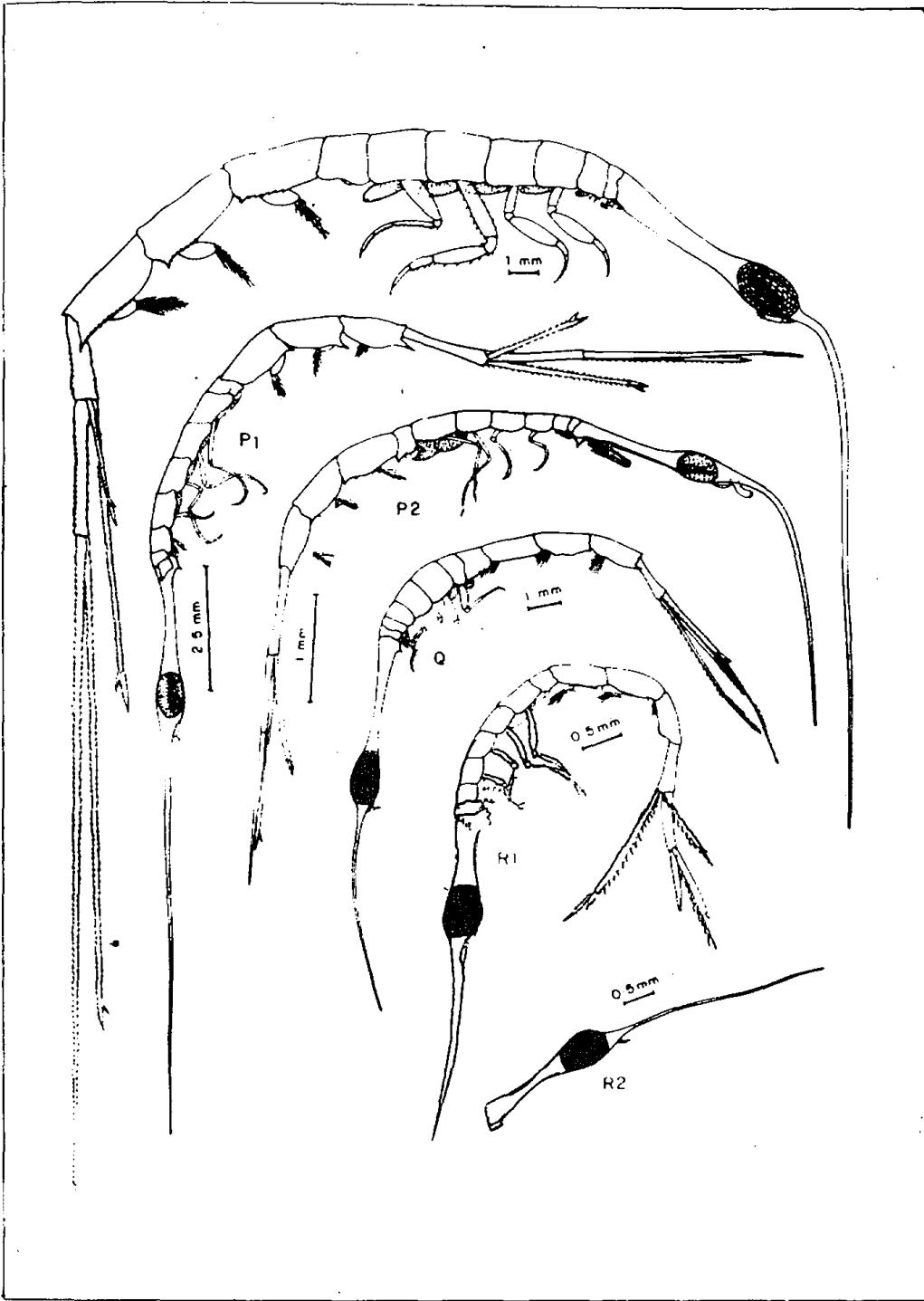


Plate 4. Fig. O. *Rhabdosoma armatum* (female), Fig. P1. *Rhabdosoma whitei* (female), Fig. P2. *R. whitei* (male), Fig. Q. *Rhabdosoma brevicaudatum* (female), Fig. R1. *Rhabdosoma minor* (juvenile-female), Fig. R2. *R. minor* (Cephalon-adult female).

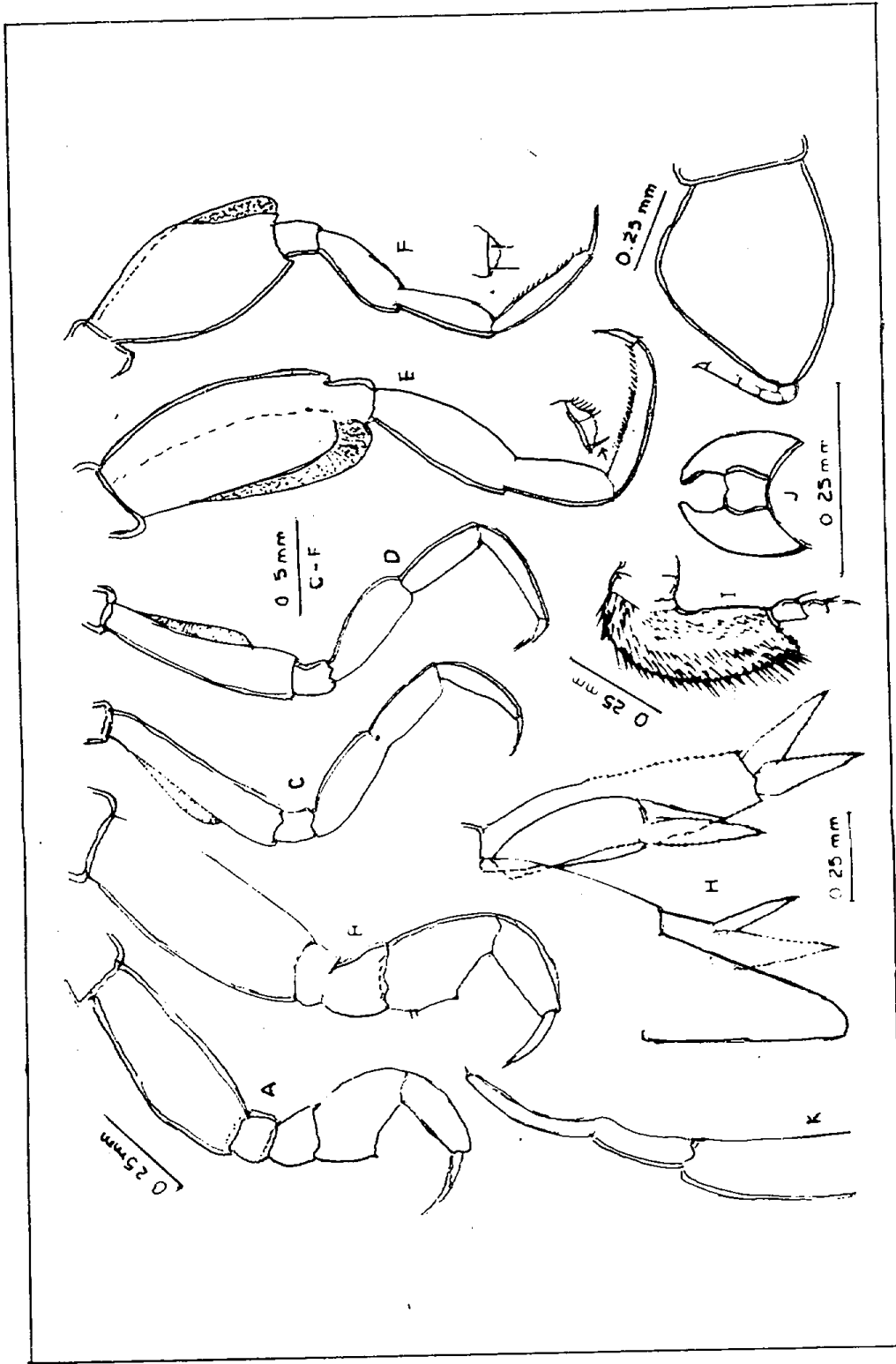


Plate 5a. *Metalycia globosa* Stephensen (adult male) - Figs. A to C. Pereopods 1 to 7, Fig. H. Uropods and telson, Fig. I. Antenna 1, Fig. J. Maxilliped, Fig. K. Mandible.

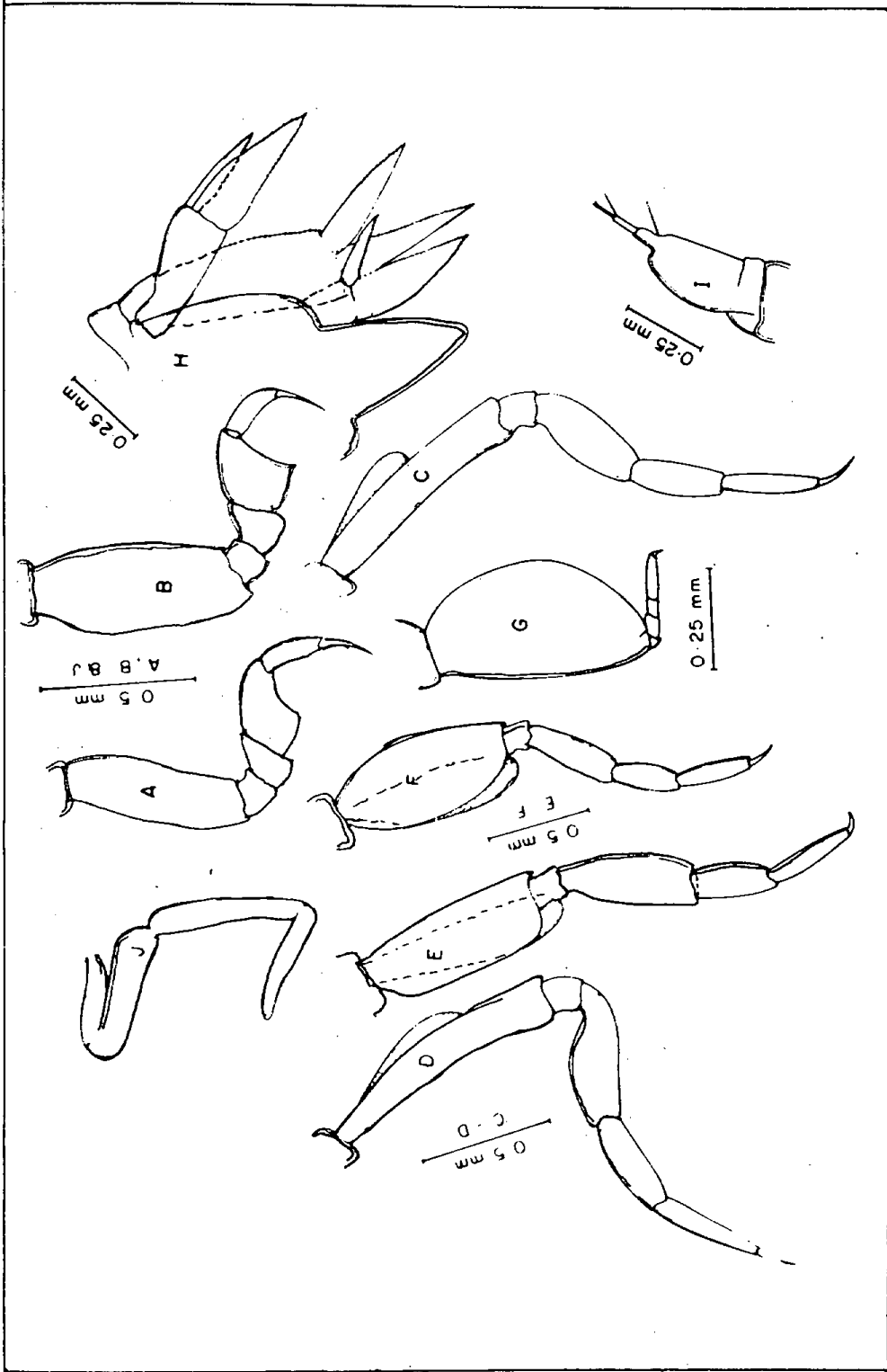


Plate 5b. *Metalycea globosa* Stephensen (juvenile male), Figs. A to G. Pereopods 1 to 7, Fig. H. Uropods and telson, Fig. I. Antenna 1, Fig. J. Antenna 2.

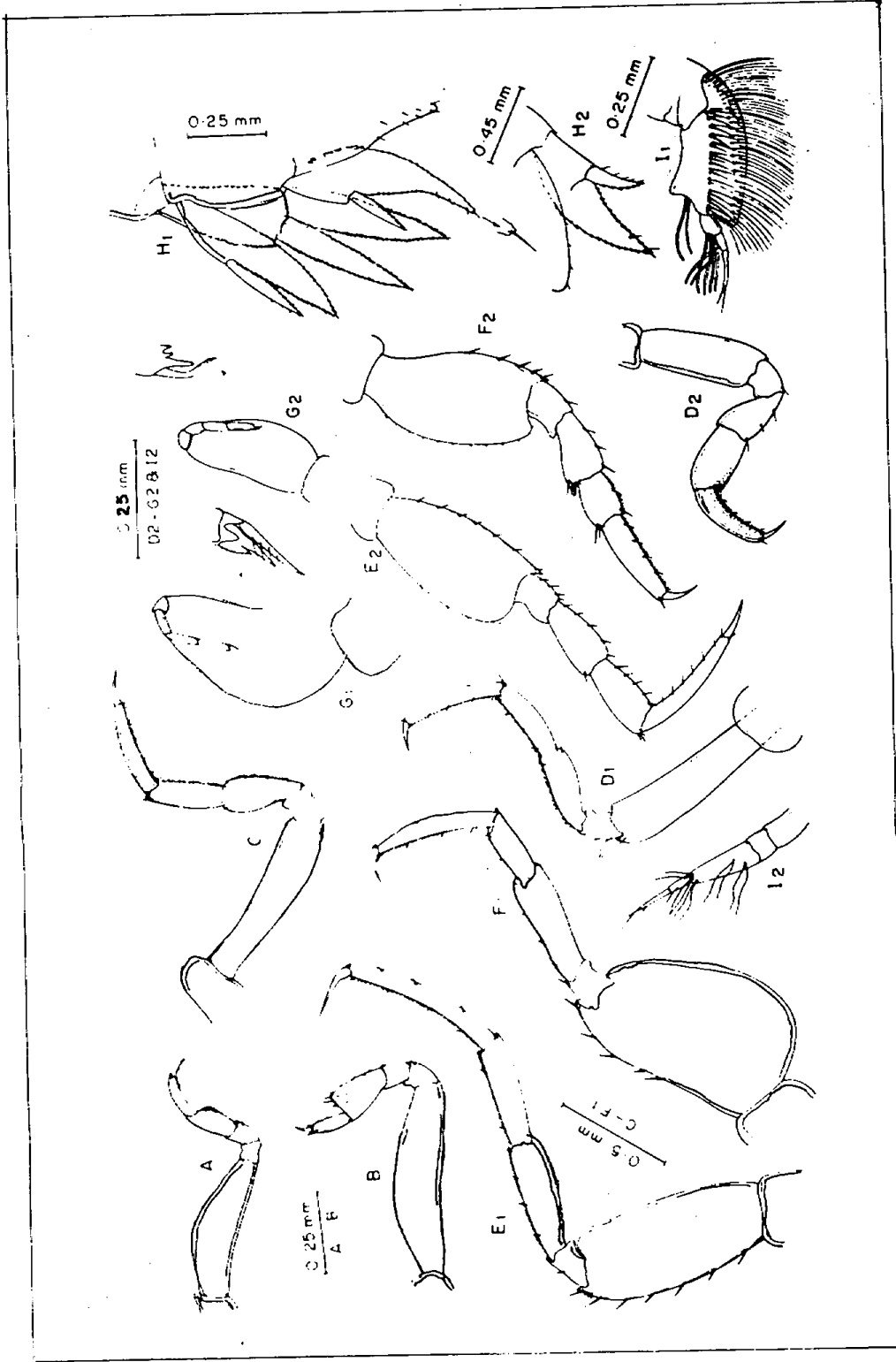


Plate 6. *Simorhynchotus antennarius* (Claus) male - Figs. A-C & D₁ - G₁: Pereopods 1 to 7, Fig. H₁. Uropods and telson, Fig. I₁. Antenna 1. *Simorhynchotus antennarius* female - Figs. D₂ - G₂: Pereopods 4 - 7, Fig. H₂. Uropod 3 and telson, Fig. I₂. Antenna 1.

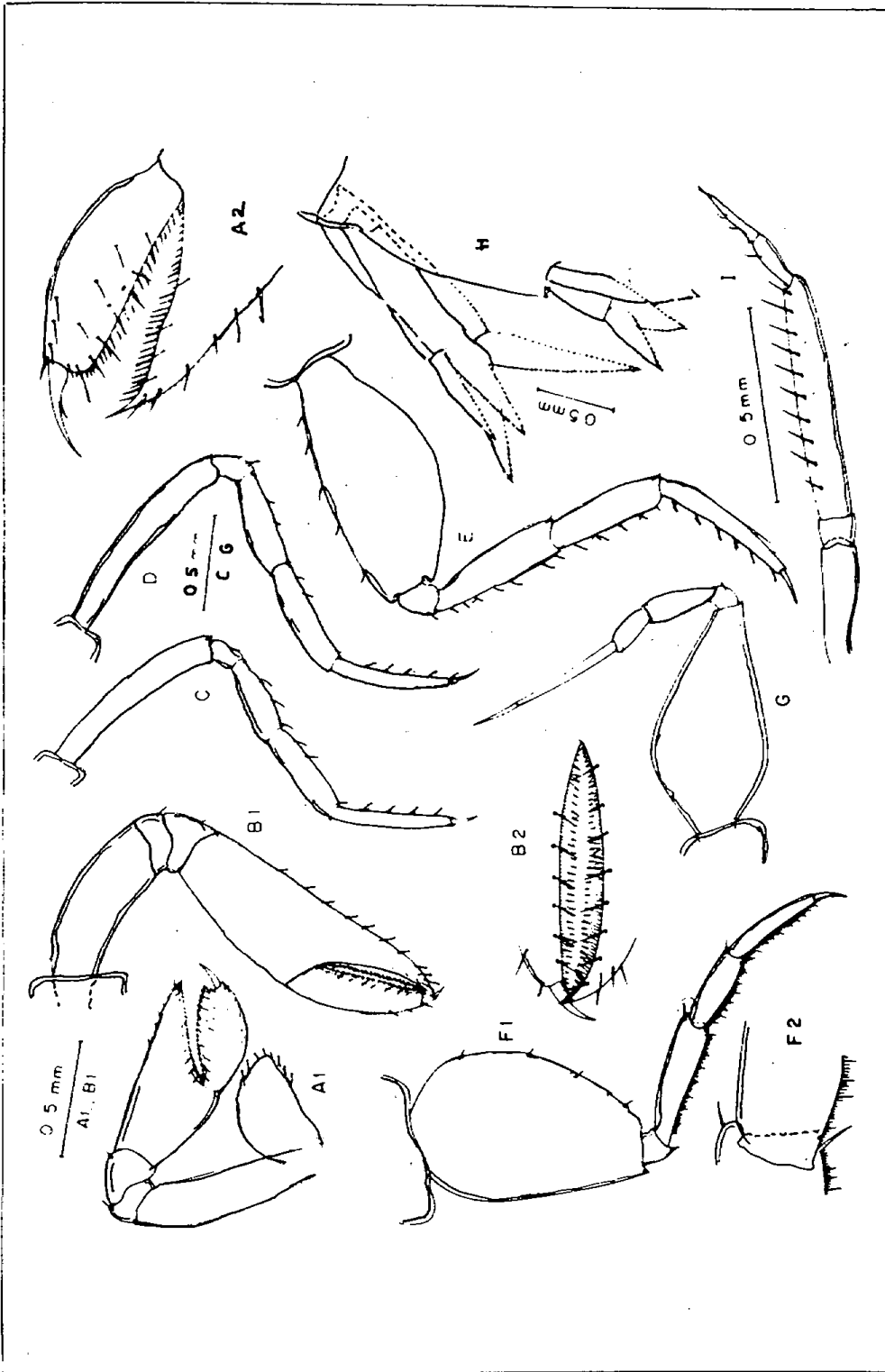


Plate 6a. *Oxycephalus longipes* (female) - Figs. A1 & A2. Pereopod 1, Figs. B1 & B2. Pereopod 2, Figs. C to E. Pereopods 3 to 5, Figs. F1 & F2. Pereopod 6, Fig. G. Pereopod 7, Fig. H. Uropods and telson, Fig. I. Antenna I.

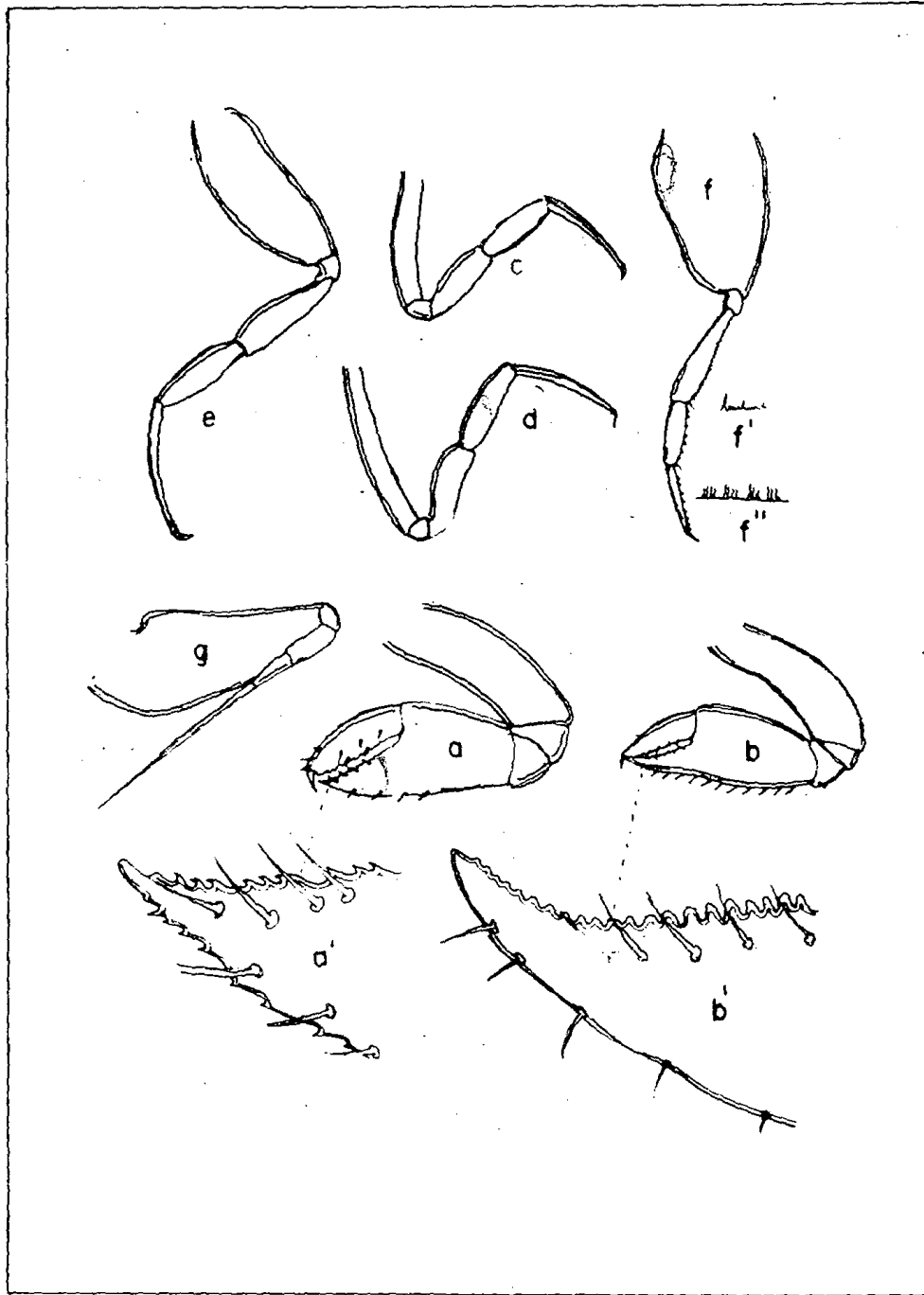


Plate 6b. *Oxycepalus longipes* (juvenile female) Spandl

Figs. A to G. Pereopods 1 to 7 (Reproduced from Spandl, 1927).

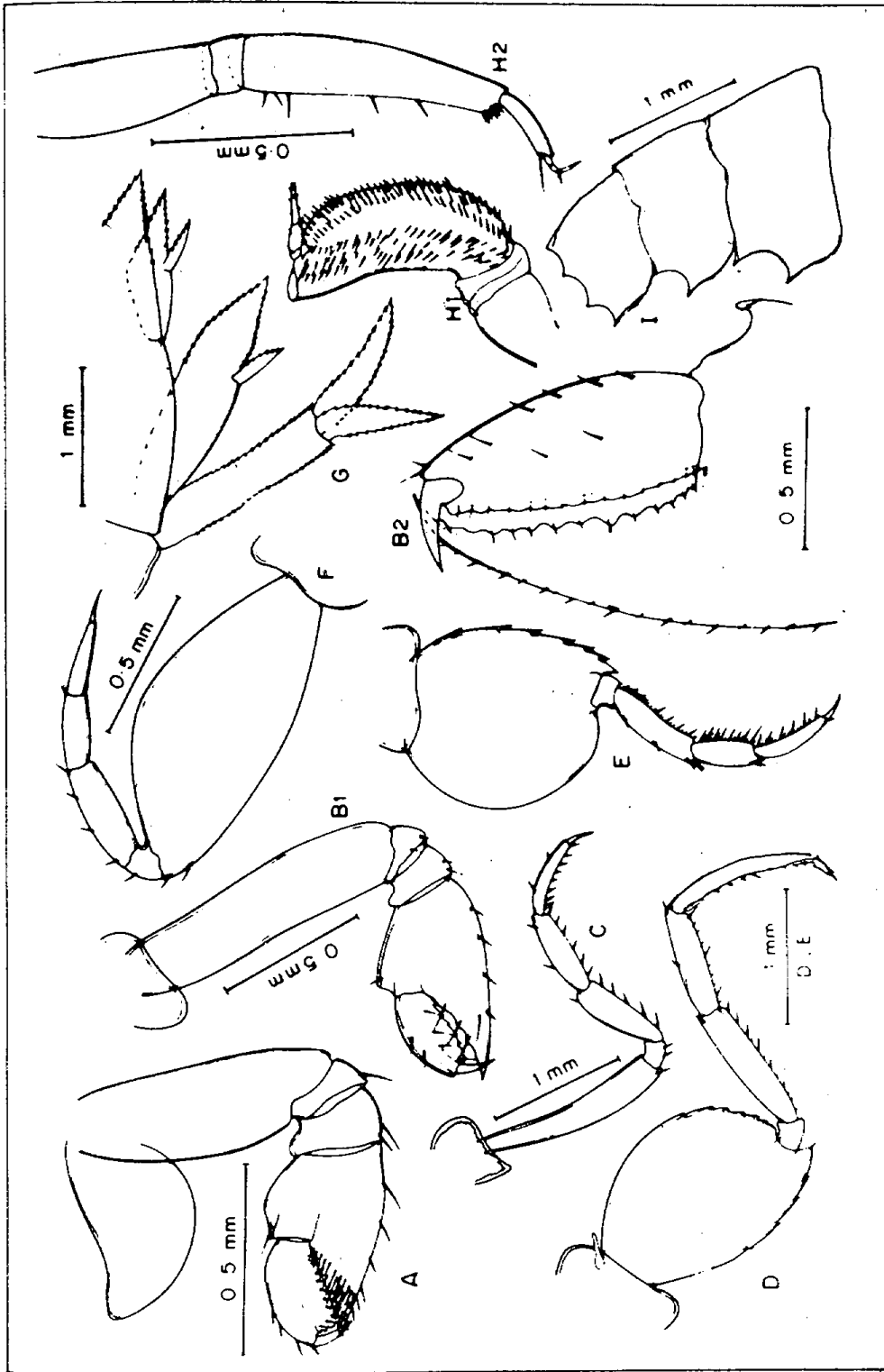


Plate 7. *Oxycephalus clausi* Bovllius (male) - Figs. A, B1 & B2. Pereopods 1 and 2, Figs. C to F. Pereopods 4 to 7, Fig. G. Uropods and telson, Fig. H1. Antenna 1, Fig. I. Abdomen. *Oxycephalus clausi* (female), Fig. H2. Antenna 1.

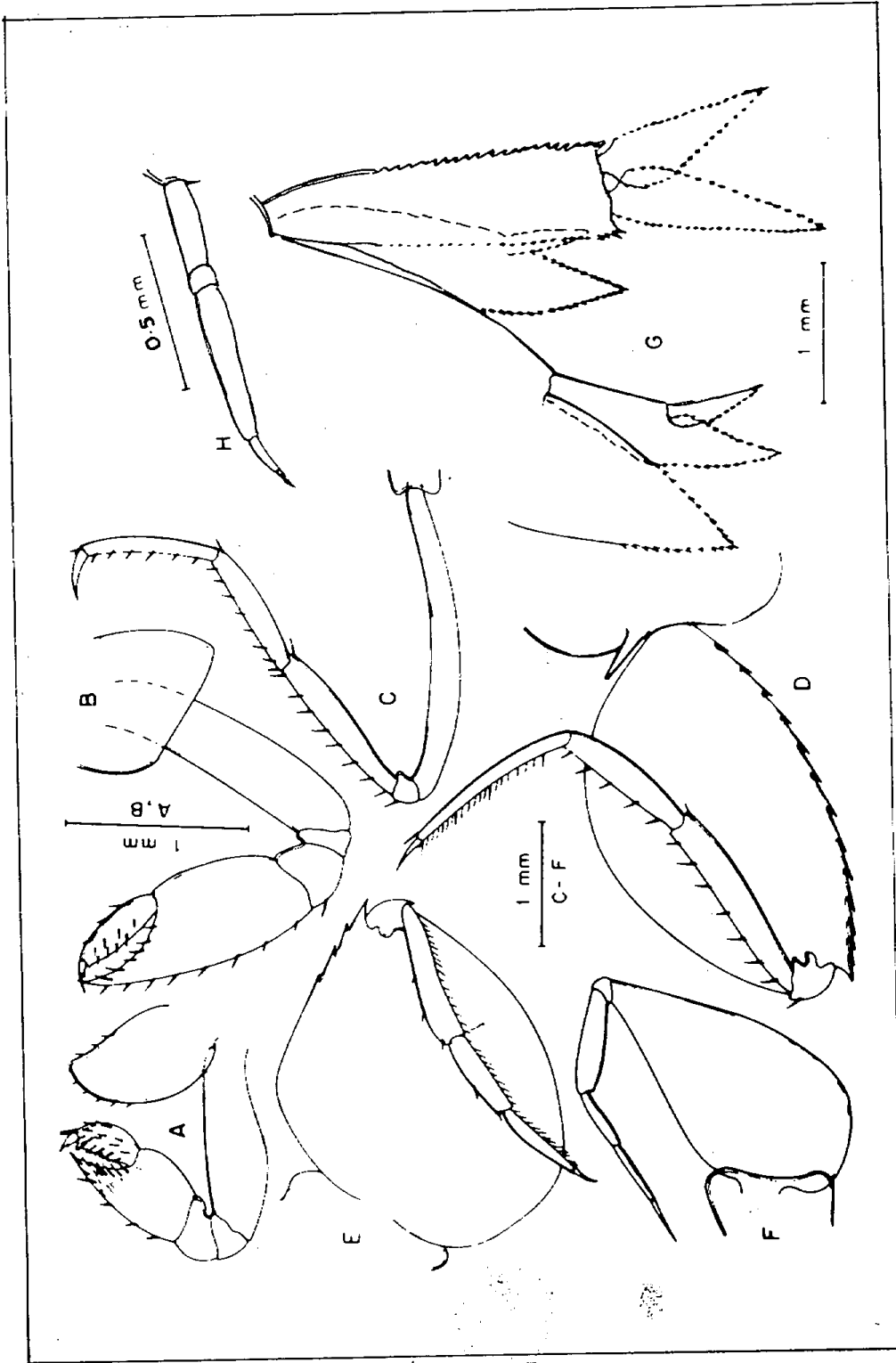


Plate 8. *Oxycephalus piscator* Milne-Edwards (female) - Figs. A and B. Pereopods 1 and 2, Figs. C to F. Pereopods 4 to 7, Fig. G. Uropods and telson, Fig. H. Antenna 1.

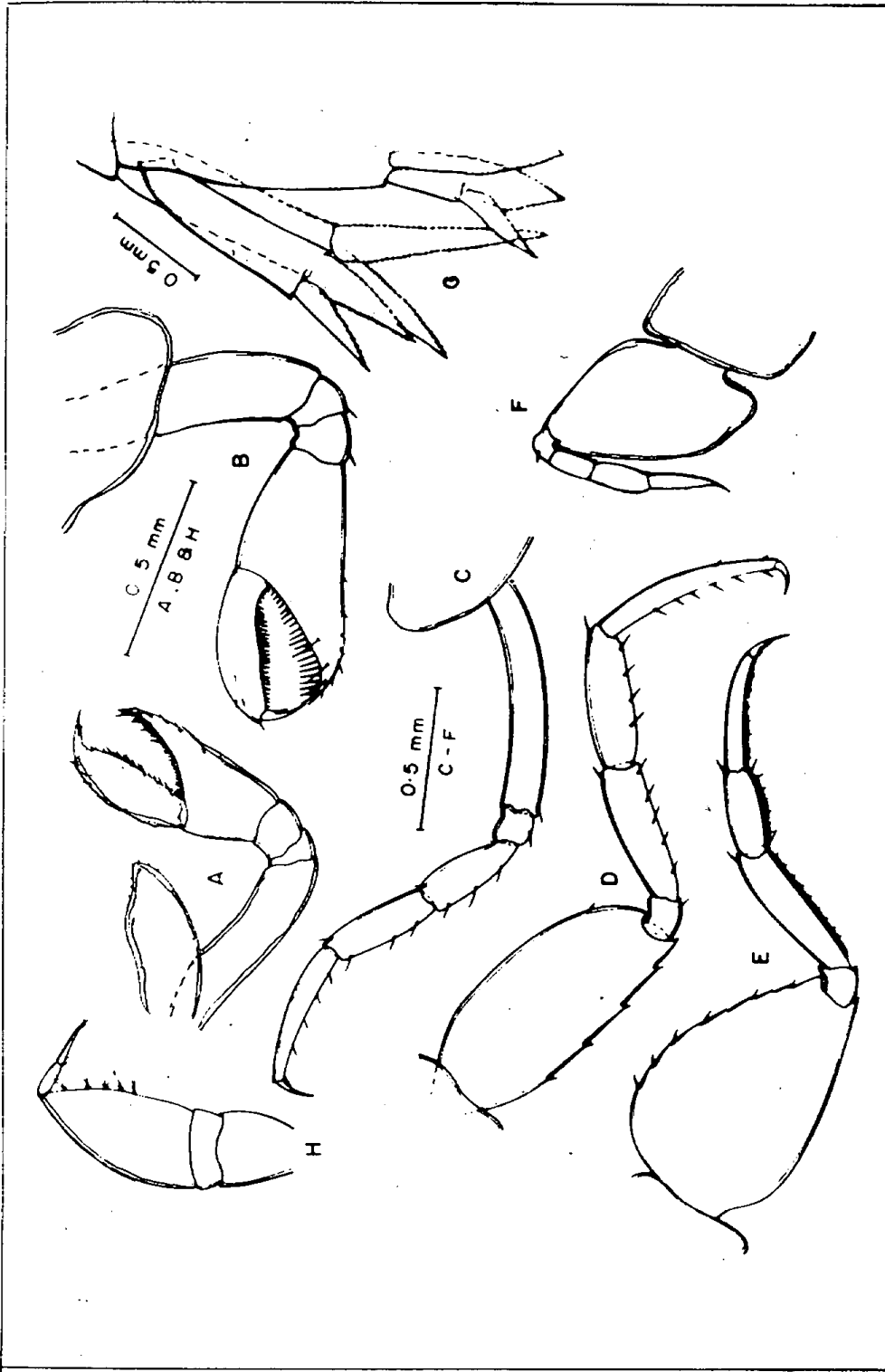


Plate 9. *Oxycephalus latirostris* Claus (female) – Figs. A and B. Pereopods 1 and 2, Figs. C to F. Pereopods 4 to 7, Fig. G. Uropods and telson, Fig. H. Antenna 1.

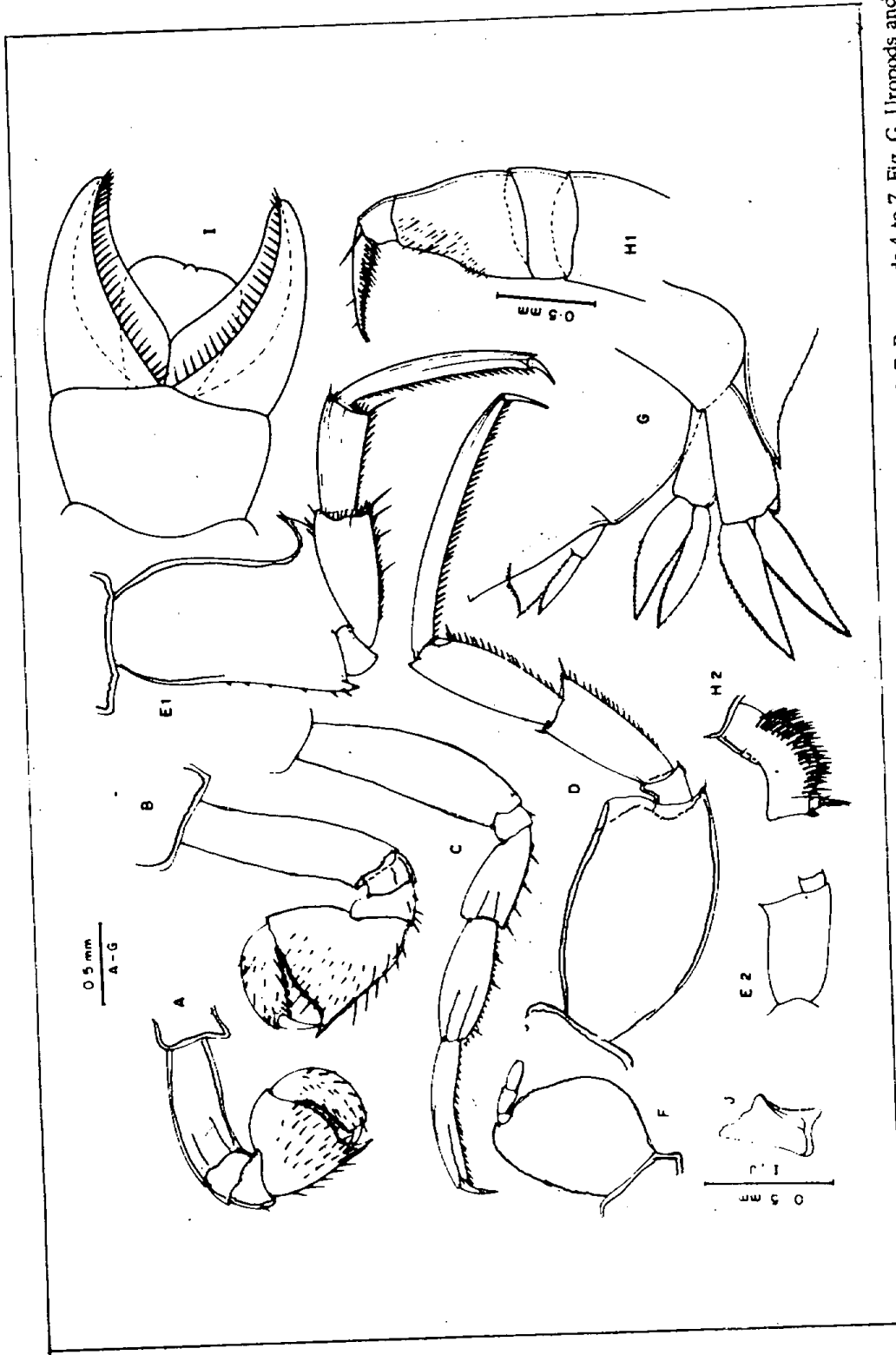


Plate 10. *Tullbergella cuspidata* Bovallius (female) - Figs. A and B. Pereopods 1 and 2, Figs. C to D, E1 & F. Pereopods 4 to 7, Fig. G. Uropods and telson, Fig. H. Antenna 1, Fig. I. Maxilliped, Fig. J. Mandible. *Tullbergella cuspidata* (male), Fig. E2. Basis of pereopod 6, Fig. H2. Antenna 1.

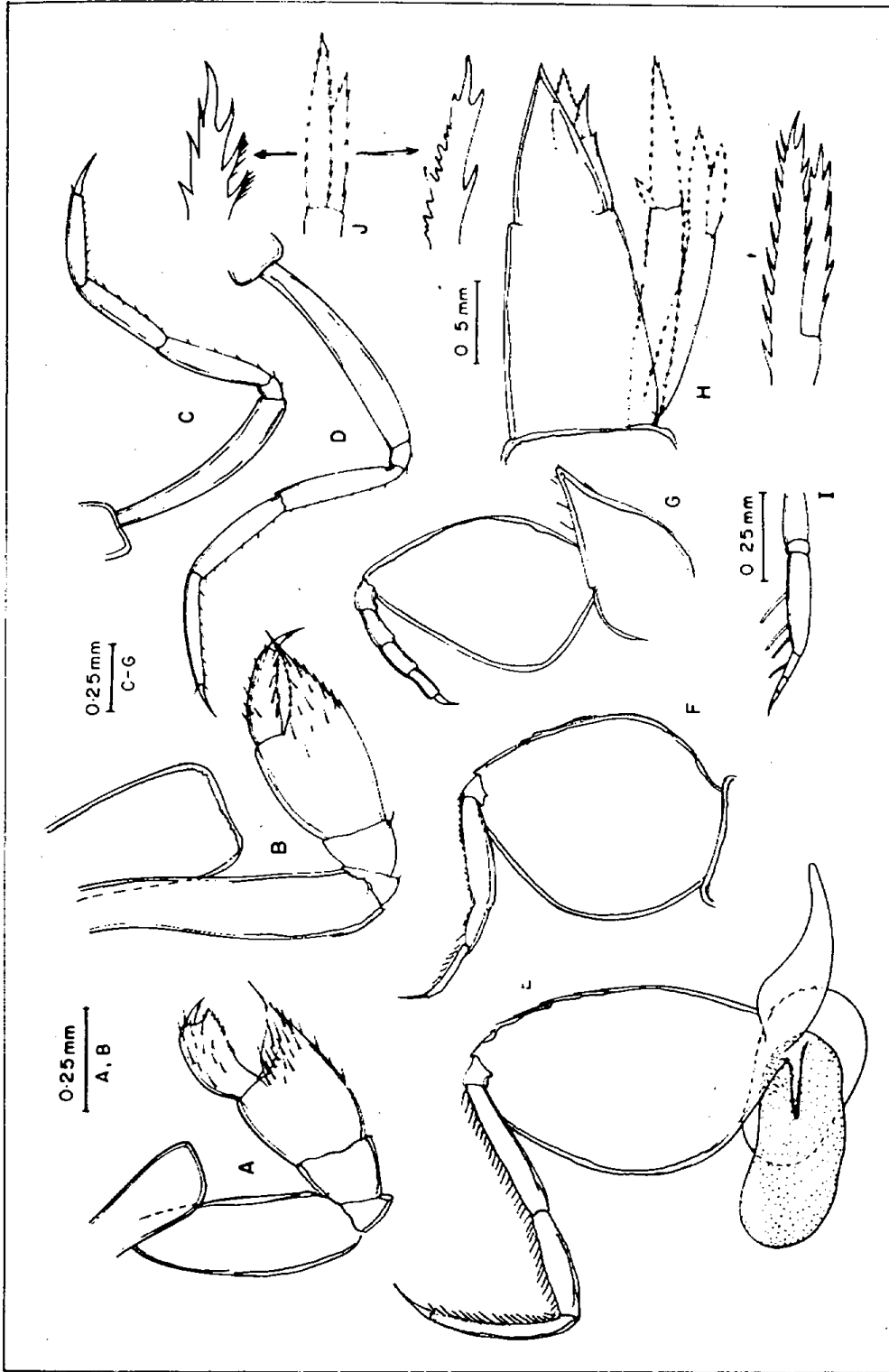


Plate 11. *Leptocotis tenuirostris* (Claus) female - Figs. A to G. Pereopods 1 to 7, Fig. H. Uropods and telson, Fig. I. Antenna 1. *Leptocotis tenuirostris* male - Fig. J. Uropod 2.

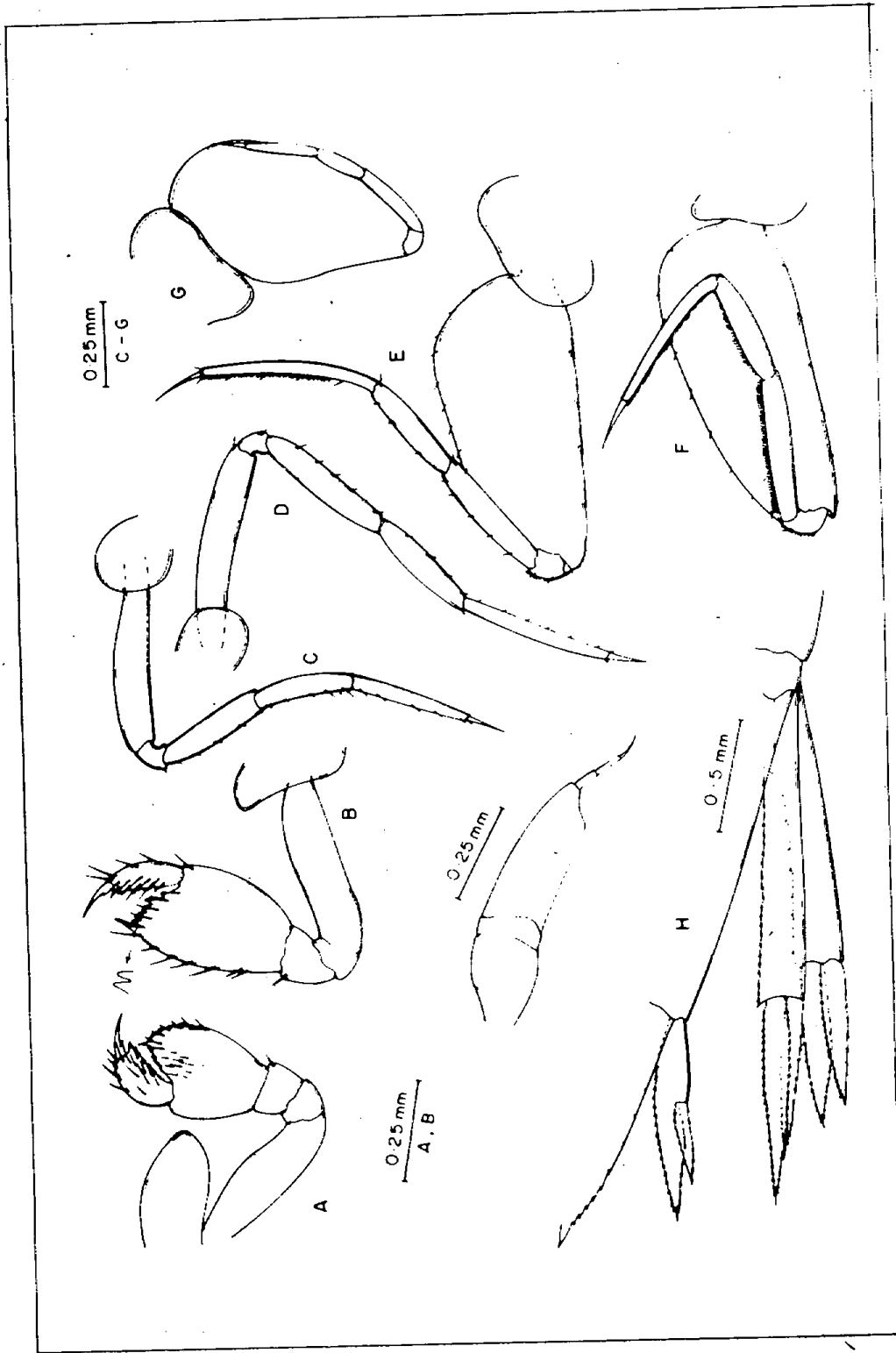


Plate 12. *Calamorrhynchus pellucidus* Streets (female) - Figs. A to G. Pereopods 1 to 7, Fig. H. Uropods and telson, Fig. I. Antenna 1.

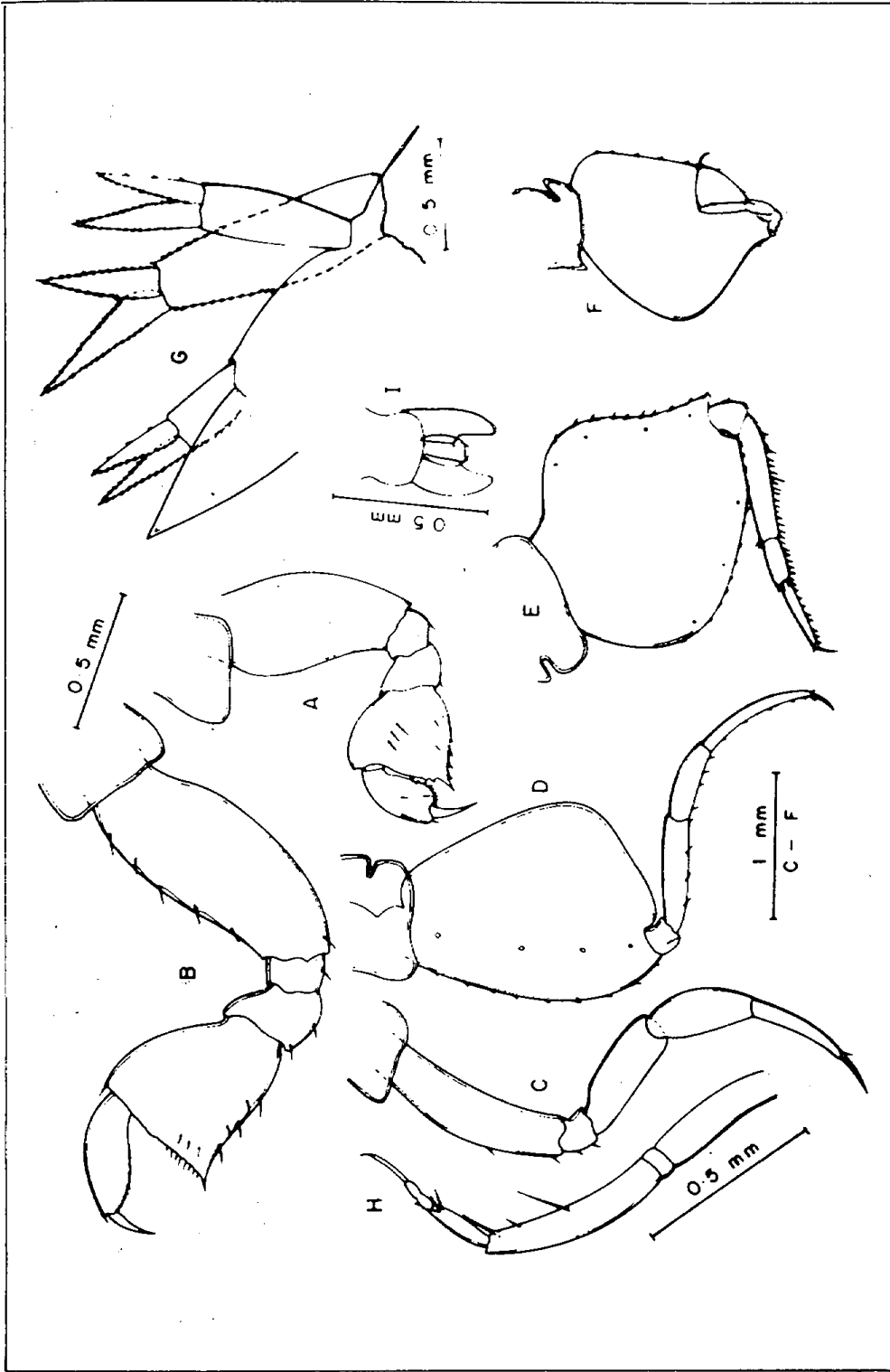


Plate 13. . . *Cranocephalus scleroticus* (Streets) female - Figs. A & B. Pereopods 1 and 2, Figs. C to F. Pereopods 4 to 7, Fig. G. Uropods and telson, Fig. H. Antenna 1, Fig. I. Maxilliped.

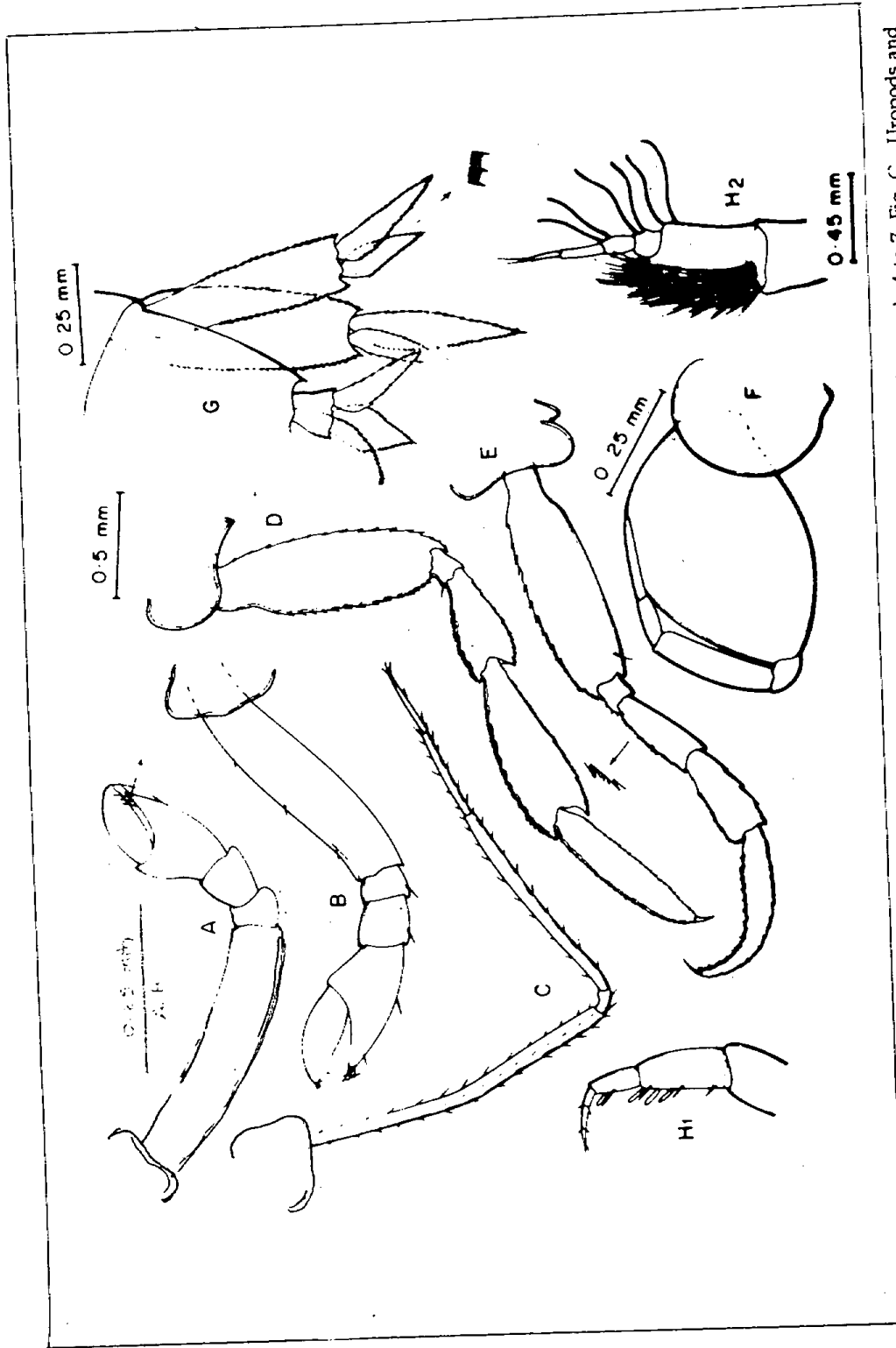


Plate 14. *Glossoscephalus milneedwardsi* Bovallius female - Figs. A & B. Pereopods 1 and 2, Figs. C to F. Pereopods 4 to 7, Fig. G. Uropods and telson, Fig. H1. Antenna 1. *Glossoscephalus milneedwardsi* male - Fig. H2. Antenna 1.

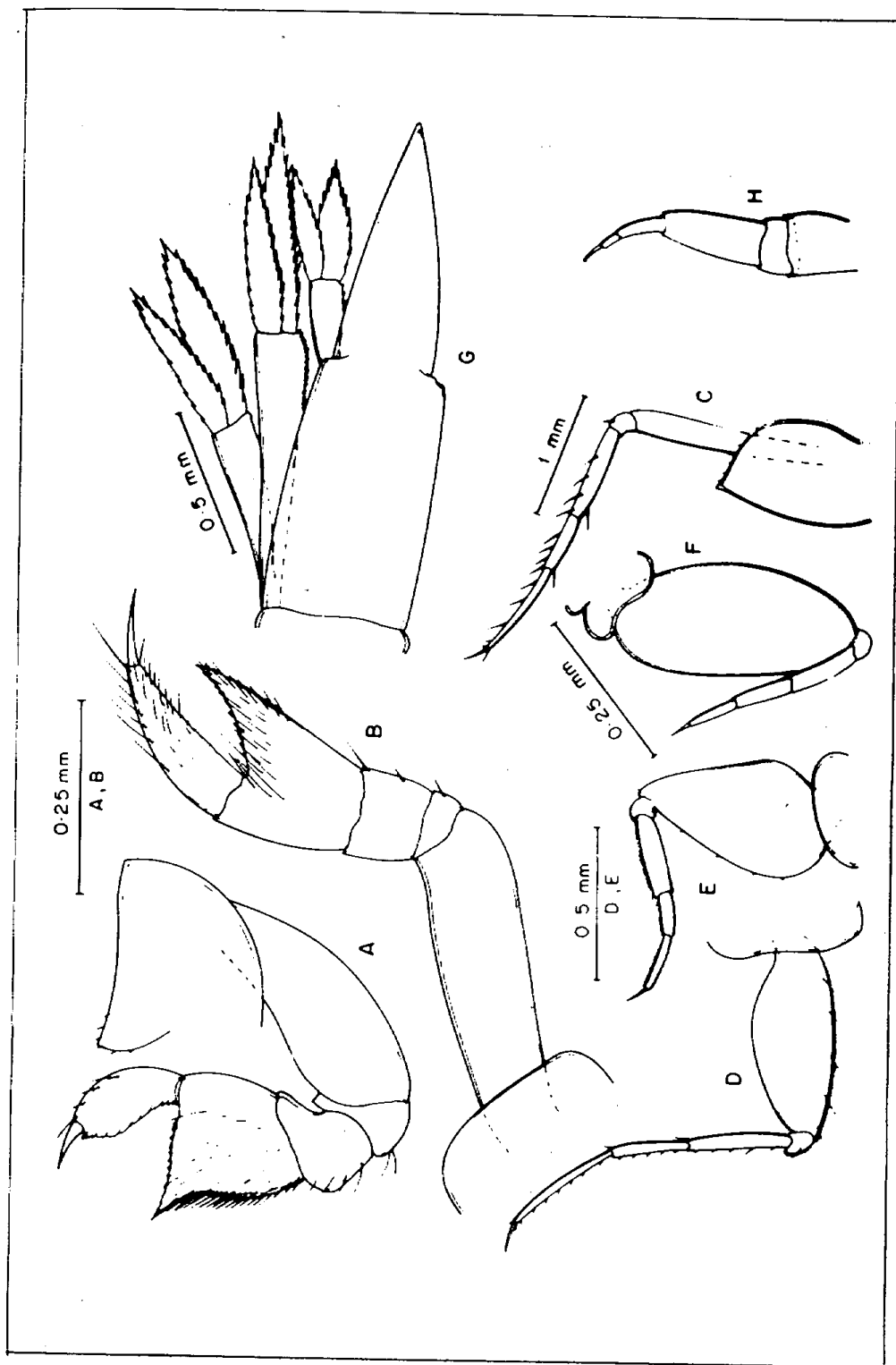


Plate 15. *Streetsia steenstrupi* (Bovallius) female - Figs. A & B. Pereopods 1 and 2, Figs. C to F. Pereopods 4 to 7, Fig. G. Uropods and telson, Fig. H. Antenna 1.

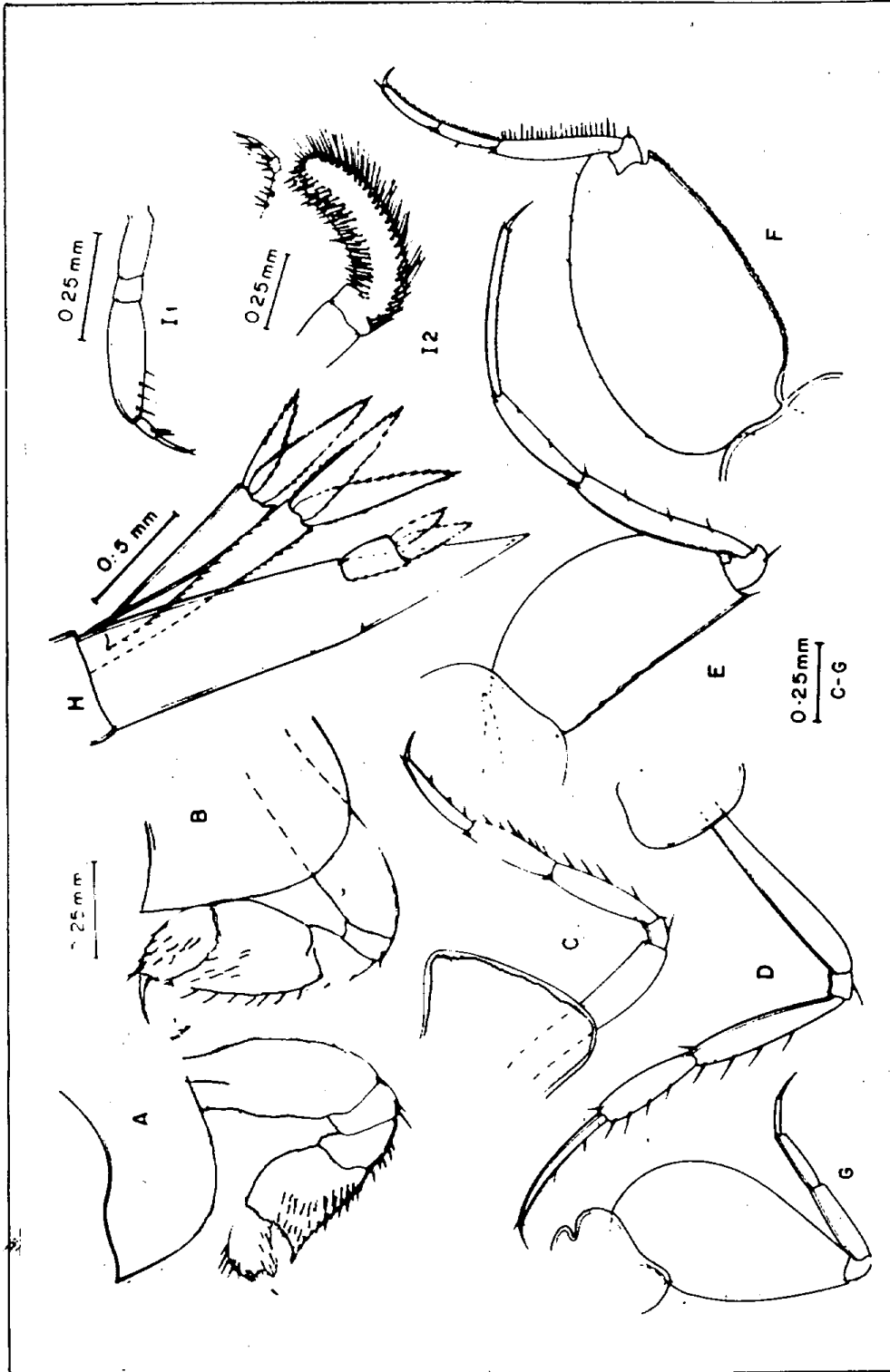


Plate 16. *Streetsia mindanaonis* (Stebbing) male - Figs. A to G. Pereopods 1 to 7, Fig. I1. Uropods and telson, Fig. I2. Antenna 1. *Streetsia mindanaonis* female - Fig. I1. Antenna 1.

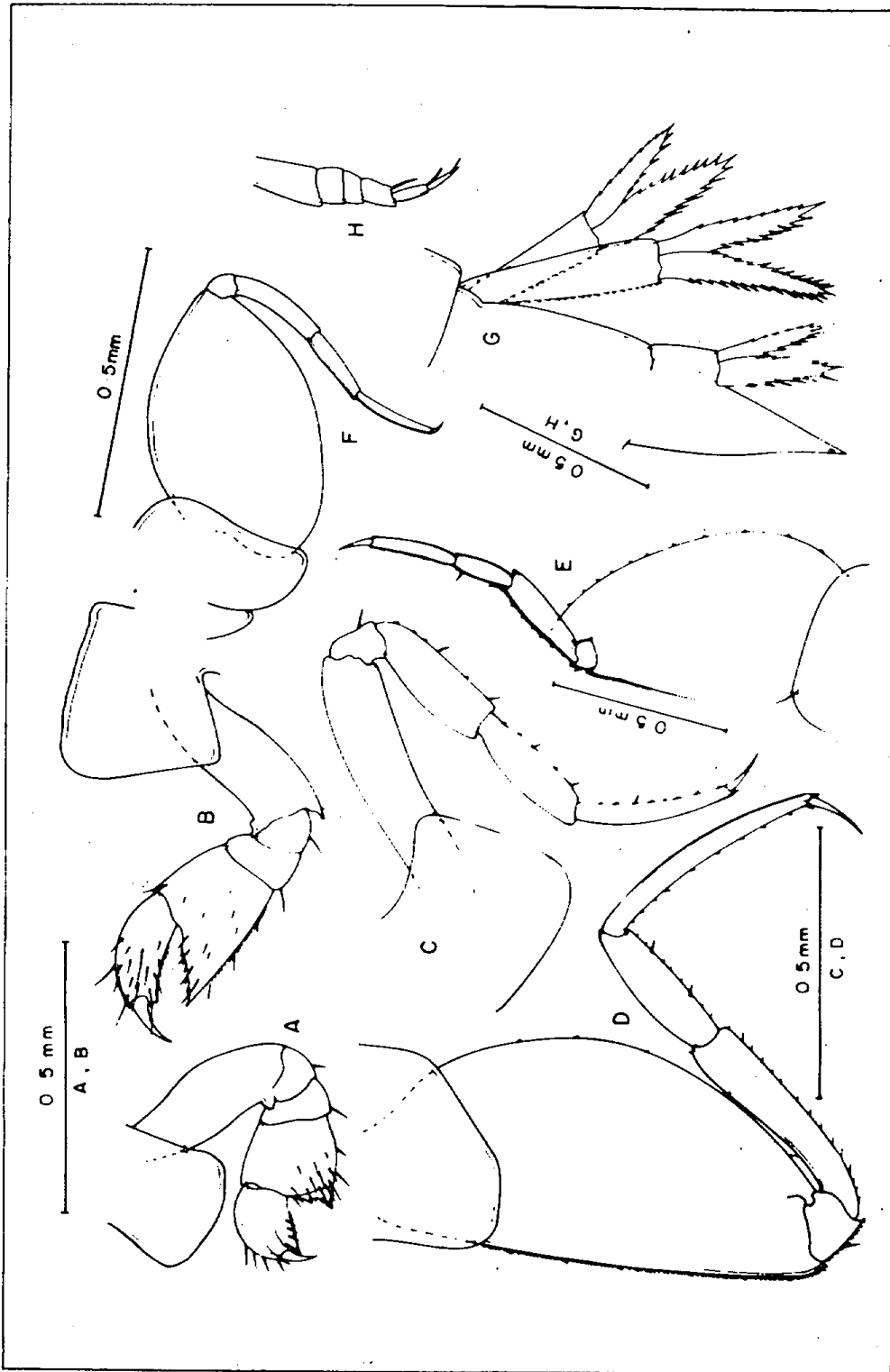


Plate 17. *Strepsia challengeri* Stebbing female - Figs. A & B. Pereopods 1 and 2, Figs. C to F. Pereopods 4 to 7, Fig. G. Uropods and telson, Fig. H. Antenna 1.

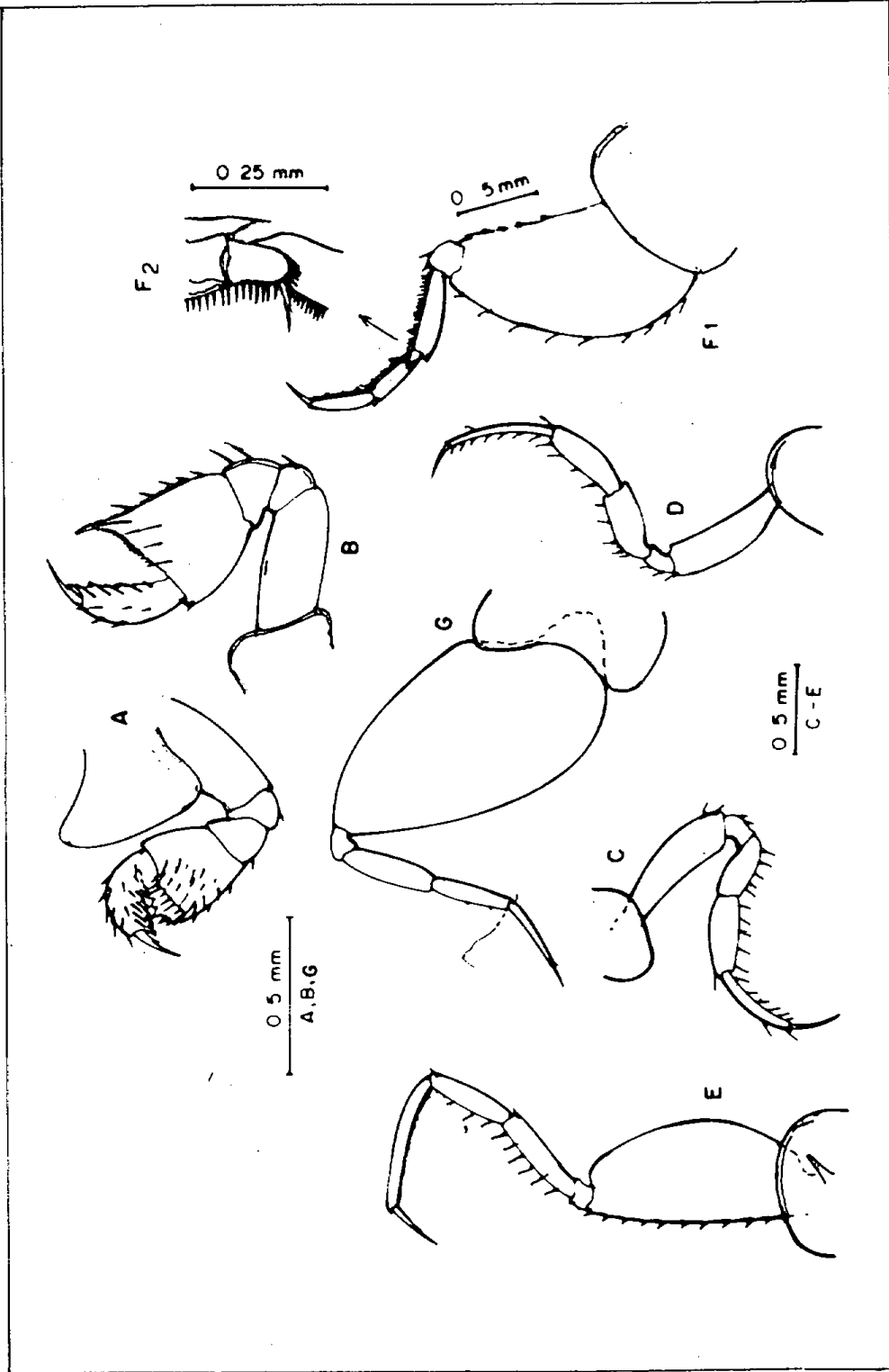


Plate 18a. *Strepsisia porcella* (Claus) male - Figs. A to E: Pereopods 1 to 5, Figs. F1 & F2: Pereopod 7.

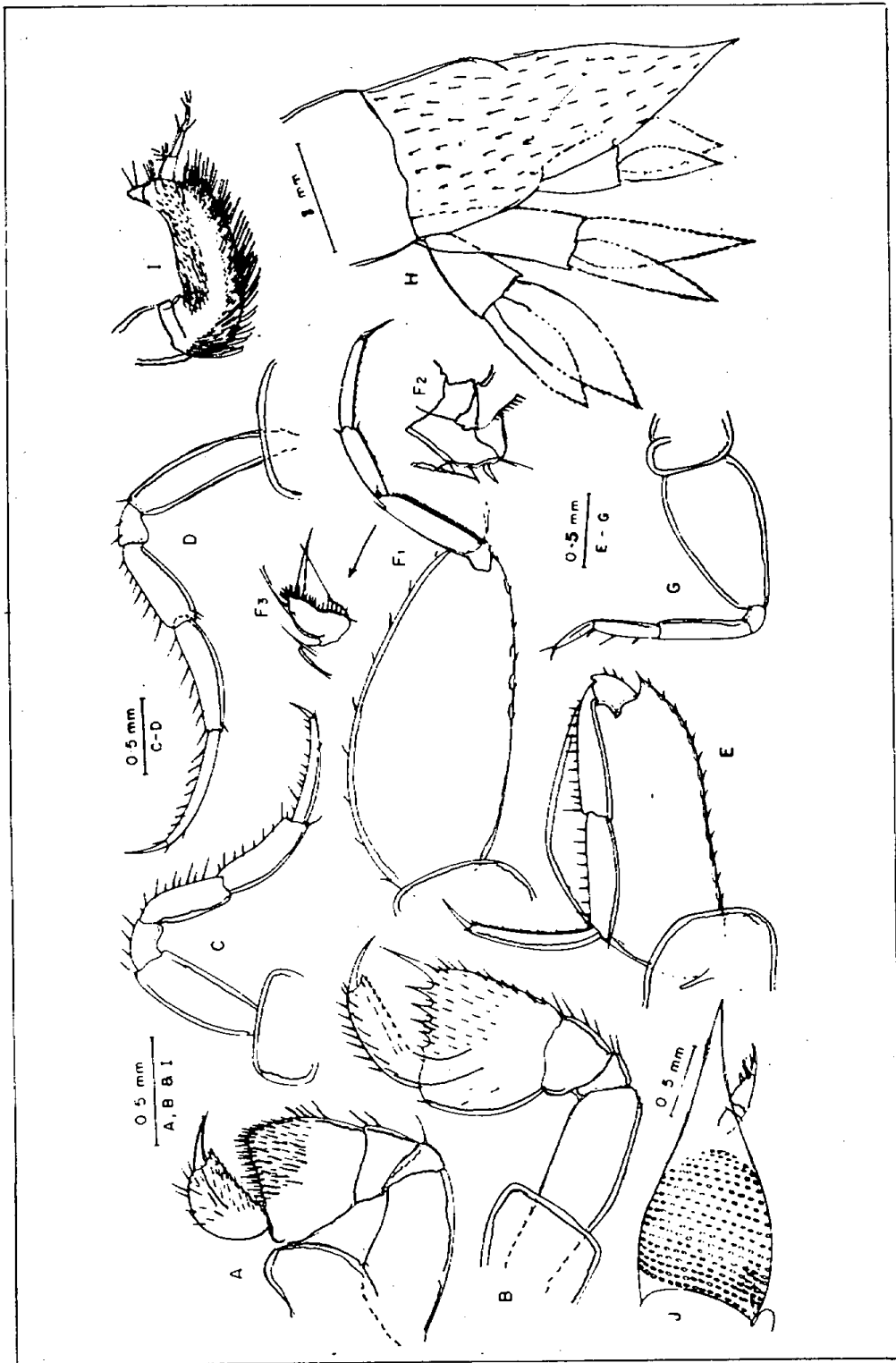


Plate 18b. *Strepsia porcella* (male - variety?) - Figs. A to E. Pereopods 1 to 5, Figs. F1 to F3. Pereopod 6, Fig. G. Pereopod 7, Fig. H. Uropods and telson, Fig. I. Antenna 1, Fig. J. Cephalon (juvenile male).

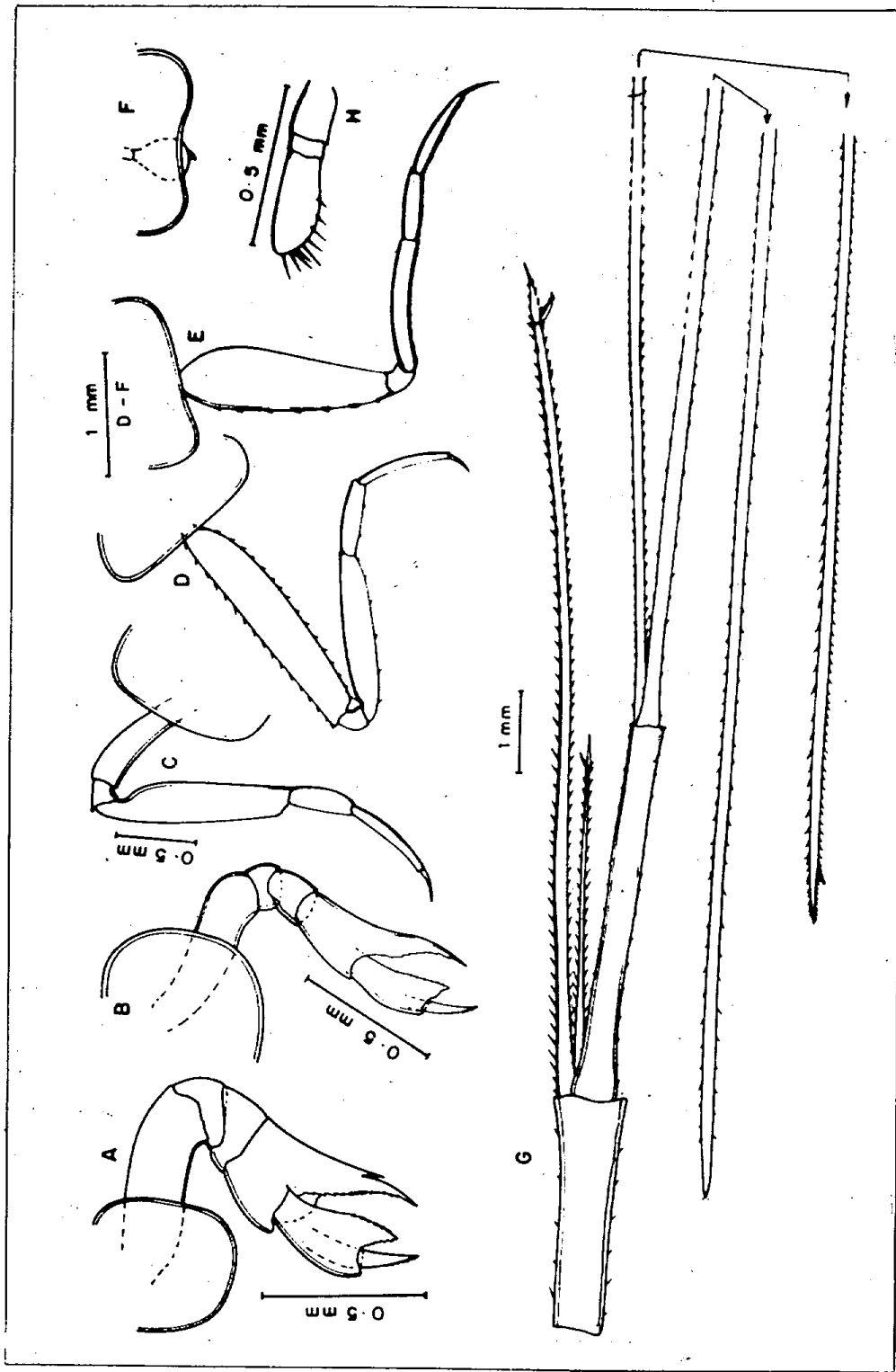


Plate 19. *Rhabdosoma armatum* (Milne-Edwards) female - Figs. A and B. Pereopods 1 and 2, Figs. C to F. Pereopods 4 to 7, Fig. G. Uropods and telson, Fig. H. Antenna 1.

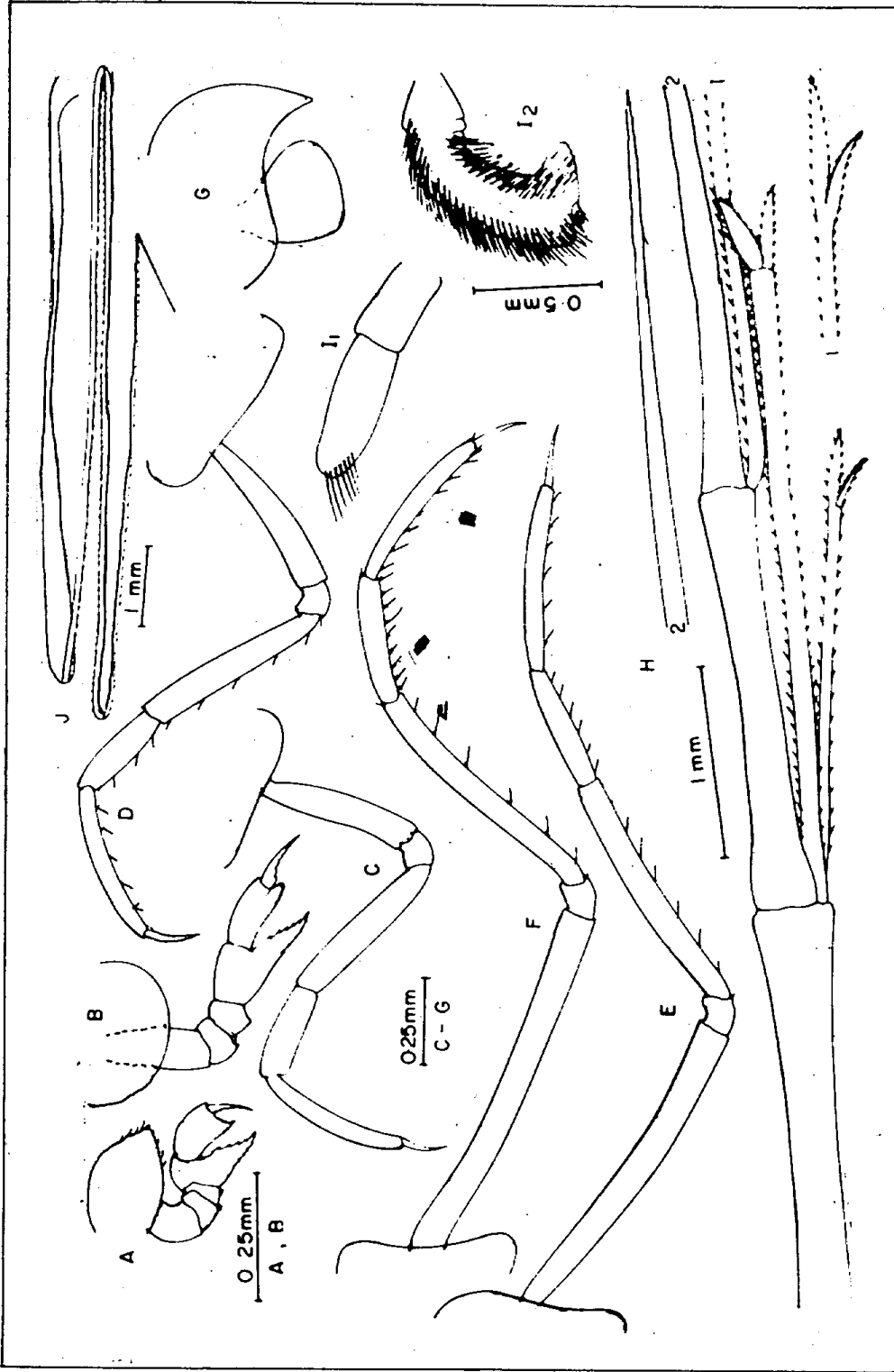


Plate 20. *Rhabdosoma whitei* Bate (female) - Figs. A to G. Pereopods 1 to 7, Fig. H. Uropods and telson, Fig. I. Antenna 1. *Rhabdosoma whitei* Bate (male) - Fig. J. Antenna 1, Fig. J. Antenna 2.

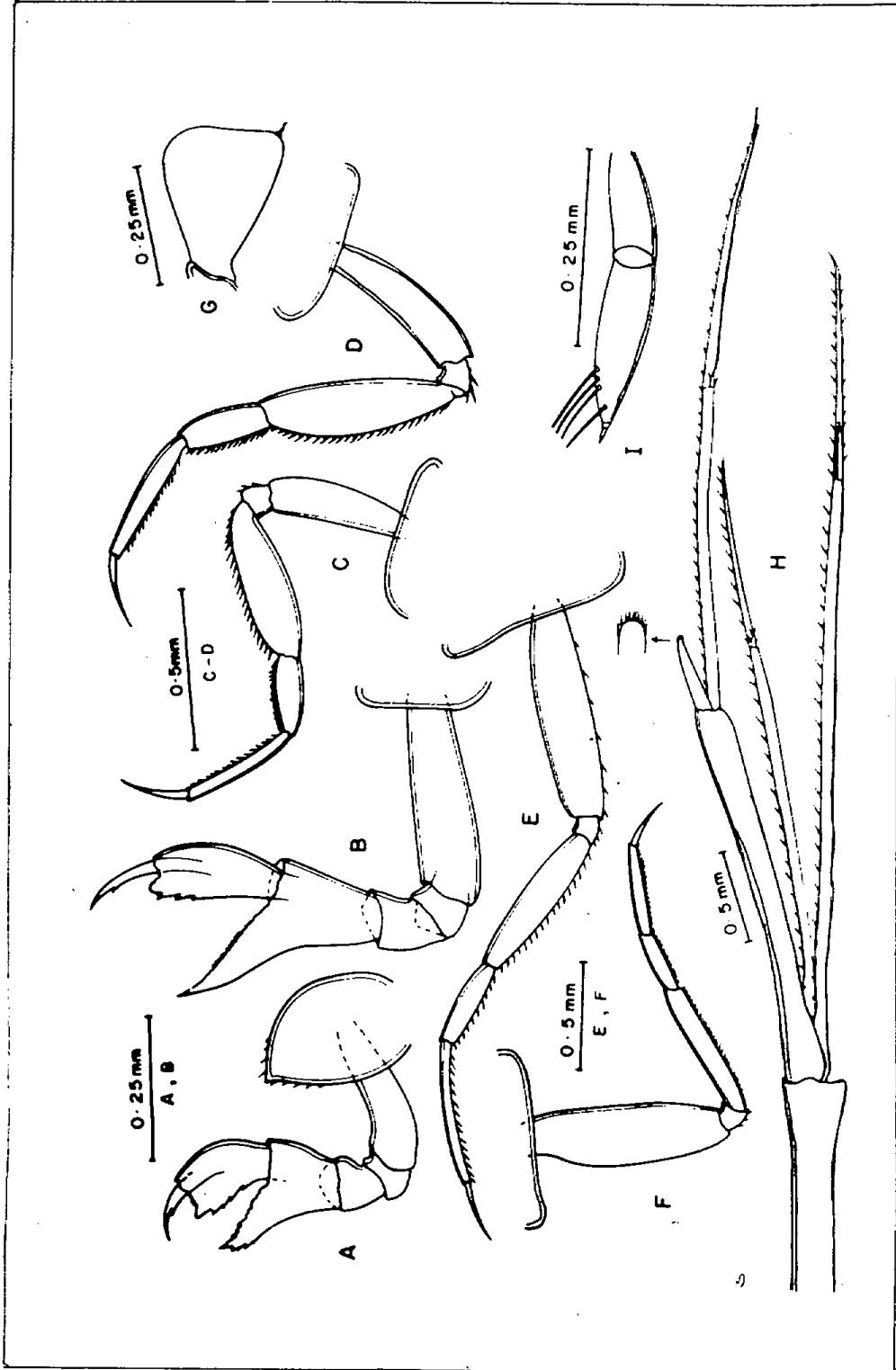


Plate 21. *Rhabdosoma brevicaudatum* Stebbing (female) -- Figs. A to G. Pereopod 1 to 7, Fig. H. Uropods and telson, Fig. I. Antenna 1.

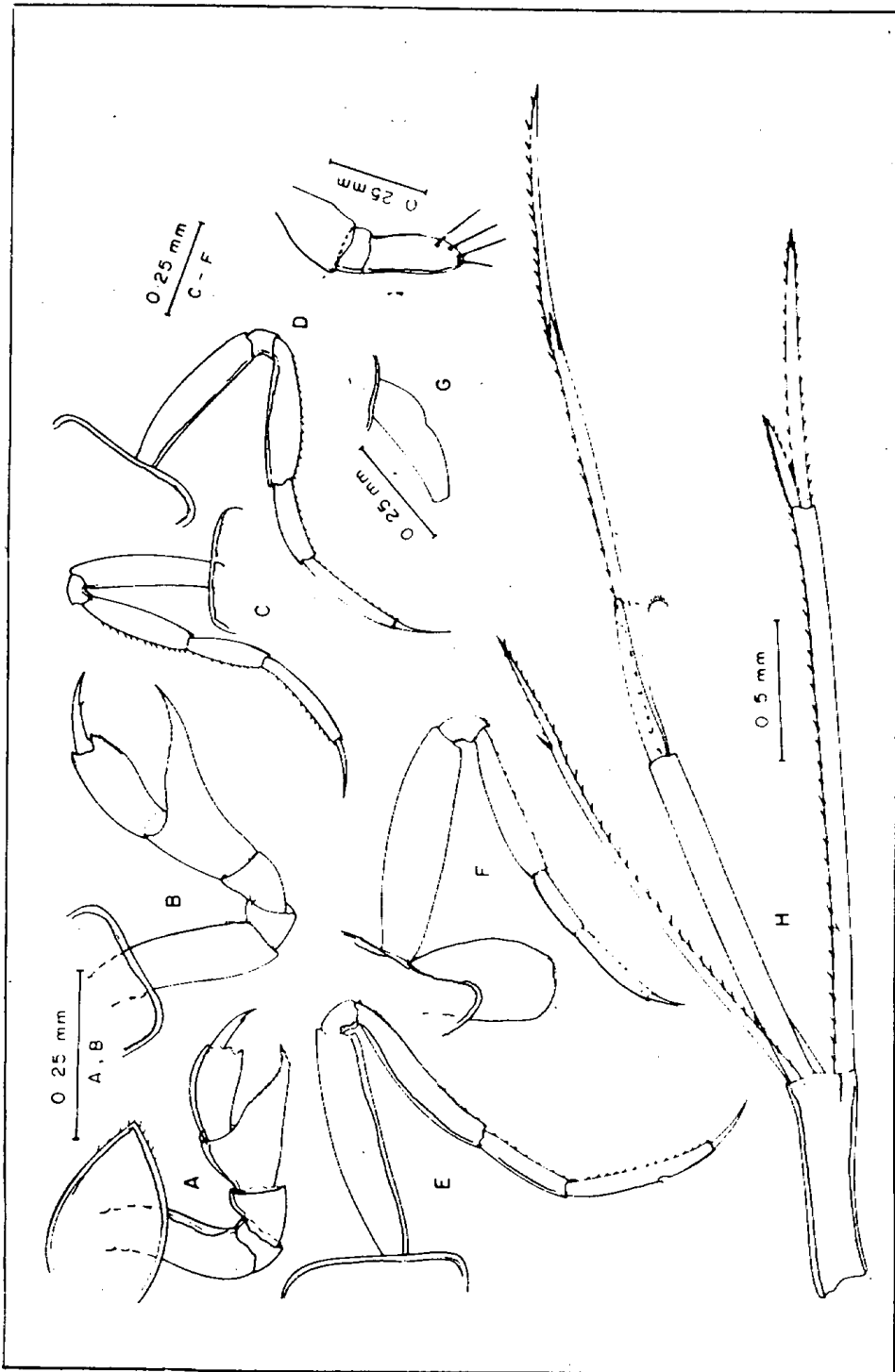


Plate 22. *Rhabdosoma minor* Fage (female) - Figs. A to G. Pereopods 1 to 7, Fig. H. Uropods and telson, Fig. I. Antenna 1.

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